Meeting Minutes of NPS BOA Subcommittee
April 24 – 25, 2019 – Monterey, CA

Board of Advisors Member Attendees: Dr. Maren Leed, Chair; Honorable William "Jim" Haynes; Dr. Katherine McGrady; Mr. Don Dixon; Dr. Gwen Hall; Ms. Sally Donnelly; Dr. Elisabeth Pate-Cornell; Honorable Kim Wincup (by VTC); MG John Kem, USA; Dr. Craig Hoffmann (for ONR); Col Todd Lyons, USMC (for TECOM); Mr. Dave Menzen and Ms. Beth Gracia (for CNP).

Other Attendees: Secretary of the Navy Honorable Richard V. Spencer; Office of the Undersecretary of Navy, Mr. Steve Deal; NPS President Dr. Ann Rondeau; NPS Provost Dr. Steve Lerman; NPS Chief of Staff CAPT John "Mike" Ward; Mr. Joe LoPiccolo; Ms. Kath Ashton; Dr. Ray Buettner; Professor Jeff Kline; Professor Brian Bingham; Professor Chris Manual; Mr. Rich Patterson; Ms. Karen Hargrove; Dr. Walter F. Jones, NIPO; CAPT Rich Wiley, NSAM; Dr. Tom Gibbons and Ms. Jaye Panza, Designated Federal Officials

Background: Secretary Spencer gave opening remarks on Wednesday, thanked the Board for their attendance, and encouraged the Board to continue to support the NPS President and Provost with their sage advice. Mr. Steve Deal provided an update on the Navy's Education for Seapower (E4S) Initiative. NPS President Rondeau provided the Board with an update briefing to include the "3R's" (Refocusing-Reconnecting-Rethinking). She indicated NPS priorities in Engagement, Research, and Facilities in support of NPS mission. Provost Steve Lerman provided the Board with the school's Strategic Planning and Governance Tracker outlining actions already taken and actions planned. NPS General Counsel, Ms. Kath Ashton then gave Board Members their annual ethics training. Board Members then had luncheon with NPS students. Professors Buettner, Kline, Bingham, and Manual provided an Innovation Update to the Board to include Emerging Technology Consortium; Sea Land Air Military Research (SLAMR); Consortium for Robotics and Unmanned Systems Education and Research (CRUSER); Warfare Innovation Continuum and AI. The day ended with a brief by NPS Foundation members.

The Board reconvened on Thursday morning after meeting with NPS Faculty over breakfast. Board Members participated in discussion until 11:00 and provided an outbrief to President Rondeau. The meeting was adjourned at 12noon.

Discussion: Chairman Leed and all Board Members expressed their active and engaged support and willingness to help NPS prepare for and shape the formation of the new Navy University System.

Dr. Pate-Cornell asked where NPS fits within the conceptual framework of the E4S. She asked how NPS will leverage and position itself with the work to come. How does the existing structure fit in the new concept? She suggested examining how the various

curricula relate to the interdisciplinary programs, in order to ensure that the most important topics are being effectively and efficiently covered. She cautioned against separating the science and technology from the strategy.

The Board expressed interest in helping NPS to think through the right organizational construct to best leverage its interactions with commercial industry.

The Board offered to assist NPS with the next WASC accreditation review (scheduled for 2020). Dr. Gwen Hall, with Dr. Susan Marquis, volunteered to review the items which the Board is charged with in their current Charter before the accreditation visit. These items include, but are not limited to Organizational Management, Curricula, Methods of Instruction and Facilities.

The Board noted that in conversations with NPS Faculty while there has been progress and NPS is more forward leaning with compliance, there are still some constraints.

Dr. Leed stressed that it is important for NPS to have an effective partnership with the NPS Foundation and within the private sector and industry. The Board is willing to help. Mr. Don Dixon indicated that he is willing to assist by serving as a conduit to the private sector.

The Board asked for President Rondeau to engage with them regularly on any specific things they might help with. President Rondeau suggested that in order to maintain communication and continuous one-on-one dialogue with the Board, a Microsoft "Teams" group site will be created. This will enable the Board to learn and be better prepared to have conversations and give advice on the most critical matters when they attend their meetings. And in future, to maximize the use of the Board's limited time, meetings will be focused specifically on the particular areas that NPS would like advice on and/or assistance with.

Chairman Leed asked if there were any additional comments from the members or the public. There were no additional comments and the DFO adjourned the meeting at 12noon.

The next meeting of the NPS Subcommittee will be held on October 16, 2019 in Arlington, VA.

Meeting Minutes certified by:

Maren Leed

Maren Leed, Board Chair

NPS Board of Advisors Semi-annual
Meeting Monterey, CA

April 24 – 25, 2019

AGENDA

Uniform: Khaki, or service equivalent/Military; Business Casual (jacket, tie optional)/Civilian for all events
Meeting Location: Herrmann Hall, Executive Briefing Center (EBC) unless otherwise stated

Action Officer/Designated Federal Official: Ms. Jaye Panza, (831) 402-0587

Confirmed board member attendees:
Maren Leed (Parent & NPS BOA Board Chair)
Sally Donnelly (Parent Board)
Gwen Hall (Parent Board)
Katherine McGrady (Parent Board)
Elisabeth Pate-Cornell (Parent Board & NPS BOA)
Don Dixon (NPS BOA)
Jim Haynes (NPS BOA)
John Kem (NPS BOA)
Dave Menzen (N1 Rep); Beth Gracia (N1 Rep)
Todd Lyons (TECOM Rep)
Craig Hoffman (ONR Rep)

Wednesday, April 24, 2019

7:30am – 8:00am	Refreshments, DFO Call to Order – Executive Briefing Center
8:00am – 8:05am	Welcome from NPS President – Ann Rondeau
8:05am – 8:15am	Introductions/Chairman Instructions – Board Chair, Maren Leed
8:15am – 9:00am	E4S Overview/Discussion – Steve Deal
9:00am – 9:30am	NPS President's Update – Ann Rondeau
9:30am – 9:45am	*Break (SecNav Departs)*
9:45am – 10:15am	NPS President's Update, continued – Ann Rondeau
10:15am – 11:15am	NPS Provost's Update – Steve Lerman
11:15am – 11:45am	Annual FACA Ethics Update – Kath Ashton
11:45am – 12:00noon	*Break (Transition to La Novia Room)*
12:00noon – 1:15pm	Luncheon with NPS Students – La Novia Room

Wednesday, April 24, 2019 *(Continued)*

1:15pm – 1:30pm	*Break (Transition back to EBC)*
1:30pm – 3:00pm	NPS Innovation Update – Buettner/Kline/Bingham/Manuel
3:00pm – 3:15pm	*Break*
3:15pm – 4:15pm	NPS Foundation Update – NPSF Director/Staff
4:15pm – 4:30pm	Chairman's Closing Day Remarks – Maren Leed
4:30pm – 6:00pm	Personal Time/Meeting Adjourns for the Day
6:00pm – 8:30pm	Dinner (No Host) – BOA Members and Presenters

Reminder of Annual Fall Meeting

October 16 – 17, 2019
Arlington, VA

NPS Board of Advisors Semi-Annual Meeting
Monterey, CA

April 24 – 25, 2019

AGENDA

Meeting Location: Herrmann Hall, Executive Briefing Center (EBC) unless otherwise stated

Thursday, April 25, 2019

7:30am – 9:00am	Breakfast with Faculty Members – La Novia Room/Herrmann Hall
9:00am – 9:15am	*Break, transition to Executive Briefing Center*
9:15am – 9:30am	Official Group Photo – Location TBD by Photographer
9:30am – 9:45am	*Break*
9:45am – 11:00am	Board Discussion – Chairman Leads
11:00	Outbrief with PNPS
12:00noon	Meeting Adjourned

Reminder of Annual Fall Meeting

October 16 – 17, 2019
Arlington, VA

Education for SEAPOWER

Secretary of the Navy Decisions

Secretary of the Navy Action Memorandum
https://www.navy.mil/strategic/E4SSECNAVMemo.pdf

Education for Seapower Report
https://www.navy.mil/strategic/E4SFinalReport.pdf

OPNAV N7
Director of Warfighting Development

- Strategic leader and Resource Sponsor of Navy Education, Experimentation, Wargaming, and Analytics
- Partnered with the Marine Deputy Commandant for Combat Development and Integration for greater naval capacity

Chief Learning Officer
for Naval Education (DoN Secretariat)

- Senior advisor to SECNAV, CNO, and CMC on all matters regarding naval education
- SECNAV personal representative for all education programs during the programming and budgeting process
- Strategic conduit to civilian academia and private sector for increased organizational learning
- Operational by June 1, 2019

Develop Naval University System

- Align and orchestrate academic efforts and resources of all naval education activities
- Enables common strategic intent, enabling integration of technology leadership and strategic studies

Centralized Educational System Technical Advisor

- Unification of design, development, acquisition and execution of all digital delivery systems
- Operational by October 1, 2019

Naval Community College

- First priority in establishing the Naval University System
- Accredited associate's degrees for our enlisted in academic fields that directly impact our National Defense Strategy
- Uses universal transcripts and all resources of the Naval University System (NUS), along with civilian institutions and partners
- Operational by January 1, 2021

Naval Educational Strategy

- Comprehensive strategy with unified intent encompassing wargaming, team learning and continual learning
- Comprehensive curriculum review coordinated with OPNAV N7 and DC CDI
- Recapitalize and refocus on S&T research within the NUS and expand private/public partnerships
- Due by December 31, 2019

"I am convinced, now more than ever before that the intellectual development of our naval leaders is the most critical warfighting capability for our national security" — ***Secretary of the Navy, Richard V. Spencer***

A DESIGN FOR MAINTAINING MARITIME SUPERIORITY

Version 2.0

December 2018

MISSION

The United States Navy will be ready to conduct prompt and sustained combat incident to operations at sea. Our Navy will protect America from attack, promote American prosperity, and preserve America's strategic influence. U.S. naval operations—from the seafloor to space, from the blue water to the littorals, and in the information domain—will deter aggression and enable resolution of crises on terms acceptable to the United States and our allies and partners. If deterrence fails, the Navy will conduct decisive combat operations to defeat any enemy.

Why Design 2.0? What has changed?

A Design for Maintaining Maritime Superiority, Version 1.0, released in January 2016 (Design 1.0), was explicitly intended to be assessed and, if necessary, revised to stay relevant. This update reflects the first reevaluation. There were three reasons we undertook this assessment.

The first reason was to ensure our plans were aligned with updated strategic guidance. President Trump issued a new National Security Strategy (NSS) in December 2017, and Secretary of Defense Mattis issued a supporting National Defense Strategy (NDS) in January 2018. A new National Military Strategy (NMS) will follow. These documents orient national security objectives more firmly toward great power competition. While Design 1.0 highlighted that competition, these new strategies demand that we reevaluate our current heading to ensure it maximizes the Navy's contribution to the objectives they set forth.

The second factor driving our assessment was to account for progress that has been made since Design 1.0 was issued. We have accomplished many of the tasks it articulated, and have advanced many more—it's now time to define what comes next.

The third motivation was to validate Design 1.0's characterization of the strategic environment, to check our assumptions.

Design 2.0 reflects the results of this assessment. Overall, the structure of Design 1.0 proved sound: the characterization of the security environment, the Core Attributes, and the Lines of Effort (LOEs) remain valid and relevant. Readers should recognize the new version as a continuation of Design 1.0; a major course change was not required.

There are, however, some adjustments. Design 2.0 provides updated operational guidance to link strategy with execution. The "Achieve High Velocity Learning" Green LOE has been tightened, focusing on outcomes rather than processes. The tasks supporting all of the LOEs have been updated to establish new and ambitious goals that will spur us to accelerate our progress. This is an all-hands effort.

Like Design 1.0, Design 2.0 establishes the framework to guide our behaviors and investments this year and in the years to come. More specific details about programs and funding adjustments will be reflected in our annual budget documents.

Security Environment

The United States Navy will aggressively compete, harnessing three forces that continue to shape our modern security environment:

- The increasing use of the maritime domain—the oceans, seas, waterways, and seafloor.
- The rise of global information systems, especially the role of data in decision making.
- The increasing rate of technological creation and adoption.

It has been decades since we last competed for sea control, sea lines of communication, access to world markets, and diplomatic partnerships. Much has changed since we last competed. **We will adapt to this reality and respond with urgency.**

The future of the United States depends on the Navy's ability to rise to this challenge. As discussed in the 2018 NDS, China and Russia are deploying all elements of their national power to achieve their global ambitions. In addition, our competitors have been studying our methods over the past 20 years. In many cases, they are gaining a competitive advantage and exploiting our vulnerabilities. Their activity suggests that Eurasia could once again be dominated by rivals of the United States, our allies, and partners. China and Russia seek to accumulate power at America's expense and may imperil the diplomatic, economic, and military bonds that link the United States to its allies and partners. While rarely rising to the level of conflict, Chinese and Russian actions are frequently confrontational. And these actions are not only directed at the United States: China and Russia seek to redefine the norms of the entire international system on terms more favorable to themselves.

This global competition extends to the maritime domain, including the seabed, and importantly, to newer domains: space and cyber. The new security environment is shaped by the following facts:

- Our competitive advantage has shrunk and in some areas, is gone altogether. We do not have the margins we once enjoyed.
- Twenty-first century competition takes place over a wide range of conceptual approaches—from peaceful competition to violent conflict. This competition involves all elements of national power.
- The competitive space has expanded to new domains, fueled by technological advances as well as the amount and availability of information.
- The pace of competition has accelerated in many areas, achieving exponential and disruptive rates of change. As this pace drives yet more unpredictability, the future is becoming increasingly uncertain. Identifying mid- and near-term outcomes will become more challenging.
- We cannot become overwhelmed by the blistering pace. This is a long-term competition. We must think in terms of infinite, instead of finite, time frames. Only sustainable approaches will prevail.

Our Response

To recapture strategic momentum and grow our advantages in the maritime domain, the U.S. Navy will act with a sense of urgency and creativity. Three central themes will guide our response:

1. The Navy will become more agile.
The Navy will develop concepts and technology to "expand the competitive space" as the 2018 NDS directs. With the Joint Force, we will restore agility—conceptual, geographic, and technological—to impose cost on our adversaries across the competition-conflict spectrum. Our efforts will be prioritized to exploit our strengths against our competitors' weaknesses. We will leverage the creativity and expertise of the Fleet.

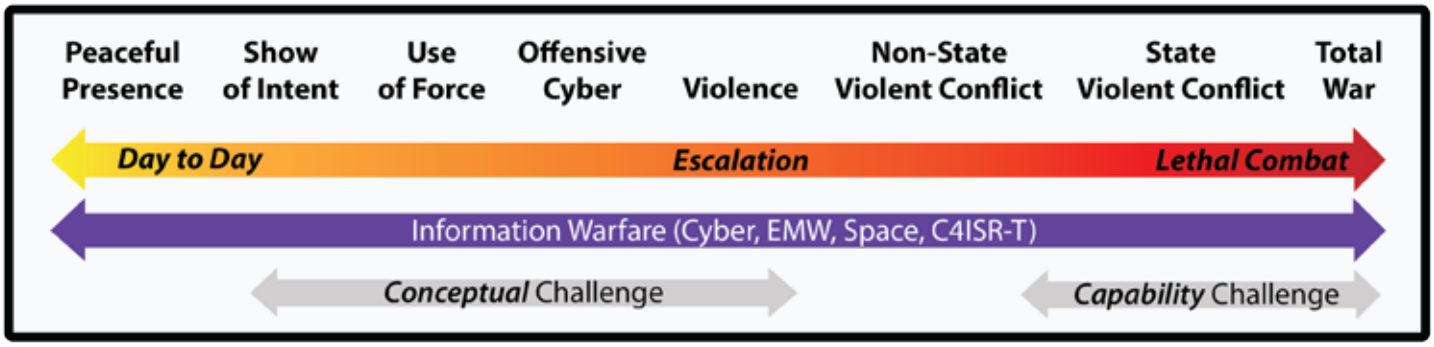


Figure 1: The Competition-Conflict Spectrum for the Military Dimension of Power. Navy concepts and capabilities should improve our ability to respond to an adversary across the spectrum from day to day operations, to escalation, to lethal combat.

It is essential to develop options for the full spectrum of competition. Naval concepts and capability development will appreciate that this spectrum is fluid from peaceful presence to total war. Our competitors see the landscape as continuous; we will do so as well. Restoring agility means realizing that operating in the spectrum can be non-linear and simultaneous—our adversaries can operate at different levels of intensity in different domains at the same time. We will not let rigid thinking or self-imposed structures prevent us from operating in creative ways.

2. The Navy will compete in ways that are sustainable.
Overextension in the short- and long-term—the pursuit of ends that are beyond the ways and means of the force—is self-defeating. Over the long timelines that characterize the current competition, the Navy will be ready to fire effectively first, but also be able to defend and return fire. We will aim to act as early as possible to de-escalate any crisis on our terms and be ready for the next move. This will require that we sustain the fight with the logistics capabilities needed to refuel, rearm, resupply, and repair our operational forces.

3. The Navy, fighting with the Joint Force and with our allies and partners, will control the high end of maritime conflict.
The Navy is a key enabler of the Joint Force's ability to prevent China and Russia from controlling the Eurasian rimland and its adjacent seas. We will protect the sea lines of communication between the United States and its allies and partners.

Four Core Attributes

The current security environment demands that the Navy be prepared at all levels for decentralized operations, guided by commander's intent. This operating style is reliant on clear understanding up, down, and across the chain of command. It is also underpinned by trust and confidence created by demonstrating character and competence. Our actions must always reflect our core values of Honor, Courage, and Commitment. Four Core Attributes define our professional identity and serve as guiding criteria for our decisions and actions. Leaders at all levels must continue to educate and focus our Sailors through example, education, and dialogue.

INTEGRITY: Our conduct must always be upright and honorable. Our behaviors as individuals, as teams, and as an organization must align with our values as a profession. We will actively strengthen our resolve to act consistently with our values.

ACCOUNTABILITY: We are a mission-focused force. We achieve and maintain high standards. Our actions support our strategy. We clearly define the problem we are trying to solve and the outcomes to which we will hold ourselves accountable. In execution, we honestly assess our progress and adjust as required. We are our own toughest critic. Our leaders in command recognize the unique trust and confidence placed in them to operate independently. This is a profound responsibility.

INITIATIVE: We strive to accomplish what needs to be done, even in the absence of direct orders. Leaders at all levels take ownership and act to the limit of their authorities. We foster a questioning attitude, and we encourage everyone to look at new ideas with an open mind. Our most junior teammate may have the best idea; we must be open to capturing and implementing that idea.

TOUGHNESS: We can take a hit and keep going, tapping all sources of strength and resilience. Through rigorous training for operations and combat, the fighting spirit of our people, and the steadfast support of our families, we maintain a culture of warfighting excellence and hone our warfighting ethos. We don't give up the ship, we never give up on our shipmates, and we never give up on ourselves. We are never out of the fight.

Four Lines of Effort

As in Design 1.0, Design 2.0 is structured along four LOEs that are interrelated and mutually supporting. Together, the LOEs and their supporting tasks define our priority efforts.

LOE Blue: Strengthen Naval Power at and from the Sea

1. Strengthen the undersea leg of our nation's strategic deterrent. Be ready to deploy USS COLUMBIA (SSBN 826) as quickly as possible—beating the current schedule—in order to preserve our ability to defeat the threat. Refresh and fortify the nuclear command and control system. Develop the nuclear capabilities directed in the Nuclear Posture Review.

2. Build SECOND Fleet to full operational capability by 2019. Commander, SECOND Fleet (C2F) and Commander, THIRD Fleet (C3F) will be expeditionary: they will have the capability to command and control their forces while deployed forward. In order to retain the capability for force generation while C2F and/or C3F are deployed, Carrier Strike Group (CSG)-4 and CSG-15 will develop the capability and capacity to generate forces, reporting directly to Commander, Fleet Forces Command (CFFC) and Commander, Pacific Fleet (CPF), respectively.

3. Continue to reinvigorate and strengthen the warfighting culture of the Navy through execution of the Comprehensive Review and Strategic Readiness Review program. In support of this, make any necessary adjustments to the command and control structure for the talent and capacity resident in the Afloat Training Groups. Aim to assign the capacity for training and certification to the accountable commander.

4. Establish data-driven decisions as a foundation for achieving readiness in our warfighting enterprises. Lead Type Commands (TYCOMs), supported by Systems Commands (SYSCOMs), Budget Submitting Offices, and higher echelons will develop and maintain authoritative and accessible data for decision-quality information. We will strive to reduce cycle time in all aspects of the organization.

5. Refine, through execution and iteration, and in concert with the Joint Force, the Dynamic Force Employment (DFE) concept. Use DFE creatively to impose costs on competitors and make our Navy stronger, more ready, and sustainable. Ensure Navy's development of DFE concepts is aligned with the Joint Force to achieve maximum effects.

6. Continue to mature the Distributed Maritime Operations (DMO) concept and key supporting concepts. Design the Large Scale Exercise (LSE) 2020 to test the effectiveness of DMO. LSE 2020 must include a plan to incorporate feedback and advance concepts in follow-on wargames, experiments, and exercises, and demonstrate significant advances in subsequent LSE events.

7. Posture logistics capability ashore and at sea in ways that allow the fleet to operate globally, at a pace that can be sustained over time. Assess and develop options for improved ability and resilience to refuel, rearm, resupply, and repair.

8. Invigorate and continually reinforce our culture of mission command, which is an enduring advantage against any adversary. As stated in the Charge of Command, the ability of Commanding Officers to execute commander's intent, using their initiative and creativity to fight, will enable victory.

9. As stated in "One Navy Team," we will leverage inclusion and diversity within our teams to make better decisions. This will make us more creative, more competitive, and more operationally effective.

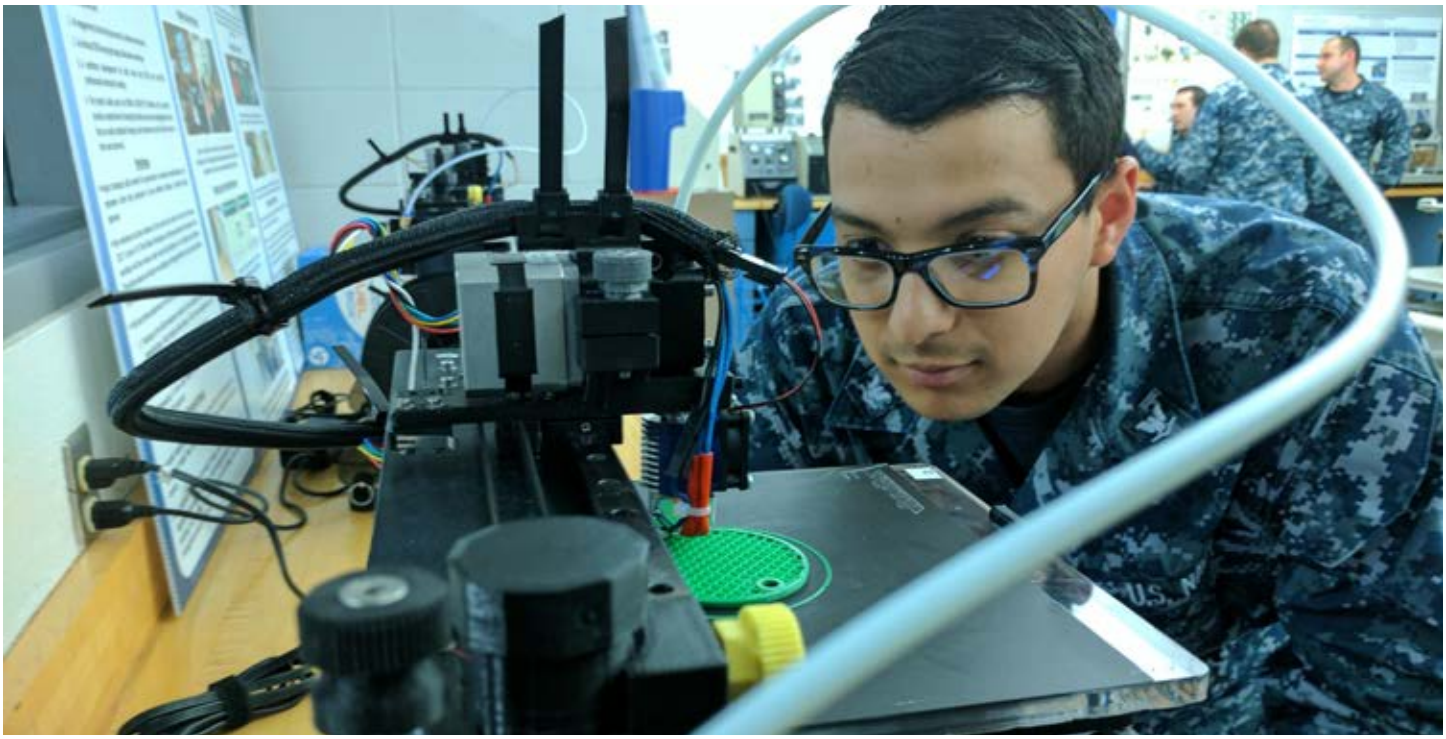
LOE Green:
Achieve High Velocity Outcomes

1. Rapidly acquire key platforms and payloads:
   - Award the Future Frigate contract in 2020 to deliver as soon as possible (ASAP).
   - Award the Large Surface Combatant contract in 2023 to deliver ASAP.
   - Award the Large Unmanned Surface Vehicle contract in 2023 to deliver ASAP.
   - Award the Future Small Auxiliary contract in 2023 to deliver ASAP.
   - Award the Future Large Auxiliary (CHAMP) contract in 2023 to deliver ASAP.
   - Contract for and field the family of Underwater Unmanned Vehicles (Orca, Snakehead, Razorback, Knifefish) ASAP, and no later than (NLT) 2025.
   - Unmanned Aerial Vehicles:
     - Reach MQ-25 first flight in 2021 and initial operating capability ASAP.
     - Reach MQ-4C Triton initial operating capability in 2021.
   - By the end of 2019, identify requirements across the family of systems to replace the F/A-18E/F and EA-18G by 2030.
   - Develop and field an offensive hypersonic weapon by 2025.
   - Develop and field the family of laser weapons (low power lasers, high power lasers, Surface Navy Laser Weapons System) beginning in 2019 and NLT 2025.
   - Improve the performance of our current enterprise networks in 2019. Modernize these networks under the NGEN-R contract.

2. Strengthen the synergy between development and dissemination of naval doctrine and naval capability:
   - Establish a concept development hub (DEVGRUEAST) at C2F. Principally supported by the Naval War College (NWC), the Naval Warfare Development Command (NWDC), and the TYCOM Warfare Development Commands, it will form the Navy's Center of Excellence for concept development.
   - Establish a capability development hub (DEVGRUWEST) at C3F. Principally supported by Space and Naval Warfare Systems Command (SPAWAR), the Naval Postgraduate School (NPS), the NWDC, and the TYCOM Warfare Development Commands, it will form the Navy's Center of Excellence for capability development.
   - DEVGRUEAST and DEVGRUWEST will collaborate to exploit the constructive, iterative dynamic between capability and concept development.

3. Design and implement a comprehensive operational architecture to support DMO. This architecture will provide accurate, timely, and analyzed information to units, warfighting groups, and fleets. The architecture will include:
   - A tactical grid to connect distributed nodes.
   - Data storage, processing power, and technology stacks at the nodes.
   - An overarching data strategy.
   - Analytic tools such as artificial intelligence/machine learning (AI/ML), and services that support fast, sound decisions.

   The operational architecture will be designed to be extensible to Joint and coalition forces. It will include a development environment to rapidly generate enhancements and support its continued evolution.



4. Upgrade the Plan-Brief-Execute-Debrief (PBED) cycle to a Plan, Practice, Perform, Progress, and Promulgate (P5) cycle:

   - "Red team" the **Plan** early to expose weaknesses and vulnerabilities as soon as possible.
   - **Practice** the Plan under expected and casualty conditions.
   - **Perform** the event according to the Plan, recording information for further analysis. Depart from the Plan during execution if required, but do so deliberately, with an understanding of what assumptions have been abandoned.
   - **Progress** to a higher level of performance by analyzing planned outcomes versus actual performance. Review the original Plan, Practice, and Performance data. Make adjustments to improve Performance the next time.
   - **Promulgate** what has been learned.

5. Focus Navy efforts for fielding AI/ML algorithms on areas that most enhance warfighting, training, and corporate decisions. By the end of 2018:

   - CFFC and CPF identify five priority warfighting problems for AI/ML to address.
   - Chief of Naval Personnel (CNP) and N7 identify five priority training problems.
   - VCNO identify five priority corporate problems.
   - Demonstrate initial capability for each AI/ML application by the end of 2019.

6. Maximize use of additive manufacturing (AM) to fabricate "hard to source" or obsolete parts, reduce cost, field more effective systems, and reduce reliance on vulnerable supply chains, through production at the point of need.

   - OPNAV N4, with the SYSCOMs in support, develop and issue means to certify each stage of the process, to include design, data transmission, printing, article test, and installation.
   - Field AM-produced metal parts in at least five current programs by the end of 2019.
   - If relief from current policies is required, recommend adjustments to better align policy with future technological trends.

7. Expand the use of Live, Virtual, and Constructive (LVC) training to support the growing demands of the scale, complexity, and security of training and operations. LVC training capabilities must provide a realistic, accurate experience in a secure environment at all levels of classification.

   - TYCOMs ensure unit-level training fully leverages LVC tools and systems.
   - Deliver an initial cross-domain solution by LSE 2020.

LOE Gold: Strengthen Our Navy Team for the Future

1. Continue to improve and modernize military personnel management and training systems through the "Sailor 2025" program. Deliver mobile access, increased career choice and flexibility, easier movement back and forth between active and reserve components, expanded family support, and tailored learning.

    - Provide Commanding Officers with a dashboard for talent management and risk monitoring by the end of 2020.
    - Build a one-stop "detailing marketplace" for reenlistment and billet negotiation by the end of 2019. Implement rating modernization so Sailors can explore opportunities and understand the training required to take a job in a different rate. Enable every Sailor to negotiate for more than one tour to include opportunities like geographic stability, education, co-location with spouses, advancements for hard-to-fill locations, and special pays.
    - Deliver a new performance evaluation system by the end of 2021 that emphasizes meaningful, frequent, and timely feedback. Use a standards-based assessment that evaluates character and that values merit over tenure. Focus on enhancing coaching and individual development.
    - Modernize and integrate the personnel and pay systems to provide accurate auditable pay to all active and reserve personnel by the end of 2021. Create a single Authoritative Data Environment for Navy personnel systems to permit the use of cutting-edge machine learning and data analytics by the end of 2024. Use commercial off-the-shelf, cloud-hosted modern technology.
    - Complete the transition to block learning and choose the training technology portfolio to deliver Ready, Relevant Learning.

2. Stand up a 3-star Director for Warfighting Development on the OPNAV staff (OPNAV N7). This office will be responsible for coordinating and aligning the Navy's education, experimentation, exercise, and analytic efforts. It will align leader development across accession sources. Synergy between how we fight and how we learn will accelerate our combat effectiveness.

3. Release a mobile version of MyNavy Portal that can be accessed without a Common Access Card and allows leave submission and record access from a smartphone by the end of FY2020.

4. Shift from multiple Personnel Support Detachments to two MyNavy Career Centers with 24 hours / 7 days a week Sailor and Family customer service support by the end of 2019.

5. Better align our Navy Reserves to fleet and warfighting, instead of administrative, roles.

6. Establish the goals in "Laying the Keel" to advance leadership development for our enlisted force by the end of 2020. Create courses that focus on character, ethics, leadership, and decision making, and are facilitated by certified Senior Enlisted Leaders. Continue to evolve Chief Petty Officer (CPO) initiation to build senior line leaders with expertise and innovative thinking—consistent with the CPO Creed.

7. Use quantitative techniques, data-driven analysis, and other research to catalyze Navy leadership development by the end of 2020. Use science-based practices and training to support leader development and better decision making.

8. Continue the work started with the Navy Civilian Workforce Framework.

- Develop Navy-wide guidance for Navy civilian acculturation that provides a consistent approach to acclimating civilians to our Navy mission and culture.
- Create a structure for effectively developing civilian leaders through experience, education, training, and personal development.
- Educate uniformed military members and civilians on effective personnel management.

9. As outlined in the Navy Family Framework:

- Provide for authoritative Navy information online.
- Provide for spouse and family training and education to strengthen a sense of mission in families.
- Evaluate the effectiveness of support provided to families.
- Include assessment of command family support in our command inspections.

LOE Purple: Expand and Strengthen Our Network of Partners

1. Further strengthen Navy and naval integration into the Joint Force.

- Ensure the development of the naval operational architecture, to include the Naval Tactical Grid, progresses in alignment with and in support of the development and fielding of the Joint Tactical Grid.
- Deepen naval integration with other services to realize the NDS and the NMS in multi-domain, distributed operations. Integration with our natural partner, the U.S. Marine Corps, will continue to get top priority.
- Work with the COCOMs and Joint Staff to support the development of *joint* operational concepts.

2. Maintain close alignment across the U.S. Government.

- Strengthen our relationships with other Executive Branch agencies and the Congress. Work to achieve a relationship of transparency in order to build mutual understanding and trust. Develop a cohesive approach to building and supporting a balanced and ready Navy.

3. Strengthen the Navy's unique role in diplomacy. Our nation's history is replete with examples where the Navy has advanced the diplomatic element of national power.

- Increase Navy International Programs Office contributions to strategic U.S. relationships.
- Strengthen support for the North Atlantic Treaty Organization (NATO), especially for high-end operations at sea.

- Mature Joint Forces Command-Norfolk as the NATO headquarters for high-end naval operations and warfare in the Atlantic theater.
- Execute the work plans as set out in our maritime trilateral agreements between:
    - The United States, United Kingdom and France.
    - The United States, United Kingdom and Japan.
- Continue to progress agreements and technology for information and intelligence sharing.
- Build on existing maritime intelligence and logistics partnerships with allied nations, and expand relationships with partner nations to broaden and strengthen global maritime awareness and access.

4. Advance the Navy's partnership with industry.

- Encourage collaboration between industry and the new Requirements Officer community. Continue to refine and optimize requirements, informed by the availability of mature technology.
- Move the acquisition process to progress via faster, more frequent iterative steps for acquisition and capability development.
- Expand dialogue at all levels with industry partners to increase shared understanding and reduce obstacles to more effective and efficient ways of doing business.

5. Enhance cooperation with academic and research institutions.

- Securely connect Navy labs in the cloud.
- Create a commercial cloud environment to accelerate collaboration with academia.
- Use this environment to allow our workforce to be more agile and innovative, as we reimagine traditional workflows to maximize efficiency.
- Leverage NPS to facilitate deeper exchanges between technology developers and warfighters, to inform rapid capability and concepts development.
- Expand cooperation with academia beyond technical matters, to include social and decision science to improve decision making in the Navy.

6. Reinforce relations with our neighbors.
   - Forge closer relationships between our Navy installations and host communities, both within the United States and abroad. Create new access opportunities, promote mutual security through drills and exercises, and build pride in and loyalty with the communities we serve.

End State

A dominant naval force that produces outstanding leaders and teams, armed with the best equipment, that learn and adapt faster than our rivals. Every person and every unit in the Navy will maximize their potential and be ready for decisive combat operations.

Conclusion

The margins of victory are razor thin but decisive. We will remain the world's finest Navy by fighting each and every minute to achieve excellence in everything we do. Our rivals are intent on taking the lead from us—we must pick up the pace and deny them. We cannot be satisfied with achieving minimum standards—we are a Navy focused on being the best we can be, every day.

I am counting on you. I am honored and proud to lead the Navy team.

JOHN M. RICHARDSON
Admiral, U.S. Navy
Chief of Naval Operations

CHIEF OF NAVAL OPERATIONS

April 6, 2018

The Charge of Command

Ref: (a) 10 U.S.C. §5947
(b) U.S. Navy Regulations (1990)

Encl: (1) ADM Ernest King CINCLANT Serial 053 of January 21, 1941
(2) Hobson's Choice (Wall Street Journal, 1952)

The Privilege of Command

1. As a prospective or serving Commander or Commanding Officer, you have been identified as worthy of the privilege of command. The decision to select you for command was not made lightly; you were selected based on your demonstrated past performance and the **trust and confidence** that senior Navy officers have in you to lead Sailors under your charge.
2. Command is the foundation upon which our Navy rests. **Authority, responsibility, accountability, and expertise** are four essential principles at the heart of command. Effective command is at risk if any of these principles is lacking or out of balance.
3. You accept the extraordinary responsibility of command with full regard for its consequences. It is the duty of every Commanding Officer to understand his or her authorities and responsibilities prior to assuming command, which are clearly laid out in statute and regulations as outlined below.

The Scope of Command

1. "**All Commanding Officers and others in authority** in the naval service are required to show in themselves a good example of virtue, honor, patriotism, and subordination; to be vigilant in inspecting the conduct of all persons who are placed under their command; to guard against and suppress all dissolute and immoral practices, and to correct, according to the laws and regulations of the Navy, all persons who are guilty of them; and to take all necessary and proper measures, under the laws, regulations, and customs of the naval service, to promote and safeguard the morale, the physical well-being, and the general welfare of the officers and enlisted persons under their command or charge." (Ref (a))
2. "**Commanders** shall be responsible for the satisfactory accomplishment of the mission and duties assigned to their commands. Their authority shall be commensurate with their responsibilities. Normally, commanders shall exercise authority through their immediate subordinate commanders." (Ref (b), Paragraph 0702)
3. "The responsibility of the **Commanding Officer** for his or her command is absolute, except when, and to the extent to which, he or she has been relieved therefrom by competent authority, or as provided otherwise in these regulations. The authority of the Commanding Officer is commensurate with his or her responsibility. While the Commanding Officer may, at his or her discretion, and when not contrary to law or regulations, delegate authority to subordinates for the execution of details, such delegation of authority shall in no way relieve the commanding officer of continued responsibility for the safety, well-being and efficiency of the entire command." (Ref (b), Paragraph 0802)

The Standards of Command

1. There are two standards to measure officers in command. The first is the standard for criminal behavior, which should be well known to you. The second — and higher standard — is trust and confidence, both with the American people we are sworn to protect and across all levels of the chain-of-command.
2. **A Commander's competence and character lead to trust and confidence**. Commanders can only feel comfortable delegating their authority — sending subordinate Commanding Officers and their teams over the horizon and into harm's way — with the knowledge that those CO's are both technically competent and share their values. If so, their teams will win — performing at or near their theoretical limits — and they will always come back stronger than when they left.
3. Trust and confidence are the two coins of the realm that enable decentralized command and operations at sea; they are the key to our effectiveness as a force. Work hard to build and guard trust and confidence.

J.M. RICHARDSON
Admiral, U.S. Navy

CHIEF OF NAVAL OPERATIONS

September 27, 2016

One Navy Team

"A Design for Maintaining Maritime Superiority" speaks to the operational and warfighting advantage strengthened by developing high performing, fast learning teams. Leveraging our diversity - from around the country and around the world – is key to reaching our potential and maintaining our advantage against our adversaries.

Respect for the dignity of all in the Navy Team, as well as our many partners, is essential to conducting ourselves according to our core attributes of accountability, integrity, toughness and initiative, as the expression of our core values of honor, courage, and commitment.

In our Navy, we have individuals from many different cultures, ethnicities, and histories. We must recognize this advantage and include the broadest-possible spectrum of people and perspectives.

As well, we often work with organizations that have different cultures than ours. Expanding and strengthening our partnerships requires us to welcome these partners as far as possible into our trust and confidence. We must work hard to forge unity of effort as one team.

Generating success as a team means going beyond merely understanding the unique perspectives of different people and cultures - understanding is too passive. Achieving top performance is enhanced when leaders tap into the energy and capability of an actively inclusive team.

This is harder than it sounds. We all have built-in biases that unconsciously influence our choices and decisions. Putting measures in place to help us overcome these biases will help us first to form a diverse team and then to include that team to achieve the fullest advantage.

Trust is the foundation of strong teams – we cannot win tough fights without it. In our business, trust is earned by demonstrating competence and character. We welcome verification and validation of that trust. Including diverse views and perspectives, and appreciating everyone for what they bring to the team, helps us improve trust - and therefore performance - throughout all phases of naval operations. Creativity and new ideas are important in the beginning, when our plans are just forming, to ensure we don't miss something. During execution, we must communicate openly, trust each other, and hold each other accountable. Finally, we should listen intently to all contributions during rigorous post-event assessments. Different perspectives shine lights into our blind spots and illuminate things we wouldn't otherwise see. In this way, we will learn and improve faster.

Actively being inclusive and open to diverse perspectives will produce leaders and teams who learn and adapt to achieve maximum possible performance, and who achieve and maintain high standards, to be ready for decisive operations and combat. Let's get to it.

J. M. RICHARDSON
Admiral, U.S. Navy

THE SECRETARY OF THE NAVY
WASHINGTON DC 20350-1000

February 5, 2019

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Education for Seapower Decisions and Immediate Actions

After review of the Education for Seapower (E4S) study led by the Under Secretary of the Navy (UNSECNAV), I am convinced, now more than ever before, that the intellectual development of our naval leaders is the most critical warfighting capability for our national security. Organizationally, we must scale with agility the many advances made across the Department, as well as those learned from our sister services, partner nations, and the private sector. To achieve this, I intend to create a Naval University System that further integrates and aligns naval education, beginning with the establishment of a Naval Community College (NCC) for our enlisted Sailors and Marines. We will raise individual and organizational learning to the level of a warfare enabler, with authority at the three-star level for the Navy and the Marine Corps, respectively, and advised by a Department of the Navy (DON) Civilian Staff Assistant solely devoted to education. They will be accountable directly to me for the execution of their broad responsibilities for all of naval learning in order to ensure ever-increasing unity, warfighting capacity, and institutional progress in support of the 2018 National Defense Strategy. I will ensure that these educational initiatives will be reflected in my Program Objective Memorandum (POM) Guidance so that the responsible organizations for executing these initiatives are funded at the appropriate level, and will direct the Assistant Secretary of the Navy (Financial Management and Comptroller) (ASN (FM&C)) to identify resources in Fiscal Year (FY) 19 and FY 20 to ensure immediate educational enterprise wholeness.

With the above strategic goals in mind, I am taking the following organizational steps regarding the future of naval education:

- **THE OFFICE OF THE CHIEF OF NAVAL OPERATIONS (OPNAV) N7/DIRECTOR OF WARFIGHTING DEVELOPMENT.** The Chief of Naval Operations (CNO) and I will adjust our current U.S. Navy Flag Officer billet structure in order to create a new three-star Vice Admiral position on the OPNAV staff as the sole resource sponsor and strategic leader for naval education. This new OPNAV N7/Director of Warfighting Development, as described in the Navy's Design for Maintaining Maritime Superiority, Version 2.0 of December 2018, will serve alongside its Marine counterpart, the existing Deputy Commandant for Combat Development and Integration (DC CDI) to refocus our naval educational efforts on increased warfighting capacity. In order to create an integrated naval educational strategy that supports naval warfighting capability objectives, the Navy and Marine Corps will work together to leverage a proactive feedback loop including wargaming, analytical capability, active relationships with the Fleets/Marine Operating Forces, and a lifetime continuum of learning for each Sailor and Marine. This increased developmental capacity, when integrated with existing planning mechanisms for our entire capabilities portfolio, will serve as a strategic accelerator for designing and delivering the naval forces of the future.

- **STAFF ASSISTANT FOR NAVAL EDUCATION.** In order to accelerate our progress in making education an integrated warfare enabler, I will create a new staff assistant position with the title, Chief Learning Officer (CLO) for naval education. The CLO for naval education will report directly to me and the UNSECNAV, and will serve in a manner much like my other staff assistants who lead portfolios critical to the future of our institution. He or she will act as a DON advisor to the OPNAV and Marine Corps Staff on all educational matters, and will work with the OPNAV N7 and DC CDI to create a Naval University System, starting with the NCC (as described below). The CLO for naval education will act as my representative during the POM development process for education, formulate policies, strategies, and guidance for my signature, and will serve as a strategic conduit to civilian academia and the private sector for the entire Department to ensure best practices are gleaned and shared equally. The UNSECNAV will lead a search for this position, create a small supporting office with zero staff growth, and submit enacting instructions directly to me for my signature. I expect this office to be fully operational no later than June 1, 2019.

- **INTENT TO BUILD A NAVAL UNIVERSITY SYSTEM.** I will provide the CLO for naval education with broad direction and sufficient resources to create a strategic plan, coordinated with the Service Chiefs and for my final approval, that will assemble the existing naval educational institutions and activities into one, united University System: United States Naval Academy, Naval War College, Marine Corps University, Naval Postgraduate School, the academic curricula of the Naval Reserve Officers' Training Corps and Service Officer Candidates Schools, Federal Executive Fellowships, and all Flag and General Officer education. The purpose of the Naval University System (NUS) will be to align and orchestrate the academic efforts and resources of all naval education activities, while retaining the special characteristics and strengths of each institution, enhancing overall agility and accountability. Using a universal transcript system, as well as a common strategic intent and supporting policies in areas such as admissions, instructor qualifications, and faculty empowerment, the NUS will be a means to scale up strategic outcomes across the Department, enabling the integration of naval technical and strategic education so keenly needed to compete and win in a new age. While the E4S study recommended the NUS be located in Newport and led by the President of the Naval War College, options regarding the long-term leadership and headquarters location of the NUS will be examined in more detail during the process of developing the Naval Educational Enterprise strategic plan.

- **EDUCATIONAL SYSTEM ACQUISITION.** The Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN (RD&A)) shall, within 60 days of receipt of this memorandum, deliver a brief to me on organizational options that will better unify the acquisition, design, development, as well as execution of all digital delivery systems that provide educational solutions to the Naval Educational Enterprise, to include a proactive conduit to the best technical sources of civilian and military massive open online courses, gamification, virtual reality, and e-learning. ASN (RD&A) will be responsible for officially appointing a principal technical adviser to the future NUS by means of an additional line of coordination with the CLO for naval education, established no later than October 1, 2019.

- **REPORTING ALIGNMENT.** All current operational reporting lines for the Presidents of the Naval War College, Naval Postgraduate School, and the Marine Corps University, along with the Superintendent of the U.S. Naval Academy, will remain intact. An additional coordinating line for strategic alignment of policy, curricula, and acquisition of naval education will be created for the CLO for naval education, who shall work collaboratively with these institutional heads as well as the OPNAV N7 and DC CDI.

- **NAVAL EDUCATION GOVERNANCE.** For effective accountability, I will recommend a new Naval Education Board to meet at least semi-annually (or more frequent, as required), comprised of the UNSECNAV, CNO, Commandant of the Marine Corps (CMC), Vice CNO, the Assistant CMC, Commander, Fleet Forces Command, Commander, U.S. Pacific Fleet, Commander, U.S. Marine Corps Forces Command, Commander, U.S. Marine Corps Forces, Pacific, Assistant Secretary of the Navy (Manpower and Reserve Affairs), ASN (RD&A), and the CLO for naval education serving as Executive Secretary. A subset of this Board will meet quarterly, or at my direction, and will consist of the CLO for naval education, the OPNAV N7 and DC CDI, the heads of the Naval Educational Institutions, Education Representatives (GO/FO/SES level) from Fleet Forces Command, U.S. Pacific Fleet, and Marine Corps Forces Command, Chief of Naval Research, Director of Naval Intelligence, Commander, U.S. Fleet Cyber Command, and Commander, Marine Forces Cyber Command. I will also recommend streamlining the current Naval War College and Naval Postgraduate School Board of Advisors into one Naval Educational Advisory Board, with 10-20 outside experts in education, technology, business, law, and finance, chaired by a retired four-star naval officer.

In accordance with the above conclusions, I endorse the following policy recommendations presented by the E4S Executive Board in its report. I hereby direct the UNSECNAV within 90 days of the date of this Memorandum to deliver a Plan of Actions and Milestones (POA&M) for my review and signature that includes the following initiatives:

- **NAVAL COMMUNITY COLLEGE.** In concert with the CNO and CMC, I intend to establish a NCC no later than January 1, 2021. The NCC will be the first vital step towards construction of a NUS. My CLO for naval education will advise the OPNAV N7 and DC CDI in designing accredited associate's degrees for our enlisted Sailors and Marines in academic disciplines that advance lethality, partnership, and reform of our supporting processes. The NCC will be a direct result of the scaling effect that the NUS will bring to the DON by means of universal transcripts and partnerships with regional accreditation authorities. The CLO shall, in coordination with OPNAV N7 and DC CDI, present a detailed POA&M to me by December 31, 2019 with identified resourcing that will enable the full operational capability of the NCC.

- **NAVAL EDUCATION STRATEGY.** In collaboration with the OPNAV N7 and DC CDI, the CLO shall develop and deliver a comprehensive naval education strategy. Using this strategy, he or she shall prepare for my signature a unified intent for all learning curricula, to be directly followed by a new comprehensive curriculum review for all educational institutions, coordinated with the new OPNAV N7 and existing DC CDI,

and completed by December 31, 2019. This strategy will include a plan for integrated naval wargaming, competitive team learning, and continual learning for every Sailor and Marine, at every paygrade.

- **UNIFIED NAVAL EDUCATIONAL STANDARDS.** The CLO for naval education, in coordination with the OPNAV N7, DC CDI, and heads of the naval education institutions, shall develop academic and professional selectivity standards for faculty and student admissions requirements by December 31, 2019. Using these standards, the CNO and CMC shall institute selection standards for top-level schools/senior service in-residence war colleges that aim for the top 30 percent of all future due-course officers in terms of leadership, as well as operational and academic performance.

- **STRATEGIC STUDIES GRADUATE EDUCATION.** All future unrestricted line Flag and General Officers will require strategically-focused, in-residence Masters degrees (military or civilian) by October 1, 2021. Waivers submitted by the CNO and the CMC will be considered on an individual basis and approved by me or my designated representative. The CLO for naval education shall, after coordination with the respective Service Chiefs, present to me a list of approved graduate strategic studies programs, both military and civilian, no later than 90 days after his/her designation.

- **LEARNING AS A DESIRED WARFIGHTING TRAIT.** Both the Navy and Marine Corps shall make, as a separate category in officer fitness reports and enlisted evaluations, competitive grading criteria for educational and learning achievements, with a new reporting system reflective of these criteria by January 1, 2020. The CLO for naval education, in collaboration with the OPNAV N7 and DC CDI, will devise precept guidance for my signature for statutory and administrative selection boards that will ensure learning achievements are appropriately weighted when selecting our best and brightest for promotion and command of our most valuable resource, our Sailors and Marines.

- **REVIEW OF JOINT PROFESSIONAL MILITARY EDUCATION.** The CLO for naval education, in collaboration with the OPNAV N7 and DC CDI, shall recommend changes in the Joint Professional Military Education system that will provide Joint education earlier in naval careers and meet the unique, expeditionary-centric, forward operational requirements of the Navy-Marine Corps team. These changes will be coordinated with the CNO and CMC, and delivered to me by December 31, 2019 for my review and eventual forward to the Chairman, Joint Chiefs of Staff and the Secretary of Defense.

I am grateful for the efforts of the E4S Executive Board: Chairman of the Board, the UNSECNAV, the Honorable Thomas B. Modly, co-chairmen Admiral William F. Moran, USN, General Glenn M. Walters, USMC (Ret.), and General Gary L. Thomas, USMC; and our volunteer Board Members: Admiral Michael G. Mullen, USN (Ret.), General John Allen, USMC (Ret.), Ambassador Barbara Barrett, Vice Admiral Ann E. Rondeau USN (Ret.), and Dr. Harlan K. Ullman. Their work ranks among the most comprehensive and influential in the Department's history. As appropriate, the E4S report and appendices shall be made available

through official publication on the DON website. All actions and decisions explained above will be included in subsequent editions of the DON Business Operations Plan managed by the UNSECNAV. I expect all hands of the Navy and Marine Corps team to join together in aligning every element of education for the betterment of the Department of Defense, DON, and our nation.

Richard V. Spencer

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DEPARTMENT OF THE NAVY

Education for SEAPOWER

FINAL REPORT | December 2018

"A leader without either interest in or knowledge of the history and theory – the intellectual content of his profession– is a leader in appearance only. Self-study in the art and science of war is at least equal in importance and should receive at least equal time to maintaining physical condition. This is particularly true among officers; after all, an officer's principal weapon is his mind.

— General Al Gray, USMC (Ret)
29th Commandant of the Marine Corps"

THE UNDER SECRETARY OF THE NAVY
WASHINGTON DC 20350-1000

April 19, 2018

MEMORANDUM FOR DISTRIBUTION

Subj: DEPARTMENT OF THE NAVY EDUCATION FOR SEAPOWER (E4S) STUDY

Continuous learning – and sharing hard-won knowledge – represents a combat-proven key to victory for our naval services. Our flagship educational institutions, including the United States Naval Academy, Naval Postgraduate School, Marine Corps University, and Naval War College, along with the many outstanding national colleges and universities associated with the Reserve Officers Training Corps, have long and well served the nation in educating our future leaders. They inculcate not only the finest sense of honor and integrity, but also creativity and deep rigor in thinking about the future of naval warfare, especially in times of great change.

As the Secretary of Defense indicates clearly in his summary of the 2018 National Defense Strategy, a new age of great power competition and strategic complexity has dawned, finding our former competitive edge relatively diminished. Once again, our forces must find new, ever-more agile and resilient strategies to dissuade our potential adversaries, and when necessary, prevail in conflict. To shape this more lethal force, we must begin by thinking anew about how those strategies and capabilities are developed in the first place – with our most critical resource – human creativity and talent.

At the same time, a revolution in the art and science of learning is currently taking place throughout the globe. New uses of digital technology and artificial intelligence are now being applied to a deeper and more holistic understanding of learning psychology, resulting in speed and capacity increases that have the potential to leap well beyond today's analog expectations – by orders of magnitude. To ensure every possible advantage for our sons and daughters sent into harm's way, we must turn our energies towards a new and comprehensive study of all aspects of naval education, challenging every assumption of roles, responsibilities, and interconnections while pursuing the highest fidelity of learning technology.

With this mandate firmly in mind, I am forming an independent subject matter expert team to conduct a comprehensive study of learning throughout the Department of the Navy. The Department of the Navy (DON) Education for Seapower (E4S) study team will seek input from experts and proven national-level leaders from government, academia, and private industry. They will use this information to develop a series of observations and recommendations for knowledge-based continuous learning throughout the naval services. In order to be effective, the results of this study must be just as consequential and pervasive as the challenges to our national security, as expressed in the 2018 National Defense Strategy.

The DON E4S study will interact with the various flagship naval educational institutions as outlined above, as well as top-flight civilian educational nodes. Interviews with thought leaders on the future of learning, from academe, the military, and corporate America will be held

to glean the best possible array of ideas on educating for seapower. An official report containing observations, conclusions, and recommendations will be presented to me no later than December 7, 2018. I will personally review-the recommendations of the DON E4S report, and plan to issue my recommendations to the Secretary of the Navy on January 5, 2019.

I hereby request that all leaders in the DON fully support the many and disparate efforts of this team: from visits to educational institutions, to requests for historical data and background, to the many options available to gather thoughts and opinions on the way ahead. Good ideas have no rank. This will be a fully transparent and open study, using the panoply of digital communications and sharing tools at our disposal. I will consider every viewpoint tendered before making my final recommendations to the Secretary, and the report will be made widely available to all.

Thomas B. Modly

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USN, Ed.D. (Retired)

DR. HARLAN K. ULLMAN

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Study Scope and Approach – Letter from the Board

In response to the Under Secretary's charge to conduct a "clean sheet" review of all aspects of naval education, reinforced by the Secretary of the Navy's guidance to be boundless in this effort, we, the Education for Seapower (E4S) Executive Board, carefully reviewed and assessed the entire naval educational enterprise to include: U.S. Naval Academy; Naval Reserve Officers' Training Corps and Officer Candidates School; the Naval Postgraduate School; the Naval War College; Marine Corps University; Federal Executive Fellowships; and Flag/General Officer education programs.

Our review also drew heavily from the 2018 National Defense Strategy (NDS), which stresses the return of great power competition and countering rogue states; signaling a fundamental change from seventeen years of war against violent extremism. Further, the NDS observed that military education has become "stagnant" in its preparation of leaders in how to think about such an uncertain future.

Against this strategic context, the challenges of new technologies - including artificial intelligence and machine learning - create what we have termed a "Cognitive Age" that portends dramatic shifts much like the Industrial and Information revolutions of the past. When these changes are applied to the spectrum of conflict, a possible result is "hyperwar": a warfighting environment where key decisions in battle must be made in microseconds. A crucial question in our review was assessing how the naval educational enterprise is responding to these new factors.

Collectively, we concluded that the enterprise is not producing what we believe will be needed in keeping with these future challenges and demands. This is THE fundamental problem that must be corrected now.

In this review, we concentrated on analyzing and understanding the current educational organizational, governance, and policy objectives and directives, both for the respective Services and for the individual. We held substantial interactions, interviews, and exchanges with the leaders of each of these institutions. We studied major analyses of the data regarding the educational enterprise, focusing on the question of whether it meets the future needs of the Nation. We also conducted discussions with civilian academics, as well as comparisons with the other Services' educational programs, both nationally and globally.

In all these exchanges, we found a common theme: the combination of a new strategic direction and rapidly advancing technologies represents an inflection point, one that absolutely must be countered by changing our current emphasis on how we educate for and think about the future. We concluded that education is even more vital than before to ensure we are prepared for the future - by producing leaders highly proficient in strategic thinking and analysis, the technologies they will employ, as well as professional warfighting competence.

Understanding how, and, perhaps more importantly, when to make change is also vital to our future success. Some will question why the Department of the Navy should fix something that does not appear clearly broken, much in the same way the Goldwater Nichols Defense Reform Act of 1986 that mandated "Jointness" was criticized in its time. The Nation cannot afford to wait until a catastrophic failure conclusively demonstrates that action should have been taken earlier. Now is the time to act.

After deliberation and consideration of a broad range of organizational options for education, we believe that the creation of a Naval University, with supporting organizational, governance, and policy recommendations, will indeed make education a crucial warfare enabler that will help assure success and victory in the future. We must also create a supporting culture of lifelong learning, enabled by a value proposition for education that is clearly understood as absolutely essential for professional advancement. In short, naval education must be weaponized for the entire spectrum of conflict that our Nation will certainly face in the Cognitive Age.

The Board recognizes and is appreciative of the superior work done by the research staff that was instrumental in helping us make our recommendations regarding Education for Seapower for the Secretary of the Navy. The next step is to act upon our recommendations.

ADMIRAL
MICHAEL. G. MULLEN,
USN (Retired)

GENERAL
JOHN R. ALLEN,
USMC (Retired)

AMBASSADOR
BARBARA M. BARRETT

VICE ADMIRAL
ANN E. RONDEAU,
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DR. HARLAN K. ULLMAN

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Executive Summary

We, the Executive Board of the Department of the Navy's Education for Seapower (E4S) Study, were tasked by the Secretary of the Navy in April 2018 to conduct a "clean-sheet" review of naval education, without boundaries on the scope of our study or possible recommendations. Reinforcing the necessity for this effort is the nation's ongoing, fundamental shift in strategic focus from violent extremism to inter-state competition, as defined in the 2018 National Defense Strategy.

Our recommended actions are based on the following analysis of the overall naval education enterprise, including examination of a range of organizational options:

> **There is no overall strategic direction or leadership for naval education or naval organizational learning; nor a successful value proposition for education as a unifying naval warfare capability; nor effective unity of command in its resourcing, policy and programming for education; nor correct prioritization for education's vital role in balancing the character and nature of war.**

We took into careful account the quantitative and qualitative analysis of the strengths and weaknesses of current educational institutions (self-reported and observed), anonymous surveys of Flag and General Officers, students, and faculty, recent scholarship in professional journals and research center studies on education, and one-on-one interviews with various civilian and military education experts. This study led to the following specific findings regarding the current educational enterprise:

- Much greater emphasis on strategic education and critical thinking for greater lethality, partnership, and reform is required for the future, to include institutionalized team learning and war-gaming opportunities planned across the entirety of naval careers that enable the leaders of the Department to think and fight as a united, coherent naval force in a new era of inter-state competition;

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- Training and personnel assignment concerns tend to crowd out needed investment (both in terms of resources and highly qualified candidates) for education in the sea services, leaving the separate educational institutions underfunded, under-prioritized, under-utilized, and disconnected from one another, without any unifying strategic vision or purpose;
- Necessary teachings of advanced technology in strategic education curricula are haphazard and randomly pursued, made more difficult by the Department's decentralized approach to education, as well as the lack of adequate time and means provided in naval careers (both enlisted and officer) to attain such education;
- Pervasive changes are occurring in learning, including customized, on-line education and greater opportunities for larger audiences, particularly in technical fields. These advances are currently pursued at scale in civilian universities and in private-sector applications, yet apart from small numbers of naval participants sent annually to study and intern in those spaces, they remain largely untapped for the broader Department;
- Disaggregated educational program management and insufficient resourcing results in missed opportunities to scale up needed agility in preparing Sailors and Marines for an uncertain future, while incurring gaps and redundancies that reduce overall effectiveness.

As the basis for re-orienting education, we developed this strategic vision:

> **The Naval Education Enterprise must produce leaders of character, integrity, and intelligence steeped not only in the art of war, the profession of arms, and the history and traditions of the Naval service, but also in a broader understanding of the technical and strategic complexities of the Cognitive Age, vital to assuring success in war, peace, and grey zone conflict; officer and enlisted leaders of every rank who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action.**

In order to ensure that this vision is implemented, we believe it is imperative that:

> **Lifelong education in the naval profession becomes both a personal and an institutional responsibility, for achievement in learning is vital for the strategic viability and long-term lethality of our fighting forces and the Nation.**

Organization

To move these conclusions and recommendations into action items, we propose a major reorganization by creating a Naval University that enables a new alignment and orchestration of efforts amongst the various institutions of naval education: the United States Naval Academy, Naval War College, Marine Corps University, Naval Postgraduate School, Naval Reserve Officers' Training Corps, Officer Candidate School, Federal Executive Fellowships, and all Flag/General Officer education. Our proposed structure retains the special characteristics and strengths of each educational institution, while aligning policy, budget, and acquisition authority in order to provide increased agility and accountability.

Organizational Recommendations

We recommend that the Secretary of the Navy create immediately the following:

- Naval University, headed by a three-star naval officer President, dual-hatted as President, Naval War College with a five-year term, rotated between the Navy and Marine Corps, located in Newport, Rhode Island, in order to integrate all education institutions in the Department of the Navy as part of the Naval Education Enterprise, with overall responsibility for educational policy, programming, and acquisition, and reporting through the Chief of Naval Operations and the Commandant of the Marine Corps to the Secretary of the Navy.

- Chief Learning Officer, a senior civilian with educational leadership experience headquartered in the Pentagon, with a small supporting staff transferred from extant Navy and Marine education management billets, responsible to the President, Naval University for all matters related to education in policy, budgets, promotion board precepts, Congressional interaction, future requirements, and assessments.
- Program Executive Office, Naval Learning Systems (PEO – L), established by dual-hatting the current Commander, Naval Air Warfare Center – Training Systems Division in Orlando, Florida, to serve as the naval education enterprise acquisition arm for all technological requirements, to include electronic learning aids on-line, website design and maintenance, virtual reality, improved and greater use of war-gaming, and other interactive learning systems.
- Naval Community College, under the leadership of the President, Naval University, to facilitate education and certifications for enlisted Sailors and Marines that are relevant to the Naval Services. Using a universal transcript system, this organization will design a rigorous associate of science and/or arts degree program for naval sciences, with concentration areas such as artificial intelligence, data analytics, organizational behavior, and information systems, while maximizing credit for existing educational and training programs.

Governance

We believe an effective governance structure will maximize the effectiveness and integration of the naval education enterprise, and ensure it remains accountable to the Fleet/Marine Operational Forces for its output. As part of this Study, we reviewed the current Board of Advisors arrangements for the Naval Postgraduate School and Naval War College, as well as the Boards of Visitors for the United States Naval Academy and the Marine Corps University, the latter decreed by statute.

Governance Recommendations

- Institute a single Naval Education Governing Board for the Naval University, chaired by the Secretary of the Navy, with the Chief of Naval Operations and Commandant of the Marine Corps as co-chairs. This board will also include on a rotating basis one of the Navy's four-star fleet commanders and Commanding General Fleet Marine Force Atlantic and Pacific. Other senior commanders should be appointed to bring specific skills such as cyber, space or intelligence.
- Create a Board of Advisors of distinguished persons to include as ex officio members the chairs of the Naval Academy and Marine Corps University Boards of Visitors. This board will have the primary duty of providing oversight for the Secretary of the Navy and for providing support, guidance and advice for the entire educational enterprise including its components. The President of the Board of Advisors should be a retired four-star military or naval officer, or civilian equivalent with national stature with a renewable four-year term.

Policy

Naval policy is an effective instrument for the Secretary of the Navy to make immediate and lasting changes within the Department's education enterprise, and help to drive an overall culture of learning. Simply creating new organizations and governance systems without direction is insufficient. We therefore recommend distinct initial policy changes to demonstrate to the entire Department, and in fact the Nation, the needed elevation of education as a critical warfighting enabler.

Policy Recommendations

- Require the President, Naval University to develop a comprehensive naval education strategy for review by the Chief of Naval Operations and the Commandant of the Marine Corps, and final approval by the Secretary of the Navy.

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- Authorize the President, Naval University to develop all naval educational budget requirements (Program Objective Memorandum, or POM), through the Chief of Naval Operations and the Commandant of the Marine Corps to the Secretary of the Navy.
- Require the President, Naval University to develop selectivity standards and admissions requirements for each of the Naval University institutions, as well as opportunities for civilian and private sector education.
- Require Reporting Seniors of each Service to comment upon learning achievements as a separate category in officer fitness reports and enlisted evaluations, and make continuous learning achievements an essential part of promotion precepts signed by the Secretary of the Navy. The newly-created selection boards for in-residence graduate education by the Navy, and as established earlier by the Marine Corps, support this objective and are recommended for permanence.
- Require in-residence, strategically-focused graduate degrees of all future unrestricted line Flag and General Officers, with waiver authority solely invested in the Secretary of the Navy.
- Develop a naval education enterprise digital network for continuous learning by all Sailors and Marines, from E-1 to O-10, that shares the educational assets and learning opportunities of the entire Naval University, as well as those of the American university system and private sector.
- Institute naval war-gaming and competitive team learning as a necessary part of a continuum of learning at the junior, middle, and senior stages of a naval officer and enlisted person's career path, as well as "just-in-time" education as new conditions arise.
- Begin the process of developing a differentiated talent management system that uses education, among other tools, to reveal, groom, and develop a deep bench of leadership in the services and the civilian workforce, acting as a retention and permeability tool in concert with the Blended Retirement System and new officer promotion flexibilities granted in the 2019 John S. McCain National Defense Authorization Act.
- Pursue changes in the Joint Professional Military Education system that meet the unique, sea-centric, forward operational requirements of the Navy-Marine Corps team, and provide essential Joint operational doctrine training earlier in the careers of its personnel.
- Activate an organizational learning continuum as part of the Naval Education Enterprise, with accountability and ownership in the person of the President, Naval University, reporting to the Commander, Fleet Forces Command, Commander, U.S. Pacific Fleet, Commander Naval Forces Europe and the Deputy Commandant for Combat Development and Integration, creating positive accountability and resources for institutional advancement.
- Implement new curriculum reviews for all educational institutions, with overarching strategic guidance and expectations to be issued by the Secretary of the Navy that are informed by a continually-adapting strategic estimate of the global situation created by the President, Naval University.
- Create a more flexible education model based on "stackable" certifications and courses that have the potential to be aggregated for graduate degrees along the course of a sea-centric naval career, in addition to greater in-residence opportunities, both officers and enlisted personnel, administered by the Naval University.

Charting the Course Ahead

The education of our naval leaders is the single most important way to prepare the Naval Services, and the Nation, for a dangerous and uncertain future. To prevent strategic surprise and ensure our national security, we must both enable and require our Sailors and Marines to continually learn and adapt. Part of this education must embrace the consequences of what can be termed a "Cognitive Age": an era of artificial intelligence and machine learning that will transform the speed and character of warfare, when we will begin replicating, and exceeding, the prowess of the human mind in specific domains of expertise.

In fact, the character of war has already changed, driven by the ever-accelerating application of technological innovation streams by an increasing number of nations and other groups, all designed to rapidly increase lethality. Further, increased machine-mind teaming and digitization of the battlespace will alter the nature, or human dimension, of future conflict. Without our proactive intervention, the balance between the character and the nature of war may quickly grow out of balance, with strategic surprise possibly the result – as we have seen throughout history.[1]

We, therefore, believe a most urgent national security task before us today is to intellectually prepare our leaders for such uncertainty, by equipping them with a strategic framework of how to think about the future and with a greater understanding of emerging technologies, all gained through a continuous, lifelong process of learning. With any organizational or governance changes the Secretary may approve, we believe the first step is to set the conditions for such systemic preparation: transforming education into a unified and fully resourced naval warfare capability, elevating its leadership to the Secretary of the Navy, and firmly ensuring accountability for individual and organizational learning.

[1] Please see Appendix F, "The Nature and Character of War," by Gen John Allen, USMC (Retired).

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Education For Seapower Final Report

Introduction

In the earliest day of the American Naval Services, as the Continental Navy and Marine Corps battled the world's most powerful navy, Captain John Paul Jones wrote that Sailors "mean more than guns in the rating of a ship." Some principles are constant. As it was then, Jones' maxim is surely as true today. The value of the individual Sailor and Marine, and their critical importance to our national strength, has become a truism for Navy and Marine Corps leaders. Yet, the development of those Sailors and Marines and how they become the most valuable part of the Sea Services receives far less attention. In particular, the education of officers and senior enlisted leaders in the U.S. Navy and Marine Corps has run on a kind of autopilot for decades, largely dependent on individual initiative and mindset, with little effort to coordinate or align its disparate parts, and a lack of oversight to assess its final products.

Education has long been the key strength of the American naval profession and a force multiplier for our Sea Services. For generations, the question of how to educate naval leaders has been subject to review and reform. From the founding of the U.S. Naval Academy in the 1840s and the U.S. Naval War College in the 1880s, through the Cold War and creation of Marine Corps University, naval education has adapted to changes in the character of war and the United States' role in the world. However, the education of leaders goes beyond the war colleges and schoolhouses of the Navy and Marine Corps. In 1818, a young David Farragut spent nine months with the American Consul in Tunisia studying mathematics and languages, where he was introduced to the Islamic religion and North African culture. Lieutenant Chester A. Nimitz spent a year on what today the Navy would call a corporate fellowship, learning about the production of new diesel engines in pre-World War I Germany. The Navy sent Lieutenant Arleigh Burke to the University of Michigan for two years to receive his graduate degree in Chemical Engineering in 1931. Non-traditional personal study and career intermissions, learning from the corporate and civilian sector, attendance at leading civilian graduate schools, and Fellowships at leading public policy research institutions, all have an important contribution to the creation of a dynamic, adaptable, and innovative Navy and Marine Corps.

Despite the importance of education in the Department of the Navy's past success, and its critical importance for our future, decades have passed since the Department has made a detailed examination of the value of education in a naval career, or how it develops strategically-minded and, simultaneously, operationally-competent leaders for the future. This Education for Seapower Study has surveyed the education of naval leaders historically. The Study has also scrutinized the current state of our institutions, schools, and programs, in order to chart a new course into the future. This effort, and the skillful execution of the recommendations that follow, is vital to creating the officers and enlisted who can adapt the complexity of our contemporary world and lead the Navy and Marine Corps with decisiveness and vision.

Why Now?

Changes in society, technology, and our security environment are occurring at a rapid pace. Failure to adapt all aspects of how we prepare our naval leaders for the future creates unacceptable risk for American citizens, who have long relied on the Naval Services to be at the intellectual forefront of national security concerns. The Naval Services must learn from the history of war, as it teaches that when the equilibrium between the character (technology and tactics) and nature (human role) of war is upset, strategic surprise is often the result. These principles have informed how the E4S Board has approached this wide-ranging study of the subject.

The United States finds itself at the crossroads of several significant changes in our modern world. We are seeing the return of great power struggle, and the rise of nation state competition, on the world's oceans and ashore. Simultaneously, society and technology are experiencing a revolution in computing and data science, with the development or artificial intelligence, and quantum computing. These changes are progressing with a concurrent shift in the tactical and operational level of naval power, from the development of hypersonic weapons and cyber military capabilities, to the growth of asymmetric conflict in the form of maritime militias and irregular forces operating short of declared war.

The current and future leaders of the United States Navy and Marine Corps will have to deal with these challenges, and will have to be prepared for the challenges that lay just beyond the horizon as well. In the Cognitive Age, where leaders have to deal not only with incomplete data but also with analysis and decision making in a world that involves overwhelming data, the ability to evaluate information, reason strategically and ethically, and act decisively, will be essential elements of future success. These are skills that can be taught. These are talents that can be developed. The challenges and multi-disciplinary issues of our contemporary world can and should be specifically examined through our naval education programs.

Over the past several months of study, the E4S Board has examined this key problem: Is the naval education program that is currently in use prepared to address the challenges of the modern world? This has involved examining how our educational programs are organized, administered, and resourced, both at the micro-level of the individual institutions as well as the macro-level of overall Navy and Marine Corps administration. In addition, we have delved into the history of our naval educational programs and institutions, and the pattern of reform and improvement that existed of over a decade but which has stagnated in today's era. Finally, answering this key question involves understanding who is attending the courses at our naval educational institutions, who is teaching at them, and how their attendance or time as an instructor fits into their naval careers and development as professionals.

A transformational role for education exists now in order to ensure that we can keep pace with modern change through agile learning and maintain a lethal, winning edge for the future.

> **From our examination of the issues and intense deliberation, the E4S Board believes that today's naval educational programs offer an adequate basic foundation, but are insufficient to maintain our critical advantage moving forward into the Cognitive Age.**

It is vital that we address improvements both in organizational and individual learning simultaneously, and with a sense of urgency. A basic foundation will not be enough to provide the Navy and Marine Corps with the kinds of thinking and professional leaders needed in the rapidly developing world of the twenty-first century.

The Department of the Navy is an extremely complex organization. We must ensure the Department understands changes in its external environment and adapts strategy, plans, technology, tactics, and operational concepts accordingly. Our research has shown that it often takes a tragedy to stimulate the organization to learn, as the USS THRESHER and subsequent SUBSAFE program shows. As an organization, we must anticipate changes in the operating environment

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and adapt to maintain an advantage. This can only be done by eliminating outdated personnel practices, adopting agile processes, and continuously improving how we operate and fight. It is highly unlikely that the greatest naval strategists and leaders of our past, such as Mahan, Ellis, and Krulak would be successful in today's bureaucratic environment. Simply put, the best naval strategists that our naval education enterprise can produce today will fail without improving the organization in which they operate.

The cognitive skills and abilities of naval leaders must be viewed as a strategic national asset. Today, our naval learning institutions serve as the "foundries of the mind" and require frequent retooling to ensure the naval learning enterprise remains vibrant, relevant, and in tune with national strategy. The United States has long held a national competitive advantage over other states in educating our citizens and military personnel. However, because we have seen little reform or improvement to naval education over the past several decades, and no effort to organize the educational programs of the Navy and Marine Corps holistically, this advantage is eroding.

When examining long-term global trends, the United States Intelligence Community expressed its concern with America's K-12 education system, noting that other nations are surpassing the performance of our once cherished institutions. The rest of the world has taken notice of the intrinsic value of education, and has taken action. Revanchist powers and our allies both recognize the importance of military education and they are in the process of retooling their programs (see Appendix B). Maintaining a cognitive advantage over potential adversaries is of vital importance, as is keeping pace with our partners and friends; preserving the status quo state of lethargy would be a strategic blunder – one that no naval leader should be willing to make. As we face this vital inflection point, now is the time for change.

A Vision for Naval Education

Our Sea Services are united by a legacy of excellence in the profession of arms that dates to their very founding. The American people have come to expect their naval professionals to be among the most far-thinking, innovative, adaptable, and creative men and women in the world. Yet once again, the world is changing. Emerging from a period of limited wars and unquestioned American supremacy, the United States has entered a new era of multi-polar competition. The gap in American dominance has closed in multiple areas; not only in warfighting, but also economic capacity and sophistication, technology, and human talent. This strategic competition presents both a challenge and an opportunity

to rethink the way we educate our Sailors and Marines for the naval institution, not just for this new era, but also for the one beyond. Beyond the purely geostrategic realities America faces today, the breathtaking advances in computing, artificial intelligence, and other emerging technologies mentioned earlier demands a focused concentration on educating and training our naval professionals for the realities of the digital deep horizon. This will require not only educational innovation, but also technical, scientific, and digital infrastructure to support this major change in our educational direction.

The time to act is now. Vigorous and transformative connections amongst education, research, science and technology, simulation and war-gaming, operational testing and Fleet exercises have never been more important. This requires a comprehensive approach and an effort that is coordinated and collaborative rather than stove-piped and individual to each educational institution. It is not only our charge to protect these precious instruments that help us understand and prepare for future conflict – it is our duty to challenge the assumptions of the manner in which we organize, resource, oversee, and network those instruments for maximum agility in anticipating that future despite an uncertain strategic environment.

The good news is that our Naval Services have been here before. When national assumptions all pointed towards a period of extended peace after World War I, naval planners at Newport and Quantico and other intellectual centers of gravity focused on educating the officer corps, and innovated and prepared for conflict: from carrier aviation to amphibious operations to supply chains of enormous breadth, and later, transformative weapons and technology. The result was victory in the Pacific and Atlantic against the most determined peer competitors our Nation had ever faced before. It is now time to empower critical and strategic thinking and decision making, creative applications of new and diverse technologies from deterrence to conflict, and naval research and development of those technologies in ways that create a winning edge.

Looking to the Past and the Future

In order to ensure that our Navy and Marine Corps are prepared for the complexity and rapidity of the modern world, we must educate leaders who have the skills required to solve problems that cannot even be imagined today. This will require an educational system that looks to the future as well as the past, which is agile enough to adapt as new problems are identified, and that will help us understand them. It is a system that must be built on the insatiable curiosity of naval professionals, both operators, professors, and researchers alike – based on the proven foundation of the scientific method of theorizing, hypothesis testing, and continual learning.

The professional military education of leaders in the Naval Service occurs across three broad segments: in the strategic and research disciplines within our educational institutions, in the naval and joint operating forces, and through an abiding lifelong individual commitment to continually improving. The Department of the Navy vision for naval education not only serves to align our educational institutions with a uniting purpose, it also emphasizes the expectations for how commanders assume responsibility for the education of their charges, and creates expectations for how individual naval leaders constantly and faithfully undertake their own personal development.

From a long study of war, we know that leaders in peace, crisis and conflict, must be able to accomplish three things: discern, decide, and act. The scope and magnitude of these three components increase across the career of the naval leader, along with their ability to understand their environment and plan for the future. These essential capabilities remain at the heart of what a leader must be able to do. The educational experience contributes to the willingness, the skill, and the readiness to discern, decide, and act.

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VISION FOR NAVAL EDUCATION

The Naval Education Enterprise must produce leaders of character, integrity, and intelligence steeped not only in the art of war, the profession of arms, and the history and traditions of the Naval service, but also in a broader understanding of the technical and strategic complexities of the cognitive age, vital to assuring success in war, peace, and grey zone conflict; officer and enlisted leaders of every rank who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action.

Continuities of Professionalism and Education

The continuities of education are derived from the elements of the vision itself and define the educational undertaking across the three principal segments of the naval leader's strategic education throughout classical and modern history, scientific research, and the development of agility in learning, both personally and institutionally. These continuities equip the leader to make decisions based in knowledge and understanding, to communicate decisions coherently and effectively verbally and in writing, and to create the bias for ethical action in an ever-more automated world:

"Leaders of character, integrity, and intelligence . . ."

- This dimension of the vision embraces the moral development of the naval leader. Here is where leadership instruction, character development, and the creation of an ethical foundation occurs with an objective of creating leaders who are humble servants, and who constantly strive to live lives defined by unimpeachable character and integrity. They are lifelong learners, artfully and indelibly instructed with a classical strategic education while young, and inspired to research, invent and discover at every age. They are possessed of sound ethical judgment, are morally and physically courageous, and fully understand their essential human leadership role in conflict in every sphere, both detached and in person. This is the foremost aspect of the vision for naval education and is essential to the development of the naval professional.

". . . steeped not only in the art of war, the profession of arms, and the history and the heritage of the naval service . . ."

- The naval leader must be, at once, a scholar of the profession of arms, but also an avowed student of the profession who possesses a fascination for a lifelong study of the history, culture, theory, character and nature of war, the preparations thereof, and the peacetime responsibilities of naval forces in a world of complex competition. From this element of the vision, the naval leader also develops an understanding of the unique contribution of naval forces in history and in the national security of the United States. An understanding of such essentials as risk, speed, agility, and flexibility are inculcated through such study. The capacity to kindle a personal and lifelong commitment to learn is achievable at any age.

". . . but also in a broader understanding of the technical and strategic complexities of the cognitive age, vital to assuring success in war, peace, and grey zone conflict." . . ."

- This element recognizes the technological, digital and scientific education necessary to embrace and master the strategic, operational, tactical, and technical realities of the cognitive age. Naval research and education are not separate tasks – either procedurally or programmatically – but coexist alongside the innovation engines of America. The educational experience of a naval leader must include an explicit institutional intention to understand the present and to demand and create the possibilities of the future. This expectation must be imbued

from the earliest moment of a leader's career along with the inspiration to hypothesize, test, and reevaluate every assumption with a view towards continual learning for both the individual and the institution.

". . . who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action."

- From the earliest moments of a professional's career, naval education must contribute to the creation of men and women of courage, decisive by nature, and emboldened to action. In terms of the bias for action, naval leaders must be just as ready to move against the enemy, solve a social problem below decks and in the platoon, or master complex systems in every domain, ensuring the values and inherently ethical nature of American democracy and our Constitution are adhered to regardless of distance or automation. Critical thinking comes from practice and the key is to develop curricula that require critical thinking to solve tough problems. Critical thinking is not doctrinal nor is it a rote training program. It is, rather, an educational approach wherein a foundation for thinking, examining, analyzing, discerning, deciding, and acting is established and continuously developed.
- From sand table exercises at the most junior level, to complex war-games simulating theater, cyber, digital, global, or space conflict, the capacity of mindful decision may be one of the most strategically important outcomes of the education of a naval leader. History is replete with examples of leaders at all levels who were immobilized at the "moment of truth" because they neither possessed the base knowledge to decide, nor did they possess the capacity to decide and act. Our future will similarly demand leaders who possess both the knowledge accumulated from all the elements of naval education previously discussed in this vision statement, as well as the moral capacity to decide and act.

Charting the Course Ahead

As the U.S. Navy and Marine Corps sail ever further into the 21st century, the education of our men and women and the cultivation of their talents are central to our future success. Access to information will not be the problem for future naval leaders, as much as the need to be able to understand, discern, and analyze the incredible amounts of data that is becoming widely available. As Alfred Thayer Mahan once wrote, "mere knowledge is the least of an officer's needs." The ability to do this rapidly, and for our organizations to adapt and learn at high velocity, requires a deep education that

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necessitates time and resources. Naval leaders will require the traditional analytical and technical skills that continue to provide the foundations of data-driven decision making, but will need to develop the ability to manage, communicate, collaborate, and empathize to understand the human nature of conflict, core skills that artificial intelligence and machine learning are unable to match.

This Naval Education Vision offers the keel on which the Department of the Navy must build our educational system. From these fundamental ideas, the educational institutions and programs in the Navy and Marine Corps should align their curriculum development, determine the relevant embrace of the latest pedagogical science, and develop their use of digital educational technologies that offer diverse delivery methods.

Organizing and equipping this new naval education ecosystem will require the identification of the resource requirements of the process at the macro level and the specific programs, processes, and institutions at the micro level.

> **A coherent vision and coherent organization, as well as management and leadership of the Naval Education Enterprise, is necessary for the fullest realization of the capacity of our Sea Services.**

Education unites us amidst our earliest beginnings, fortifies us for joint operations, and inspires us to imagine our strategic future. The Department of the Navy should undertake this entire process with a holistic, prudently integrated, and career-long approach to the education of naval leaders.

The Education for Seapower Study process has been data driven and rigorous. In establishing the Study, the Undersecretary of the Navy directed the research team to consult experts from a broad range of academic and professional fields, both within government and the private sector. The Education for Seapower research team collected data using a variety of techniques following the norms of social science research: semi-structured interviews, meta-analysis of previous reports and studies, organizational questionnaires, focus groups, content analysis, and online surveys, and the data mapping of these results. This project used three widely accepted approaches to research: quantitative, qualitative, and mixed-methods analysis to support findings and recommendations.

Quantitative analysis was conducted using the data submitted by the naval education institutions, service personnel systems, and outside agencies. The data showed trends in attendance rates, academic performance, and promotion rates. Qualitative research methods were used to analyze survey results of faculty and naval officers, the survey was conducted in accordance with the Department of the Navy's human subject research protocol, and included both open-ended and structured questions in order to draw from the research subjects the desired information into our current naval education system. Analytic data coding was used throughout this project in particular during semi-structured interviewing techniques for more than 55 subject matter experts (SMEs), drawing from public and military academia, military and governmental leaders, as well as experts in the cognitive sciences. A sample of articles from premier naval journals was taken and articles were analyzed to draw inferences from the perspective of naval practitioners. Mixed-methods research also was used where appropriate. Advanced analytical coding methods were used to quantify trends in survey data, open ended responses to interview questions, and content analysis of professional journal articles. Special thanks are owed to the Center for Naval Analyses for their assistance in analyzing the survey data and to our outside experts who participated in numerous focus groups and fruitful discussions.

Our recommendations begin with fundamental and vital change to the organization of the Naval Education Enterprise, as well as adjustments to the key governance structures, in order to enhance alignment, oversight, and command and control. The current arrangement and distribution of naval educational programs is disparate and lacks not only centralized command and control, but also lacks efforts at cooperation and coordination. This results in curricular incompatibility, insufficient coordination between the research arms of the Department of the Navy and its educational institutions, and alignment to the strategic challenges of the contemporary world. This will include the reassignment of authorities and responsibilities, including financial matters. The current structures spread authorities and responsibilities for budgeting and policy development throughout multiple commands and Department of the Navy organizations. This results in an inefficient use of resources, as well as an incrementalist or limited view of education, and must be rectified.

Following those changes, the Study's Executive Board has also developed a list of specific policy recommendations for the new structure to pursue. Adjustments to naval policy are often the most effective way for the Secretary of the Navy to influence not only the bureaucracy but also the cultures of the Navy and Marine Corps. We must make efforts to inculcate the values of naval education within the broad expanse of career-long naval service. Education is a fundamental and foundational element of not only the management of talent, but also its very creation across the span of a naval career. The Department of the Navy must take measures to highlight its importance and value to our warfare communities, align promotion and selection policies to that importance, and require its prioritization within the personnel systems of the Navy and Marine Corps.

Finally, the Study's Executive Board developed a list of areas where detailed efforts and reform should continue, and which demand rapid further examination and study. There are important questions about the future of the curriculum at each of the Navy and Marine Corps' educational institutions. By making the vital changes to the governance and policy at the Department of the Navy and service level, the Board expects this new structure to address the detailed questions of how and what our institutions are teaching. Senior leaders across the joint force have expressed dissatisfaction to the Board with the skills that graduates of the nation's PME institutions are bringing to their staffs. Addressing these concerns must be at the top of the list for the new Naval Education Enterprise to tackle, and it must involve the expertise of the faculty at our schools alongside the stakeholders from the Fleet and the Pentagon.

Likewise, follow on efforts should examine the recapitalization of the Naval Postgraduate School to ensure that our professionals have world-class facilities for their distinctly naval technical studies. The Enterprise should also examine key academic questions, including the relative value of today's credentialing methods, which are exclusively focused on the

THE NAVAL EDUCATION ENTERPRISE (NEE) concept is necessary to synchronize individual and organizational learning, along with integrating and coordinating better policies, resources, and acquisitions. It will provide SECNAV a sustained framework to issue unified strategic guidance, a common vision for the global environment, and enable lifelong learning by leaders of all ranks. The NEE should consist of:

- **NAVAL UNIVERSITY (NU).** The President of NWC will be a three-star naval officer. Navy and Marine Corps officers will rotate into the position every three-to-five years. That person's new duty as NU's President will be to instigate and be responsible for the orchestration, coordination and integration of policies, curricula, and systems acquisition for NWC, NPS, MCU, the USNA, and the NROTC, including all naval fellowships and General and Flag Officer education. The NU President will unite the budget process for education across the NEE.
- **CHIEF LEARNING OFFICER (CLO).** The CLO shall write policy, assist NU with policy formulation, answer Congressional interests in education, assist NU in oversight of Navy and Marine Corps educational budget lines during the POM process, and represent education as a warfare capability and enabler.
- **PROGRAM EXECUTIVE OFFICER-LEARNING (PEO-L).** This position will be the Commander of Naval Air Warfare Center-Training Systems Division in Orlando. They are responsible to President of NU for all acquisition and RDT&E by providing technological educational solutions to the NEE.
- **NAVAL COMMUNITY COLLEGE (NCC).** It will serve as the focal point for enlisted education in the naval services. The NU President, and the USNA Superintendent, will develop accredited programs relevant for naval operations.

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attainment of accredited master's degrees and should examine other options like certificates or post-graduate diplomas, and issues of standardized administration around faculty tenure and publication standards. Finally, the Enterprise must tackle how to develop the modern digital backbone necessary for modern education. As these questions are scrutinized, more areas for coordination and collaboration with rise to the surface as well, offering the Naval Educational Enterprise the opportunity for continuous improvement, reform, and delivery of the best-educated naval professionals in the world to the Fleet.

We have structured this Study to offer a clear view of the research conducted for our efforts, and to sequentially build toward the conclusions and recommendations for reform drawn by the E4S Board. First, the study examines the history of naval education and the development of the Navy and Marine Corps' key institutions to provide a foundation of where the services have been and how naval education has been reformed in the past. Chapter Two discusses the role of education in the development of naval professionals, offering both an assessment of the current situation and a vision for the future of the value proposition for both the services and the individual professionals. Chapter Three lays out the current organization of the major naval education programs and assess the challenges that they face and the immediate areas for improvement. Chapter Four details many of the previous efforts to study naval education or create plans for reform, and offers a meta-analysis of the multitude of ideas that have come from inside the defense establishment and outside it in the form of Congressional studies, think tank reports, scholarship from military and academic thinkers, and the observations from the experts interviewed by the E4S Staff. The Fifth and final chapter of this study discusses the detailed, specific, and immediate recommendations provided to the Secretary of the Navy, as well as brief descriptions of the areas that the Executive Panel believes are ripe for further study and reform.

CHAPTER 1:
The History of Naval Education

"In 1919 then-Captain Ernest J King authored the report of the Knox-Pye-King board that was commissioned to chart the future for the education of naval officers following World War One. The report "offered a coldly honest portrayal of fellow naval professionals as being insufficiently prepared for the broad spectrum of challenges facing the naval profession."

Almost 100 years have passed since King's report was submitted yet the situation faced by today's naval officers today is glaringly similar to what King saw coming in the aftermath of the first world war. There is a broad spectrum of truly daunting challenges – strategic, operational, fiscal, geo-political and socioeconomic – that must be confronted in an environment characterized by extraordinary technological change, significant social unrest and declining faith in the institutions of government at every level.

What to do to better prepare our Navy and Marine Corps to operate, fight and win in such a demanding environment and in the face of such challenges? The answer today is the same that Captains Knox, Pye and King gave in 1919 – dramatically increase the quality of professional education and break down the bureaucratic barriers that prevent that increased investment in education from having the impact absolutely necessary to prevail in an era of great power competition.

We cannot predict when or where the next conflict will come, but we can prepare for the inevitable conflict that awaits by providing our Sailors and Marines the intellectual architecture necessary to confidently confront the unfamiliar and the unknown.

— Admiral John C. Harvey, Jr, USN (Ret)
Former Commander, U.S. Fleet Forces Command"

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Summary:

For much of the Navy's history, education often took a secondary position to operational priorities. One of the constants of that history has been the reform and development of more advanced educational programs to keep pace with the changing character of war. With the advent of the steam powered navy, the U.S. Naval Academy was formed to give officers foundational knowledge in science and technology and in the wider history and culture of the world around them. As the steel navy and big-gun battleships changed naval conflict, professional crusaders like Stephen B. Luce and Alfred Thayer Mahan formed the U.S. Naval War College to introduce postgraduate education focused on strategic thought and operational art. After World War I, a recognition of the changes that submarines and aircraft were making to naval conflict led to William Sims' revitalization of the strategic program in Newport and the growth of graduate education in technological disciplines. When technology accelerated in the atomic and missile age, Naval Postgraduate School moved to Monterey and began granting its own degrees grounded in naval research as naval education began to focus on the technical and technological. But, after inconclusive conflicts in Korea and Vietnam, and as the Cold War came to a crescendo in the 1970s, Elmo "Bud" Zumwalt ordered Stansfield Turner to revolutionize strategic education at the Naval War College to address the challenge of the growing Soviet threat. As the Cold War came to an end and the character of conflict drifted toward the irregular, the Marine Corps University reorganized and advanced our understanding of the broad spectrum of military operations. These educational enhancements and reforms have often required bureaucratic disruption, special studies and boards, and innovative advocates. At times of strategic or technological inflection, education has been the means to identify change and prepare our personnel intellectually to balance the character and nature of war. Today, another inflection point is at hand: the transition from a focus on countering extremism to near- and peer- competitors, as well the impact of deep learning and Artificial Intelligence and the prospect of hyperwar. As it has in the past, the naval educational enterprise must react accordingly.

Concerns over the education of Sailors and Marines, and in particular the officer corps, date back to the founding of the Department of the Navy. As with many naval subjects, including fleet size and constitution and the funding for the force, it has been an area of debate and discussion, infused with a sense of tradition but also of reform. Across almost two and a half centuries, officers, civilian naval leaders, and the political leaders of the nation have updated the Naval Education Enterprise in ways that produced critical results and served to raise America's Navy and Marine Corps to the pinnacle position they presently inhabit in the world. This came about not only through the development of institutions of higher learning, but also the semi-regular assessment and reform of those institutions over time. The history of naval education suggests, if nothing else, that the enterprise serves the Naval Services and the nation best when it is the critically re-assessed and reformed, especially as the needs of the nation and the needs of the services shift alongside the changing character of war.

One of the first formal expressions of how a naval officer should be educated came from the quill of Captain Thomas Truxtun in 1799, at the time the Department of the Navy was being established to fight the Quasi-War with France. As the Navy and Marine Corps deployed into the grey zone of the Caribbean, where multiple great powers were in a state of conflict and non-state actors like smugglers and pirates abounded, Truxtun laid down his view of the knowledge needed by the young officers who were the future of the services. Knowledge of the practical elements of seamanship, navigation, and gunnery were clearly important to the training of a Midshipman, but the officer who would become the Navy's most combat effective Captain during its first war also believed that aspiring officers required wider education in character and cultures. While Truxtun himself was not long for the service, leaving in a petty squabble over seniority in 1800, his ideas served as the foundation that the Naval Education Enterprise was built upon.

Throughout the Age of Sail period for the United States Navy, tensions rose over the fundamental question of where officers should receive their educations. At first, following the model of the British Royal Navy, education was provided aboard ship. The Ships of the Line, the largest sailing warships, were assigned dedicated "Schoolmasters," considered a warrant officer position in the early Navy. On some smaller ships, Chaplains were often responsible for both tending

to the religious needs of the crew and also educating the Midshipmen, so many Chaplains came from both teaching and clerical backgrounds. On other ships, the educational program was left directly to the Captain and his Lieutenants. While literally "learning the ropes" of a warship under sail, and practicing with their gun crews, midshipmen studied academic subjects like mathematics, history, and occasionally, languages. But on most ships, these studies were given a secondary position in the daily routine of the aspiring officers, and were only allowed for when all other responsibilities had been completed. It was an inefficient way to teach and the lack of standardized instruction resulted in a dramatically inconsistent level of knowledge across the whole of the Navy.

Reformers in the years before the War of 1812 began to propose the establishment of a naval school where midshipmen could be educated ashore to ensure both a consistent level of knowledge and the time needed for true academics. But the operational mindset of most senior officers, who had never been given such an opportunity themselves, predominated. In 1814, as the War of 1812 was coming to a close, Secretary of the Navy William Jones made the Navy Department's first legislative proposal to formalize the education of Midshipmen. While there was some limited interest from individual politicians, Congress generally ignored the suggestion. As U.S. warships deployed in squadrons to distant stations to protect American interests around the world, as well as to encourage science and trade, schoolmasters and chaplains remained the center of naval education, and the system continued to produce inconsistent results.

In the 1830s, the Naval Lyceum was founded in Brooklyn, NY and printed the *Naval Magazine* for two years. In that early professional journal, numerous junior officers published articles under pseudonyms advocating for a formal curriculum for the education of a naval officer, as well as the creation of a service academy on the model the Army had adopted with the founding of the U.S. Military Academy at West Point in 1802. It was not until the famed historian George Bancroft was appointed Secretary of the Navy under President James Polk, and in the aftermath of a mutiny aboard the training ship *Somers*, that the Department of the Navy succeeded in convincing Congress to create a Naval School at the former Fort Severn in Annapolis, Maryland. In 1845 the U.S. Naval Academy, as it was officially renamed a few years later, was born and a formal and official curriculum of education was created that all officer candidates would complete. This initial course of study made an effort to balance the scientific knowledge needed by young officers – such as the physics necessary to understand gunnery and the mathematics necessary for celestial navigation – with the study of history and foreign languages and cultures which they would encounter in their deployments around the world. For the moment, the forces of formal education had overcome the service bias toward operational experience.

In the early decades at the Naval Academy, the effort to balance the curriculum between the sciences and the humanities was matched by an effort to balance the faculty, with a mix of expert civilian professors and promising and intelligent officers who could model the institution and served as mentors to the midshipmen. The first of these was Lieutenant James Ward, who would earn the unfortunate distinction of being the first U.S. naval officer killed in combat during the Civil War, while in command of gunboats in a battle on the James River. In the closing year of the Civil War, after the Academy had moved to Rhode Island to avoid proximity to the conflict, a young Lieutenant named Alfred T. Mahan joined the seamanship and navigation department under the direction of a Lieutenant Commander named Stephen Luce. There, as they taught the Midshipmen the fundamentals of ship handling and prepared them to join the war raging to the south, the two men struck up a deep friendship cemented in an understanding of the fundamental role education played in naval professionalism.

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Following the Civil War, and the return of the U.S. Navy to a forward deployed, squadron-based global strategy, Luce and other officers reflected back on their wartime service. Considering the Navy's successes and failures in the war, Luce concluded that naval leaders had not been educated to think about or plan for the higher operational and strategic levels of war. In the early 1870s a group of both Navy and Marine Corps officers gathered in an unofficial capacity to teach each other about naval history, strategy, and policy, while they were serving as instructors and staff in Annapolis. Their aim was to create an environment of personal professional study to learn the important material that the Navy itself seemed to be ignoring. They named their group The United States Naval Institute. After their first meetings the members of the group began publishing papers and articles written for their personal development in a new journal that became known as *Proceedings*.

Not long after the Institute's founding, the organization's elected officers decided to create an essay contest in order to address the most pressing questions of reform and innovation for the Naval Services. They named the contest "The General Prize" and the very first topic which they selected for the essays, and the area most in need for reform in their minds, was the subject of naval education. It had been three decades since the founding of the Naval Academy, and while the United States had fought two wars and had a growing role in world affairs, almost nothing had changed in how officers were educated. Ten essays were submitted in early 1879 with suggestions of how to improve education in the Navy and Marine Corps.

The judging committee for that first General Prize included two senior officers and the President of Harvard University. The winners were LCDR Allan Brown, LCDR Caspar Goodrich, and CDR Alfred T. Mahan who was now the head of the Gunnery Department at USNA. The essays written by these three officers offer the first formal and written "review" of naval education and its practices and suggestions for reform. The topics covered included: 1) How to balance the undergraduate education of Midshipmen between the sciences and engineering on the one hand (which had come to predominate in Annapolis), and their need to understand history, international relations, and languages and cultures on the other; 2) The need for postgraduate education for naval officers to adapt to changes in modern technology, the design of ships and weapons, and develop the higher knowledge and understanding of strategy; 3) How education should

be seen as a fundamental part of the naval profession, required throughout a career, and how it should fit in the regular officer career path.

In the wake of the Naval Institute's General Prize, the Department of the Navy formally commissioned a committee to examine the question of higher-level education, placing Captain Luce in charge and including Caspar Goodrich in the membership. The Luce Board produced a formal recommendation for the creation of a Naval War College (NWC) at Newport, RI, in order to begin the postgraduate education of naval officers. In 1885, Secretary of the Navy Benjamin Tracy authorized the creation of the college, and Luce was named its first President. Luce built a small faculty for the first years of the college, which included Commander John Stockton to teach naval and international law, and LT William McCarty Little, who became the founding father of Navy war gaming. Luce also invited his old friend A.T. Mahan to assume responsibilities as the professor of naval history and strategy.

The founding of the NWC introduced postgraduate strategic education to the U.S. Navy, but the fleet as a whole looked at the enterprise with suspicion. There were many leaders, just as in the years before the founding of the Naval Academy, who believed that Sailors and Marines and their officers learned best through experience and by being at sea. There was little room for education in a classroom when operational excellence and experience was the measuring stick for success in the services. Just as with the founding of the school in Annapolis, senior officers who had not had the opportunity offered to them for formal postgraduate schooling suggested that spending time at sea was the only strategic education needed for the most senior levels of command.

For the first decade of the existence of NWC, both Luce and Mahan, who assumed the Presidency on Luce's orders to take command of the North Atlantic Squadron, struggled for funding and material support. Besides the fiscal challenges, the Navy's personnel system sent as few officers to Newport as possible, and made no effort to send the service's top performers. Instead they sent whomever was left over when the important sea going billets were full.

After the Spanish-American War, the role NWC professors and students played in creating the strategy and leading some of the operations of the war made an impression upon the Navy. In the early 20th century, particularly after President Theodore Roosevelt took office, the Navy began sending more officers to the college and expanded the program to include a yearlong course of study. It was also recognized that rapid advances in technology which accompanied the turn of the century, including wireless radio, submarines, and aviation, required officers with a higher level of technical literacy than undergraduate education was then providing. In order to integrate new technology and learn how to think amidst an incredible rate of change, education was necessary. A postgraduate course of study was created at the Naval Academy in science and engineering and a small number of officers began to be sent to civilian universities to obtain Masters Degrees in engineering. This was the beginning of what soon became known as the Naval Postgraduate School (NPS) in Annapolis. In 1910, the Marine Corps also established its first formal school, the Advanced Based School in New London, Connecticut. The Corps treated attendance at NWC as their most valued educational billet, but in the years before the First World War they maintained a joint view of education and sent many of their officers, like John Lejeune, to the Army War College.

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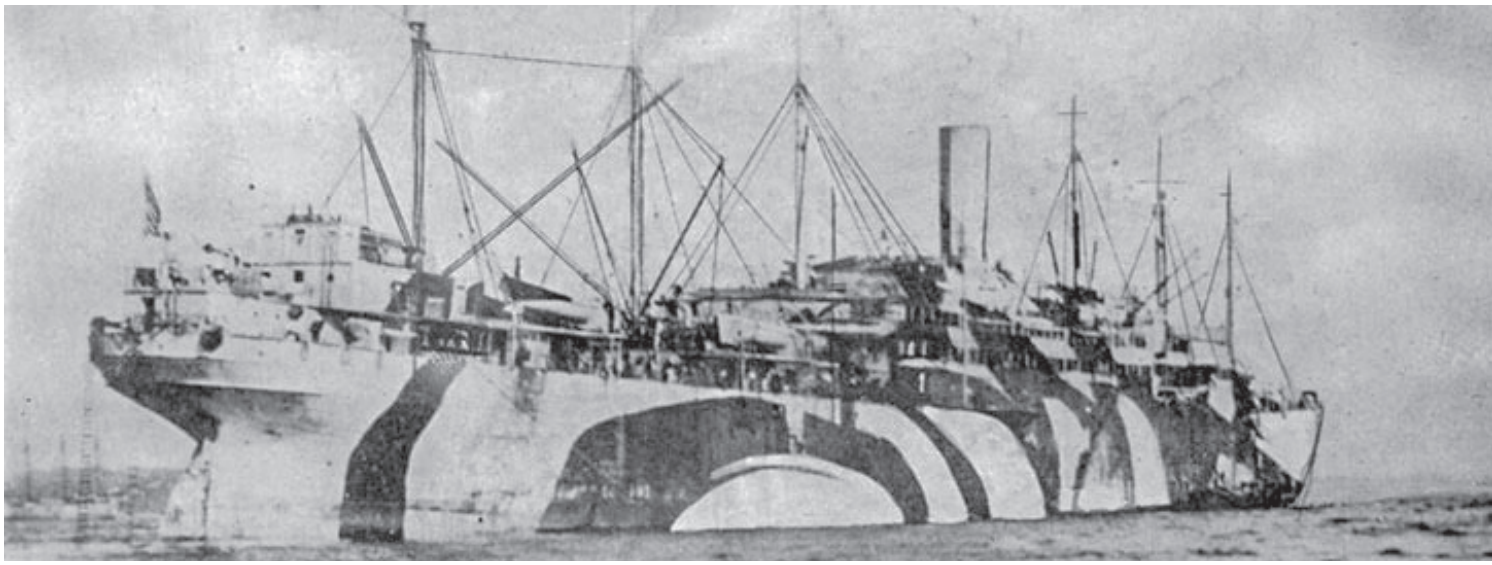

In 1916, as news of the Zimmerman Telegram and the memory of the sinking of *Lusitania* brought the United States to the brink of joining the war in Europe, the Navy's postgraduate educational programs were temporarily closed. Both NWC and NPS were shuttered and all the students and military faculty returned to the fleet as the nation mobilized for war. The experiences of the Navy and Marine Corps in World War I had a profound impact on the sea services and naval education. Upon return from the war Admiral William Sims, who had commanded U.S. naval forces in European waters, determined to return to the rank of Rear Admiral in order to assume the role of President of the Naval War College. His testimony before Congress, and Pulitzer Prize winning book *Victory at Sea*, illustrated his belief that the Navy had suffered from deficiencies in strategic and operational thinking during the war. He believed that this could only be addressed by a more rigorous approach to naval education. Under his leadership, NWC revitalized their curriculum, continued to improve the war gaming and integration of the gaming with the work of the new Office of the Chief of Naval Operations and the Navy's home for innovation, the General Board.

In Annapolis, NPS reopened under the leadership of Captain Ernest J. King. As he re-established the technical learning at NPS, King, Captain Dudley Knox, and Commander William Pye were tasked by the Navy's senior leadership to examine educational reforms to better prepare naval officers for the wars of the future. The Knox-Pye-King (KPK) Board, as it came to be known, made a clean-sheet review of the Navy's education programs and schools and produced a report that would serve as the template for the Navy of the interwar years. KPK explicitly placed education as a fundamental part of the naval officer's career. Acknowledging that advances in technology meant that combat officers would need to specialize in either aviation, submarines, or surface ships, every officer would learn to be a naval generalist through a long regimen of education. After their initial schooling at the Naval Academy, the KPK report laid out a career path that included a year of post-graduate study at NPS in a common curriculum called the General Line Course, a year in the junior course at NWC, and a year in the senior course at NWC. In addition to these requirements, some officers would be sent to civilian graduate schools to obtain degrees in relevant fields.

While the KPK report insisted that a standard Navy career path including four years of undergraduate education, and that three to five years of postgraduate education should be compulsory for all unrestricted line officers, the personnel system executed the plan in a less than ideal manner. However, despite some resistance from the entrenched bureaucracy, the results were still significant. Officers like Lieutenants Arleigh Burke and Hyman Rickover had the opportunity to go to the University of Michigan and Columbia University, respectively, to earn their Masters' degrees in engineering, and the vast majority of the officer corps attended a combination of multiple postgraduate educational programs following their undergraduate education and commissioning. On the day before the Japanese attack on Pearl Harbor, 81 of 83 Flag Officers were graduates of NWC, and only one of the non-alumni was an unrestricted line officer. While the performance of these initial leaders at the start of the conflict was certainly mixed, the officers that rose into positions of operational leadership during the war had all been educated at the Naval War College as well. As David Kohnen has

written, completion of the course at Newport "matured to become a prerequisite for promotion to higher command." The career path reforms that valued education and helped develop strategic ability and operational planning laid the foundation of the Navy and Marine Corps' success in the coming war.

The joint nature of NWC, including both Sailors and Marines as students as well as faculty and inviting Army officers to attend and teach, continued in the interwar years as the Marine Corps also began developing Marine Corps Schools at Quantico. The curricula began with many courses borrowed from Army schools, but as the interwar era continued, and the Marines developed their specific doctrine and approach to conflict, those curricula were discarded and instructors wrote their own educational programs. The center of Marine Corps education included staff officer educational programs and service specific courses, which led eventually to the development of the Amphibious Warfare School to prepare company and field grade Marine officers with an operational-level education. The Marines blended education with more specific staff and tactical training in an effort to build a continuum of learning that would stretch across a Marine's career.

Following the end of the Second World War, the Department of the Navy continued the pattern that had begun after the Civil War and after World War I, initiating reviews of naval educational programs and how well they had prepared their students for the major war that intervened. Before stepping down as CNO, Admiral Ernest King appointed Vice Admiral James Holloway to examine the undergraduate education and commissioning system in the Navy and Marine Corps. Likewise, Vice Admiral William Pye was appointed to look across the whole of the Naval Education Enterprise. For the most part, both studies affirmed the basics of the system laid out on the KPK report over two decades earlier. The Pye Board advocated for not less than four postgraduate schools in an officer's career. They also both examined how the Department of the Navy might contribute to the larger goals of national service and national education. These studies introduced the idea that the input to the naval education system – meaning the quality of graduates of American public schools – was a consideration that had national security implications.

However, after the affirmation in the immediate post-war years, naval education saw another series of changes coming in the approaching decade. In the 1950s, as Rear Admiral Hyman Rickover began building the nuclear submarine force, his technical inclination and belief in the ideals of the technocracy movement began to influence naval education. USNA had begun awarding Bachelor of Science degrees in 1933, and engineering remained the central element of the curriculum in Annapolis. Rickover insisted on the introduction of even more science, technology, engineering, and math (STEM) courses. He advocated for the development of an officer corps that could not only operate the weapons and

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platforms of the Navy, but had the technical mastery to design and build them as well. Major curriculum reforms began in the 1960s with the introduction of academic minors, under the generic Bachelor of Science degree, which shifted in the 1970s to the introduction of majors and a specific requirement that the majority of midshipmen study in the STEM fields. Tension remained between the academic education of thinking, innovative officers, and the practical training of future division officers.

Changes came to the Navy's postgraduate education programs in the first half of the Cold War as well. NPS had grown larger, and more capable, and in order to have the space required to build a graduate school that conferred more of its own degrees, it was moved to Monterey, California. The curriculum at NWC drifted towards the practical preparation and training of staff officers and away from larger questions of strategic reasoning and understanding of the wider world. Efforts like Rear Admiral J.C. Wylie's Advanced Strategy course came and went without gathering much institutional support. Admiral Rickover continued to lobby against anything that took away from training in technical and STEM subjects as the United States drifted into the Vietnam War. Following that conflict, however, VADM Stansfield Turner was dispatched to Newport by CNO Zumwalt to revitalize how the Navy's future leaders would be educated.

What became known as the "Turner Revolution" at NWC began with a fresh look at the curriculum and what kind of education an officer needed, rather than training in staff process and bureaucracy. Turner, himself a Rhodes Scholar, focused on introducing a system designed around intensive reading of the military classics and considerations of strategy and military decision making. The new course of study embraced a pedagogy that included heavy use of seminar style learning as had become common in the nation's top graduate schools, and brought in numerous rising stars from the civilian academic community to teach alongside experienced naval officers. In many ways, the fundamental changes to NWC driven by Admiral Turner survive to this day, with the three core courses remaining essentially the same almost half a century later.

In the aftermath of the Vietnam conflict and the introduction of the all-volunteer force, the Marine Corps led the development of enlisted education in addition to their officer programs. The first Senior Enlisted Academy was added to Marine Corps Schools in 1971, and both services introduced voluntary programs to help their Sailors and Marines begin taking courses for college credit. The development of enlisted education continued slowly as the Cold War ended and the end of the 20th century approached, generally put together with a patchwork of voluntary programs and the development of the Navy College and tuition assistance efforts. In noting these efforts at enlisted education, the history suggests that we must do more to both encourage wider education and coordinate its delivery and integration into our personnel system in our contemporary era.

In 1987, Commandant of the Marine Corps Alfred Gray ordered the redesign of the Marine Corps' education and doctrine development organizations. Marine Corps Schools was revived as Marine Corps University at Quantico. New courses of study were created over the following years, including Marine Corps War College and the School of Advanced Warfighting, which built upon previous schools like the Command and Staff College, Amphibious Warfare School, and the enlisted academies.

The development of MCU coincided with the introduction of the modern structure of professional military education, which was focused on the production of officers with a joint outlook. Following the passage of the Goldwater-Nichols Defense Reform Act of 1986, Representative Ike Skelton of Missouri led an effort to develop a new educational foundation to support the joint doctrine and philosophy advocated by the new governing legislation. Ever since the Skelton Panel completed its work at the end of the Cold War, there has been little formal and organizational change to naval education. The need for educational reform has been recognized and identified.

While the history of naval education has been one of adaptation, and response to changes in the character of war and in the operational challenges faced by the U.S. Navy and Marine Corps, the reforms that have occurred over the years were not without struggle. To think about the potential for reform today, it is also important to recognize the fact that naval culture is often uninterested in change or in progress. When Luce and Mahan formed the Naval War College,

they met with stiff resistance from other senior leaders in the Navy. Leaders of the Bureau of Ordnance and the Bureau of Navigation repeatedly cut the funding to the school, severely limited the number of officers they would allow to attend, and politicked in Congress to eliminate the educational program entirely. It took years of effort, the engagement of supportive politicians, and the leadership of the Office of the Secretary of the Navy to make Naval War College a permanent part of the Navy. The response to the Knox-Pye-King report following World War I was similar. While the Bureau of Navigation commissioned the board and their study, the final report was buried once it was complete. With the report and recommendations lost in the bureaucracy, the naval leadership in charge of personnel management wanted nothing to do with the significant reforms that the study advocated. KPK only came to guide naval personnel and education policy between the wars because someone kept a copy of the report and leaked it to the Naval Institute, who published it in the pages of *Proceedings* where it was widely celebrated. Reviewing this history has reinforced for the E4S Board that innovation and reform are never easy, and the naval bureaucracy will often work to maintain the status quo. This will be just as true in the 21st century as it was the nineteenth and twentieth.

Over the course of more than two hundred years, the U.S. Navy and Marine Corps have witnessed the changing character of war and have used reform and improvement of naval education as a fundamental tool in adapting to the pace of that change. The educational institutions and programs that naval leaders have developed over this history continue to make vital contributions to ensuring the United States maintains competitive advantages over potential adversaries. The Board's effort to compare the history of our naval education to our modern day challenges suggests that there is an area that has yet to be optimized for our strategic advantage. Individual institutions are valuable, but today's era of accelerating change and complex international challenges demands a synergy of efforts. The current educational enterprise, having grown out of individual efforts to address particular issues rather than holistic efforts across the Department of the Navy, lacks that synergy. Just as our Joint forces have learned to work together to enhance lethality and improve operational efficiency in combat at the start of the 21st century, the Navy and Marine Corps need a Naval Educational Enterprise that is collaborative, coordinated, and makes a holistic effort to leverage the strategic advantages that it creates. The board has concluded that today's naval leaders must stand on the shoulders of Alfred Thayer Mahan, Ernest King, Stansfield Turner, and Al Gray, reforming naval education as a whole and aiming to integrate and coordinate, rather than continuing as individual constituent parts.

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CHAPTER 2:
Education and the Naval Profession

"The U.S. military is being swept into tremendous shifts in the tides of global politics, economics, and security that will demand unprecedented innovation to navigate safely. Innovation is spawned by the synergy of disparate ideas spun into new—and often disruptive—concepts and capabilities. Diverse and continual education of our people is absolutely vital to this process. As such, it may be correctly said that the future of the sea services, and of our nation, rests squarely on the education of our workforce and those who lead it.

— Admiral James "Sandy" Winnefeld, USN (Ret)
9th Vice Chairman of the Joint Chiefs of Staff"

Summary:

In his 2018 National Defense Strategy, the Secretary of Defense called professional military education "stagnant." While each of the components of the naval educational enterprise is performing relatively well individually – it is not sufficiently integrated or coordinated as a whole. The value proposition is that the Fleet and Marine Operating Forces depend on education to enhance our leaders' ability to think and reason strategically and critically. To accomplish this, a process of continuous learning must be instituted across the services, especially at this inflection point in history. In reviewing the current state of the Department of the Navy's educational institutions, as well as scrutinizing the writing, thinking, and studies on naval and military education over the last twenty years, we agreed that there is a significant cognitive challenge ahead for the Navy and the Marine Corps as we head further into the 21st Century.

Scanning the history of the Naval Education Enterprise, regular patterns emerge. A regular cycle of assessment and reform occurs, generally after the Navy and Marine Corps experienced a large-scale war. As the character of war continues to change throughout time, fundamental questions are revisited. As the United States emerges from a unipolar period and begins to appreciate the new era of great power competition and friction, an opportunity presents itself to ask hard questions about how we are educating our force once again. This creates both a challenge for the naval profession, as well as a substantial opportunity. Due to the interest of the Secretary of the Navy, the Chief of Naval Operations, and the Commandant of the Marine Corps, the stars have aligned for what might be a once in a generation chance to look anew at naval education. A basic question that has been asked throughout American naval history, from the essays of the 1879 Naval Institute contest, to the King-Pye-Knox Board (KPK) of 1920, to the efforts of the Skelton Panel in the era of the Goldwater-Nichols reforms, is how and where education fits within the career of a naval professional.

The E4S Board's research, via interviews with both uniformed leaders and academic and civilian experts, has suggested that there is a disconnect between what education provides for a thinking, learning, and adapting Navy and Marine Corps, and how the naval culture of the twenty first century views education. While the most vibrant, intellectual engagements with the challenges of the new century come from highly educated and continuously learning leaders, today's Navy and Marine Corps tend to see education as a "check in the block" on an industrial age promotion path. In many ways, this is why Secretary of Defense Mattis makes the case that professional military education has stagnated. The quantitative data from the wider officer and faculty surveys conducted by the E4S Staff, and the data provided by the service personnel management offices, suggests this same detachment. Renewing the Navy and Marine Corps' understanding of the value proposition of education, to the individual as well as to the operational units and the services as a whole, requires immediate leadership and discussion.

The Value Proposition of Education for the Professional

Education, like training, is an effort that must extend throughout a naval career. For officers and for enlisted Sailors and Marines, when and how educational programs fit into a career path might require different approaches. However, a career of naval service crosses decades, and service members will experience fundamental changes of technology, weapons and systems, international relations, and of the very character of war during that time. In order to keep up with the pace of change – which is ever accelerating – Sailors and Marines require education and continuous learning throughout their career. For officers, this suggests that the current norm of an undergraduate degree before commissioning and a single ten-month accelerated executive course of graduate study is insufficient to create the operational and strategic leaders needed for the modern Navy and Marine Corps. For enlisted service members, a more organized and holistic view of service educational opportunities may be required, especially with the advent of the Blended Retirement System (BRS). The fact that an undergraduate degree and ten months in graduate school was considered insufficient for officers after World War I, when the KPK Board suggested three years of graduate education, and insufficient after World War II, when the Pye Board suggested four years of graduate education, may give us pause in the ostensibly more complex world of today.

Today's approach to naval education is one that fits within an industrial age view of a naval career and the 20th century's vertical schooling model. The concept of a "yellow brick road" toward promotion and advancement has combined with the rise in the cultural power of tactical, platform-based warfare communities. This dynamic serves to create naval career paths that might have worked in the binary strategic environment of the second half of the twentieth century, but could result in group-think, "school solutions," and the dominance of lock-step procedure over creative and critical thinking in the 21st century.

Today's naval professionals see themselves as members of tribes within the naval sphere, as opposed to actually identifying as naval professionals. Officers self-identify as Naval Aviators, Surface Warfare Officers, Submariners, SEALs or Marine Infantry, Marine Air, etc., focusing inward on their tactical and procedural specialty. As a result, naval learning produces

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master technicians and tacticians who may struggle to raise their heads to look at the whole of the naval profession and to study and understand the larger questions of naval strategy, policy, and the future. It is not uncommon for the same kind of tribalism to inhabit our enlisted areas of specialization, where, for example, Infantry Marines or Aviation Ordnancemen may hold themselves up as something wholly separate to the rest of their service brothers and sisters.

There is certainly positive value in a strong ethos, unit cohesion, and tradition that comes from these narrowly defined professional identities. But the dangers of the rise of these warfare-specialty tribes was identified as early as the KPK report. That report pragmatically recognized that specialization would be required to master the large amount of expertise and knowledge needed at the tactical level, but also espoused that education was required during periods spent ashore in order to inculcate not only the identity of a naval professional, but also to study those elements of knowledge and the skills necessary to produce officers capable of leading at the higher operational, strategic, and diplomatic/statesmanship levels of naval activity.

Dynamics and requirements of personnel management are driven by these communities or tribes, and are in large measure responsible for how naval professionals viewed education through the end of the Cold War and over the last three decades. The warfare-specialized culture and industrial age personnel system have united to reduce the value proposition of education for the naval professional.

Official naval policy dictates that officers should receive a graduate degree, which is enshrined in promotion and selection board convening orders. In addition to that, the Goldwater Nichols reforms mandated completion of some form of Joint Military Professional Education. But as the NDS states, these have become "checks in the block" in career management timelines. An online correspondence course crammed in on weekends, with a commensurate level of effort, is considered equivalent to the ten-month course in residence at the Naval Command and Staff College. The higher value of in-residence

education is not currently recognized by a Navy culture which continues to prize the tactical and technical level jobs and time at sea to the exclusion of other factors. In recent decades, advice and mentorship provided to both junior and senior officers was that the path to promotion valued "time in the cockpit" or "time at sea," etc., and as a result a set of orders spent in graduate school or in a program of higher learning would be seen as a black mark on an officer's record.

To be sure, many excellent officers have attended graduate programs and in particular have attended the Naval War College, Naval Postgraduate School, and Marine Corps University. It is the nature of any educational system for the exceptional to rise to the top. However, that rarely (if ever) happened because of a personnel system that intentionally tried to develop the talent of our officers through education. The exception to this general rule, however, is the Marine Corps, which implemented a selection board process for higher education in 2011. The Marine personnel system appears to value education for its officers, but it also makes an effort to select the most talented and upwardly mobile officers for the most prestigious education opportunities. In addition, education and learning are specifically addressed on the Marine Officer fitness report (FITREP) system, whereas in the Navy there is no ready method to do so.

Following in the historical wake of the founding of USNA, all of the naval educational institutions have attempted to maintain a balance between expert and credentialed civilian professors and military instructors who model the services. Historically, these have included both talented and upwardly mobile members of the service. Alfred Thayer Mahan's classic work *The Influence of Sea Power Upon History, 1660-1783*, began its existence as his lecture notes from his time teaching at the NWC, and he had twice served on the staff at USNA. Ernest King served as an instructor at USNA and was the head of the Naval Postgraduate Department at USNA (which became NPS) following World War I, before he rose through the ranks to become CNO during World War II. Chester Nimitz was the founding Professor of Naval Science at the University of California, Berkley where he established the NROTC program. Retired members of the E4S Executive Board have themselves served on the faculty and staff at USNA as junior officers before rising to Flag ranks. However, today's officer corps tends to see service at an educational institution as a poor career choice. Currently, only 2 of over 150 current active-force Navy Flag Officers have served on the faculty or as staff at a naval educational institution. While the Marine Corps continues to specifically select officers to teach at USNA and other schools through a board process, the Navy makes no such effort. Many uniformed faculty and staff at today's navy educational institutions are in their terminal rank, and likely in their terminal billet if they are not a member of a specialized restricted line community like the Permanent Military Professors or a staff corps officer. The natural bond between leader and teacher is often overlooked and an assignment in education is seen as having little to no systemic or promotion value for the naval professional today.

When considering the value proposition of naval education to today's professional, neither teaching at, nor attending the Navy's flagship educational institutions appears to enhance career prospects. While 98% of Flag officers had attended the Naval War College on the eve of World War II, today, only roughly 20% have. A majority of officers today complete their educational career requirements through distance learning programs. Studying at night and on weekends, on their own time, and sometimes using their own funds to supplement tuition at civilian graduate schools, officers with a lifelong desire to learn do the best they can to achieve the gates necessary for promotion while following the advice of the mentors in their tribes to not leave their operational communities. The message is clear to today's officers.

> **If education were valuable, the Navy would find ways to provide them the time to focus on it, to attend either JPME or other graduate opportunities in residence so that they could gain the most from the education, have the time to deeply engage with the material, and learn to think about the elements of the naval profession, beyond the elements of their warfare community.**

Yet there is change on the horizon. The Chief of Naval Operations (CNO), Admiral John Richardson and the Naval Personnel Command (NPC) have begun taking initial steps to re-cage the gyro for the naval profession. In October 2018, a NAVADMIN was released requiring competitive screening of officers to in-residence graduate education (IRGE), addition of precept guidance regarding competiveness of IRGE, and requiring IRGE for selection to major command

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for officers in YG15 and beyond (in effect, this requirement will affect officers 20 years from now). NPC is beginning the introduction of a board process to select officers eligible for Navy educational programs. These are first steps that the E4S Executive Board heartily commends. However, there are still unanswered questions about the efficacy of allowing the warfare tribes to control the education selection boards, and the process that might simply select officers as "eligible" without intending to place a priority on sending them to educational billets, either as students or instructors. In the Marine Corps, proposals continue to be made to reform the education board selection system. Some have pointed out the need to make it more effective and bring it in line with the interests and talents of the Marines selected, and others have suggested there is a need to consider how time away from the fleet in education and reutilization affects promotion potential. Questions about the Marine Corps' reliance on military schools and doctrinal education, with only limited opportunities to attend leading civilian institutions to develop wider perspectives, should be addressed moving forward.

The Value Proposition of Education for the Fleet

The lack of value that today's warfare tribes have placed on education in the recent past does not equate with the actual value of that education, at either the service level or for the warfare communities themselves. Ernest King told his fellow officers in a speech at NPS in 1925 that the reason to get a graduate education is not the explicit knowledge or data that is accumulated through that education. The great value of a graduate education, according to King, is "mental training" and learning methods of analysis and ways of solving problems, which can be applied to not only technical subjects but also "strategy or tactics or logistics or any other professional field." Education, according to King, teaches officers "how to think" and offers them the chance to become an "abler and better naval officer." The value of continuous education for the naval professional is, in the language of the 21st century, the development of critical thinking.

All of the warfare communities of both the Navy and Marine Corps face the technological challenges of integrating unmanned and autonomous systems into their daily operations. The requirement to understand and employ cybernetics, artificial intelligence, unmanned systems, and robotics will only accelerate. This is more than a technical challenge of making computers communicate, considering network security, and establishing checklists for systems employment. Developing the real integration of these advances into the Fleet and Marine Operating Forces will require creative thinking and the mental flexibility to see how these new technologies can revolutionize our current operational and tactical ways and means. As was experienced in the years between the World Wars, the operators are often the best minds to engage in technological and warfighting innovation.

All warfare communities of both the Navy and Marine Corps face a looming personnel challenge. By means of a wider variety of choice in curating professional careers of service, both in and out of uniform, the introduction of the Blended Retirement System (BRS) will likely create fundamental cultural and career management changes in another ten to twenty years. The personnel system reforms offered in the *FY19 McCain National Defense Authorization Act* create unique opportunities, but also second- and third-order effects on the culture of the Navy and Marine Corps. Each warfare community will meet these challenges at different times, because their normalized career paths already have different customary on-ramps and off-ramps when service members consider leaving the service. The new BRS may require entirely new thinking about the concept of the naval career, and the development of new incentives, including educational ones, as well as intra-community norms.

All of the warfare communities of both the Navy and Marine Corps face an immediate, but in some ways perpetual challenge of ever increasing integration and joint warfare. As concepts in the U.S. armed forces are introduced, like the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC), or even newer constructs like distributed lethality or multi-domain battle, naval officers and senior non-commissioned officers will require knowledge far more than their specialized tribe – and at earlier times in their service progression. The traditional mindset of focusing on limited tactical excellence for several years before thinking about wider concepts of operations and military strategy becomes less imaginable for the future, as even the most basic tactical evolution can include multiple inputs from the Joint Force.

> **The tactical and operational innovation in the warfare communities of the future will require continuous education in the Joint Force and military capabilities and strategy to maintain a competitive advantage over potential adversaries.**

In addition to these three areas of challenges for today's warfare communities, there are the continuing classical reasons for education.

> **In today's multipolar world, naval officers will need to be both warfighters and diplomats able to operate across the wide spectrum of international competition and conflict.**

This will require senior staffs with cultural and language understanding that comes from education. This does not always require long periods in-residence at school houses, but instead can often be provided through focused executive level courses and mobile education teams from our flagship institutions. Individual units, from ships and squadrons to submarines and Marine Battalions, benefit from brief educational programs about the area of the world where they will be operating, making them more effective both in combat but also in the ever-important grey zones of friction and competition that are a part of an emergent great powers competitive world. In addition to these kinds of focused educational programs, the Fleet and Marine Operating Forces will be better prepared for their future challenges by embracing a wider use of war-gaming to practice doctrine and in the form of "free play" to innovate the tactics and strategies of the future.

These are just a few of the areas where in-residence attendance at military colleges and universities, wider opportunity to attend civilian institutions, focused executive courses, and the development of a continuum of learning throughout a naval career will add value to the Navy and Marine Corps warfare communities. Broad sources of education beyond the doctrinal curricula of our military schoolhouses, and service members instructed in a wide variety of disciplines and approaches, will be necessary to develop the habits of mind, and to inculcate the customs of continuous personal education, necessary to face the future. The value proposition of education for the Fleet and Marine Operating Force is an imperative as the complexity of our multifarious futures come into focus.

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Naval Education and the Key to the Future

The debates which began in the decade following the very founding of the U.S. Navy and Marine Corps – over whether time and training at sea was the sufficient form of learning, or if increased classwork and academics in schools were necessary – has been at the heart of debates surrounding how the Naval Services should view the value of education. That tension between training in practical matters of the warfighter, and education of the professional in how to think has nearly been constant for over two centuries. At its most fundamental, success for the U.S. Navy and Marine Corps requires balance between the two. Our study indicates that today's naval cultural appreciation of education, and the value proposition of naval education for the warfare communities, is decidedly out of balance in favor of training.

In order to return balance to the Fleet and the Marine Operating Forces, the value proposition for both the individual naval professional, along with that of the warfare communities, must be reassessed and policies put in place to incentivize a resulting culture of education. In our view, this requires oversight and an organization to take ownership of the Naval Education Enterprise, with reporting responsibility to the highest level of the Department of the Navy: The Secretary of the Navy. In order to maintain the value of education to the Fleet and Marine Operating Force, the President, Naval University should have as one of its founding roles and responsibilities the continual review and renewal of naval education curricula to ensure applicability to greater lethality, and the ability to think critically about the increasing complexity in the character of war. The President, Naval University should also coordinate required educational outcomes from the educational institutions, as deemed necessary by the Secretary. Research, analytics, and study proposals will be overseen with a view towards greater agility and speed in approvals, while maintaining auditable accounts and procedures to encourage and facilitate collaboration and development of the continuum of learning. Joint Professional Military Education procedures and curricula should also be periodically reviewed by the President, Naval University in order to coordinate with the Joint Staff and best recommend changes by the Secretary of the Navy to the Secretary of Defense.

The office of the President, Naval University will also be responsible for addressing the value proposition of education for individuals in the Naval Services, both officer and enlisted. Included alongside its responsibility to collaborate with the Fleet and Marine Operating Force, the office will create policies, systems, and enablers to incentivize the naval

professionals who demonstrate a desire to learn continually throughout their careers. This action will include policies for fitness reports and statutory promotion board precepts, as well as technical systems that allow the entire Naval Education Enterprise, create access to non-degree courses and learning modules, and share learning achievements. By order of the Secretary, the President, Naval University will also define the difference and oversee the right balance between naval education and training, and ensure that education matters are clearly delineated in all regulation and policy.

There is an intrinsic value of deep and continuous education to the naval profession. The knowledge, skills, and habits of mind that are developed through both formal schooling and a personal, self-directed effort to learn the profession of arms, are invaluable. But the E4S Board's research has demonstrated that they are often assumed, or at the very least unspoken, when today's naval leaders discuss leadership, command, and the strategies of the future. It is time for the naval profession to move beyond "check in the block" career management and instead return to a model of talent development and learning that embraces the professional value proposition of naval education. More than something done for four years before commissioning, and then a single ten-month opportunity when an officer is already over half way through a career, lifelong naval education is the foundation upon which the Naval Services should build its future and maintain American power on, and from, the sea.

In the future, we foresee career paths of continuous learning, enabled by the new Naval University and a supporting enterprise of on-line and in-residence delivery systems, increased use of civilian institutions, and a universal transcript system that facilitates a wider range of accreditation. Shorter, more frequent, and more continuous opportunities for learning would result throughout a naval career. Initial educational opportunities would include Naval University-supplied MOOCs, virtual learning programs, and stackable certificates in Joint and Professional Military Education, providing operational education much earlier in a career. Through the Naval University system, officers and enlisted would access all the benefits of the formerly separate educational institutions, including a virtual Naval University interlibrary loan and research system. The enterprise could also involve virtual access to "best of" subject matter classes at the various NROTC units, leveraging the American higher education system like never before. As part of Naval University, the Naval Community College would use the universal transcript system to combine civilian and military educational credits, offering accredited associates degrees to every Sailor and Marine in disciplines that directly affect lethality, partnership, and reform.

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CHAPTER 3:
Naval Education Institutions

"Although I personally cherished education through over four decades in uniform, and often leaned upon my operational analysis coursework at the Naval Postgraduate School, I did not see learning valued systemically across the institution. Indeed, if there is one area to which I could return and reevaluate for its strategic effect, both as Chief of Naval Operations and as Chairman of the Joint Chiefs, it would be the enduring value proposition of education — and, just as importantly, the culture of continuous learning required to sustain it. Education is critical to the future of the Nation's warfighting capacity, just as much as promoting the right leaders, or augmenting their talents with the very best platforms and technologies possible. There is no better time than right now to strike a strategic balance between the critical future value of education and the treasured place it must rightfully hold in our national security portfolio.

— Admiral Mike Mullen, USN (Ret)
17th Chairman of the Joint Chiefs of Staff
28th Chief of Naval Operations"

Summary:

In seizing the opportunity ahead to shape naval education to meet the demands of the Cognitive Age, we must determine the state of the naval educational institutions and their readiness to prepare our warfighters for the changes in the nature of war. To make that determination, we draw on the demand signal from the 2018 National Defense Strategy and the Vision for Naval Education laid out in this study. By assessing the current state and competitive advantages of the educational institutions, an initial calculation can be made regarding the opportunities for synergistic cooperation and integration.

The Naval Educational Enterprise consists of the US Naval Academy, NROTC and OCS; Naval Postgraduate School; Naval War College; Marine Corps University; Federal Executive Fellowships; Officer Candidates School; and Flag/General Officer Education.

The Naval War College excels in teaching strategy and critical thinking, the Marine Corps University is the center of study for maneuver and expeditionary warfare, the Naval Postgraduate School is a nexus of scientific and technological

innovation, and the Naval Academy produces excellent generalist naval officers. The challenge is to integrate, align, and exploit the capabilities of each of the institutions for the benefit of the whole education enterprise. Addressing that challenge relies on understanding the strengths and weakness of our institutions.

The Future of Education

A theme apparent across all the educational institutions by its omission is the future of education. In our study, we found no unified effort to address the future of education in terms of gaming, cognitive science, or other advances. There is no continuum of education or system of "lifelong learning" to identify and educate service members with the aptitude for critical and strategic learning. There is also minimal-to-no coordination occurring between the institutions to capture lessons learned and share best educational practices.

The Navy and Marine Corps' educational institutions are doing their best, but the data provided by the institutions and by the Services make it clear to the E4S board that they are suffering from a lack of coordinated support and direction from the Department of the Navy. The challenges of the twenty first century require holistic approaches to the changing character of conflict, and solutions will not rise inherently out of a naturally occurring synergy. That is not the nature of the elaborate administrative structures of the Navy and Marine Corps. These institutions are fundamentally a part of the naval bureaucracy and that bureaucracy must be led and directed, to ensure the results the nation needs. With the proper resourcing, coordination, and policy, we believe these educational institutions will better provide both an appreciation of the strategic elements of the nature of modern war combined with the understanding of the character of modern technology in conflict, and develop the critical thinking skills the Department requires for the future.

Data Collection and Analysis

Understanding the current state of the Department of the Navy educational institutions is central to this study. A critical component in evaluating our current educational system is comprehensive self-evaluation. How the institutions view themselves provides valuable context and a basis for reform recommendations. In order to establish a baseline level of understanding of the institutions, the Education for Seapower study team formulated a series of questions posed to the institutions. The following is a summary, based on the responses, encapsulating the current state of the educational institutions, as well as brief overviews of the challenges they face. The actual responses of each of the institutions are included as presented and without edit in the appendices of this report.

United States Naval Academy

The United States Naval Academy (USNA) is a four-year coeducational federal service academy in Annapolis, Maryland. Approximately 1200 midshipmen enter the Naval Academy each year. Approximately 1000 of those 1200 midshipmen will graduate. Naval Academy graduates make up approximately 14% of the Marine Corps officer corps and approximately 34% of the Navy officer corps, marking the Naval Academy as a significant lever in the education and development of the Naval Officer corps. The Naval Academy offers Bachelors of Science degrees to all graduates in all majors.

The mission of the Naval Academy is to develop midshipmen morally, mentally, and physically – fostering an educational environment that supports and encourages learning and critical thinking. The Naval Academy seeks to instill a passion for lifelong learning and spark intellectual curiosity and analytical rigor. An area for consideration is the Naval Academy's self-

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awareness on the "general" nature of the education provided. While other institutions may better prepare their graduates for specific career fields, the Naval Academy seeks to prepare its graduates for success in any of their future endeavors. The Naval Academy constantly has to seek a balance between developing graduates with the critical thinking skills needed in Naval Officers and developing technically proficient leaders.

While the Naval Academy self-assesses itself as successful in achieving its goals of educating and training Naval Officers, challenges exist on the horizon. While the demand signal for USNA graduates has remained constant and annual throughput has remained steady at approximately 1000 graduates per year, costs have increased and financial resources have decreased. The Naval Academy's Budget Submitting Office (BSO), located in the Office of the Chief of Naval Personnel, has provided financial relief during execution years, but the BSO is budget-constrained as well. The Naval Academy's Program Objective Memorandum (POM) issues are supported and endorsed by the BSO, but have not resulted in POM increases.

To illustrate the risk of budgetary uncertainty, USNA's new Cyber major will incur an annual operating increase cost of approximately $6 million that has not been addressed and must be addressed in POM-20. The Superintendent of the Naval Academy has noted that construction progress for Hopper Hall is threatened by budgetary uncertainty. As noted by the Naval Academy in their feedback to the study, financial constraints are the primary limiting factor in executing USNA's mission, especially as pertaining to the hiring and retaining of quality instructors, particularly in the STEM majors. At the same time, other military undergraduate institutions have received increased personnel funding, further perpetuating the notion that the Department of the Navy does not value education.

Naval War College

The Naval War College (NWC) is a postgraduate educational institution, the Navy's Senior Service College, located in Newport, RI. It is comprised of the College of Distance Education, College of Leadership and Ethics, College of Maritime Operational Warfare, College of Naval Command and Staff, College of Naval Warfare, Senior Enlisted Academy, Naval Command College, and Naval Staff College, the last two of which are for our international allies and partners. The NWC offers a variety of certificates and Masters of Arts degrees to graduates, depending on the program of study selected. Most students attend for 10 months.

It is the mission of the Naval War College to "educate and develop future leaders by building strategic and cultural perspective, and enhancing the capability to advise senior leaders and policy-makers." Established in 1884 to serve the

needs of the Navy by providing original research and scholarship into the profession of arms, the Naval War College aims to produce graduates steeped in the theory of war and trained to be critical strategic thinkers.

The Naval War College continues to evolve in the specifics of the curriculum and education methods, in order to maintain abreast with the latest developments in warfare and educational theory. Unique to the Naval War College's mission is the responsibility to support the Chief of Naval Operations in his seven mandated missions to the NWC. Additionally, unique to the Naval War College is the scope of the student body. While the NWC educates approximately 500 in-residence students annually, the Naval War College also provides distance education to over 5000 students every year around the globe.

Operationally, the Naval War College has evolved to suit the needs of the combatant commanders, most notably through the creation of the Maritime Staff Operators Course through the College of Maritime Operational Warfare. Additionally, the Naval War College also engages with, and educates, our allies and partners – creating and maintaining partnerships of benefit to the Naval Services and the United States, a great strategic advantage. The Naval War College points to its responsiveness to Secretary of Defense and Combatant Commander demand signals in creating and modifying curriculum to meet current requirements as part of its competitive advantage.

The quality of the education provided by the Naval War College is anecdotally supported by interviews provided by Army and Air Force educational leaders, referring to Service-specific competitive boards for selection to in-residence education at the Naval War College. Officials at the Naval War College maintain that the mission of the Naval War College is threatened by a manpower bureaucracy that does not adequately fill Navy quotas, as Chief of Naval Personnel data reveals that there has been over a 930% increase in unfilled quotas at the Naval War College from FY14 to FY18. Marine Corps attendance has remained consistently high over the same period, with virtually no unfilled quotas.

Another area of concern is the assertion that the Navy is not sending its best and brightest to the Naval War College. That assertion is supported by data regarding degrees conferred with distinction. When graduation rates and honors rates are calculated for June graduations from 2016-2018, Navy performed the worst of all the Uniformed Services and their civilian counterparts. Services with competitive in-residence education selection boards, most notably the Marine Corps and Air Force, far outperformed Services without a competitive in-residence education selection process. In general, the

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Army, Air Force, and Marine Corps view education as a requirement for future growth and eventual command, a positive effect that for decades has helped to create strategic leaders at the four-star level as well as action officers ready to assist them at the staff level.

The NWC's mission is further threatened by an inability to recruit and retain the most talented faculty due to an inability to compensate faculty at market rates. Ambiguity regarding copyright protections for faculty increases the risk to the NWC's educational mission.

Naval Postgraduate School

The Naval Postgraduate School (NPS) is a post-graduate school in Monterey, CA. NPS has a student body consisting of members of all the Armed Forces, civilians from every level of government, and international allies and partners. NPS graduates approximately 1200 students every year, operating on a year-round quarterly system. NPS offers Master of Arts, Master of Science, Doctor of Philosophy degrees, as well as a number of certificate programs. Most students attend for 18-24 months.

The mission of NPS is to "provide relevant and unique advance education and research programs to increase the combat effectiveness of commissioned officer of the naval service to enhance the security of the United States." NPS' competitive advantage lies mainly in technical education and applied research that is responsive, and applicable, to the demands of the Department of the Navy. Through its program and curriculum sponsor structure, the Naval Postgraduate School remains agile and in tune to the demands of the Fleet and whole of government.

Different from the Navy's quota fulfillment at the Naval War College, Chief of Naval Personnel data shows that Navy quota fills at NPS has improved since FY14, from 35% unfilled to 13% unfilled. That is a promising sign of the Navy's commitment to the education of our leaders, if partially belied by data regarding academic achievements of Navy officers compared to their counterparts.

Like the Naval War College, selectivity of Navy personnel for NPS attendance is low, relative to other Services. Again, the data regarding degrees conferred with distinction shows that Navy personnel earn distinction at a significantly lower number than their Sister Service counterparts, at the lowest percentage amongst the Armed Services at NPS, though at a lower delta than at the Naval War College. Along with this demonstrable lack of selectivity amongst the Navy population is a difficulty with hard-to-fill curriculums, wherein more challenging programs at NPS require a talented student body that can be difficult to consistently fill, especially if a move to a more selective and critical cohort selection process were to be adopted. As interviews with senior NPS leaders point out, some of the harder curriculums would not be viable at NPS if the Navy could not be flexible in the standards and minimum qualifications for students to attend.

In addition to difficulty with getting the right student population to the Naval Postgraduate School, NPS faces challenges in recruiting and retaining qualified faculty due to non-competitive compensation, high costs of living, ambiguity regarding copyright, and other intellectual property rules.

Marine Corps University

Marine Corps University (MCU) is comprised of the Marine Corps War College School of Advanced Warfighting, Marine Corps Command and Staff College, Expeditionary Warfare School, College of Distance Education, College of Enlisted Military Education and Center for Advanced Operational Culture and Learning. MCU sees itself contributing to the students' experience in three ways: emphasizes the Corps' ethos, expand how students think and write, and develop the philosophy of maneuver warfare.

MCU leadership reports the quality of Marine Corps students as very high. Since 2011, in-resident PME selection is determined through the Commandant's Education Board, a non-statutory board that evaluates approximately 2500 Marines annually. The Board screens and briefs each Marine based on career timing, qualifications, and personal

preferences. This competitive process ensures MCU students are the most qualified, from the available population of Marines.

MCU has made curricula changes based on the latest National Security Strategy, National Defense Strategy, and the Commandant's Message to the Force 2018. An emphasis on peer competition and technological impacts in warfare are noted as drivers for these changes. Initiatives to expand graduate education opportunities and exposure to civilian educational institutions include:

1. Expanded Advanced Degree Program (EADP): allows members to pursue graduate education for 12 months with no required utilization tour.
2. Career Intermission Pilot Program (CIPP): provides a one-time temporary transition to the Individual Ready Reserve for 1-3 years to pursue personal and professional goals with the means to return to active duty.
3. Doctor of Philosophy Program (PHDP): is a fully funded program which selects up two Marines for the strategist and technical tracks to complete a PhD. The strategist track utilizes civilian institutions (Georgetown University, George Mason University, American University, and others, while the technical track leverages NPS).
4. Congressional Fellowship Graduate Degree: Opportunity for Marines to participate in a fully funded Master's degree in Public Policy at George Mason University.

MCU notes that, as a liberal arts institution, it has limited faculty experience in scientific and technological sectors. MCU identifies a need to upgrade IT infrastructure in order to grow into those sectors. A possible solution to this weakness is a dedicated integration effort with civilian institutions and the Naval Postgraduate School, which have specialties in technical subjects that MCU currently lacks. Another noted deficiency is Navy representation as students and faculty members within the MCU educational system. The Navy consistently does not meet its student and faculty quotas and the lack of Navy representation degrades the quality of education and discussion regarding high-end maritime warfighting. Additionally, the Marine Corps in conjunction with the NWC has drafted a legislative proposal allowing it to hire Title 10 employees to support classes less than 10 months in duration. Like the other naval postgraduate institutions, ambiguity in copyright issues and personnel challenges present difficulties in attracting and retaining the best faculty and staff.

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Conclusion

The institutions are currently meeting the mission of educating the officers who attend. The main question is the value to which the Department of the Navy, specifically the Navy, assigns to education. In establishing the baseline level of knowledge, we have noted several themes and challenges overarching all the institutions.

Financial Constraints

It is evident from all the responses from the institutions that finances are their foremost concern and are viewed as the primary impediment to continual growth as academic institutions. The handicap on hiring and retaining qualified professors was a common refrain from all the institutions. Governmental salaries cannot keep pace with the salaries that the private sector can offer.

Physical Planned Maintenance, Upkeep, and Renovation Concerns also were Affected by Fiscal Resources

As noted earlier, at the Naval Academy, a critical burgeoning major – Cyber - is at risk due to financial constraints on physical plant development. At NWC and NPS, administrators face the constant challenge of maintaining antiquated buildings, while also addressing the need to modernize to maintain pace with modern educational requirements

Quality of Students

Professors from the various graduate institutions all make reference to the quality of the students being crucial in the success of the educational mission. There is minimal-to-no student applicant selectivity by the educational institutions themselves; rather, they rely on the individual services to fill available seats through their own selection methods.

The need for competitive in-residence graduate education selection boards is evident, especially from the Navy. The Marine Corps, Air Force, and Army have such selection boards, and the results are evident from a review of degrees with honors conferred. The other Services consistently outperform Navy students, and the margin appears to be growing in the last few years. When combined with decreasing Navy quotas at Naval graduate institutions, as well as sister Service institutions, there is the threat that the next generation of senior Naval Officers will be lacking in critical thinking skills that graduate and professional military education bring to the forefront, and possibly behind their peers in competitiveness for higher Joint and strategic leadership roles. At the very least, common heuristics, vocabulary, and frameworks needed to think through operational and strategic problems together will be missing from the generation of naval officers who did not receive such professional military education.

CHAPTER 4:
Analysis of Studies and Perspectives on Education

"The proven power of combining shared education with deep operational experience as a way of preparing Navy leaders for profound changes in strategic and technologic direction is part of our history. Also part of our history is the evidence that focusing on the education enterprise alone does not yield sustained and intentional talent outcomes. Nor does managing talent primarily through promotion boards guarantee that the talent we need to promote arrives at the selection point ready. This study of the education enterprise comes at an opportune moment: the forces of strategic change are widely recognized--if not yet well understood; their impact will be pervasive—no Navy community will be unaffected; and, for the first time in 40 years, personnel chiefs have been granted important flexibilities in officer career management. By seizing this moment, the DON can synchronize the realignment of its education organization and its talent management process in ways that will accelerate service-wide mastery of the changing national security environment.

— VADM Patricia A. Tracey, USN (Ret)
Former OPNAV N7 and Director, Navy Staff"

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Summary:

To provide a balanced perspective on the state of naval education, this section includes the analysis of data obtained from outside the normal reporting chain of command. By comparing institutional data with data from outside sources, the research team identified several areas in need of improvement. Specifically, 1) there was a lack of coherent education strategy for the naval services, 2) institutional strengths were not leveraged fully, 3) education was not valued consistently across warfare communities and services, and 4) there was a lag between emerging warfighting demands and the education programs needed to prepare for naval professionals to maintain maritime superiority in the future.

Over the past several decades, a number of research efforts have examined military education broadly, and the naval education enterprise in particular. From studies within government, including Congressional committees and the Services, independent think tanks, and individual professionals and scholars writing in the pages of academic journals, the subject of professional military education has been examined extensively. In addition to these views on naval education, the staff of the Education for Seapower study conducted dozens of one-on-one interviews with leaders from all over the world, in industry, academia, government, actively serving and retired military service members, sister and partner military services to learn about their thoughts on the subject of naval education. This chapter provides an overview of this research.

The following analysis concentrates on data from five external sources: organizational questionnaires, selected previous studies relevant to DON Education, E4S expert interviews, professional journal articles and a detailed survey of both current faculties at naval education institutions and active duty naval officers. The purpose of this approach was to balance internal DON measures of effectiveness with outside perspectives of Navy and Marine Corps programs, and to ensure the E4S Study maintained a balanced view regarding naval education and potential recommendations rather than rely solely on information created from within the organization.

The large majority of the analyzed content and all of the top-occurring themes fell within the four overarching categories of Curriculum/Faculty, Personnel System/Incentives, Organization, and Culture. This assessment revealed a strong correlation between these four categories, suggesting that a top-down approach is required for improvement of the system. This analysis demonstrates the importance of an educational mission statement, as well as goals and policies to support the cultural acceptance of education as a career force multiplier. A stronger foundation will help to create a more robust and applicable curriculum and encourage faculty. In addition, a restructured curriculum based on a unifying vision and will positively impact the students along their career paths (incentivizing them to continue their education).

According to this analysis, it appears that the changes which need to take place within the organization include greater clarity on how important education is for careers and how the organization intends to enforce this educational performance as a value. Further, it appears from the data that the DON's culture places greater value on operational experience rather than on education, and while it requires officers to have achieved a certain level of education, it does not adequately encourage self-directed learning. There is a dichotomy between the personnel system and the broader organization, which may be attributed to not being resolute on what the organization needs. The DON should define educational requirements by understanding the educational demands and how they differ for each role within the personnel system. The organization should clearly define education and knowledge requirements for its naval officers beyond simply having a graduate degree. With a strong foundation, real effective changes can be made throughout the entire enterprise to all meet the same goals.

Part 1. Organizational Questionnaires

To establish a baseline for this analysis, each naval education institution was given a set of detailed questions regarding the performance of their organizations (see Appendix D). These results provided the leadership of each institution with the opportunity to conduct a detailed self-assessment. The personnel lead for each naval service were also asked for information

on how formal education affected officer assignments and promotions. Outside military education institutions such as National Defense University, Air University, and the Army University also were consulted to ascertain their perspectives on naval education.

In addition to formal questionnaires, which focused on the current state of naval education, the leaders of the five naval education programs met in person with the E4S Executive Panel the share their perspectives on the future of education and ways to improve the current system.

In general, each service and education institution stated they were meeting their organizational objectives and were making a valuable contribution to the naval mission by preparing officers for operational assignments. A detailed discussion of their responses is contained in chapter three of this report, and provided in full, as delivered, in Appendix E. This section focuses on three significant concerns identified in this inquiry.

Participation

As a result of the *Goldwater Nichols Defense Reform Act of 1986*, seminars at Service staff and war colleges must include at least one officer from each of the two non-host Military Departments (CJCSI 1800.01E). However, low Navy support for the educational programs of other services places them in jeopardy and undermines the overarching intent of Joint Professional Military Education. The following data were provided by the Joint Staff J-7.

During the period of AY16-AY18, 22 of 72 Student Seminars at the Army's Command and General Staff College had no Sea Service officers, and 9 of 40 Student Seminars at Air Force Command and Staff College had no Sea Service officers. The Marine Corps Command and Staff College reported 7 out of 16 class seminars had no Navy officer participation, resulting in major deviations from policy and law. Over a three-year period, participation percentages of naval officers are indicated in Table 1.

School	AY15-16 (Percent of total student Population)		AY 16-17 (Percent of total student Population)		AY 17-18 (Percent of total student Population)	
	USN	USMC	USN	USMC	USN	USMC
Air Force Command and Staff College	5.75	2.18	4.70	2.45	3.52	2.34
Army Command and General Staff College	3.52	2.14	3.16	2.30	1.84	2.45
Marine Corps Command and Staff College	8.62	52.59	8.57	48.57	4.27	50.71
College of Navy Command and Staff	43.33	5.83	43.15	6.71	41.43	6.85

Table 1

Additionally, from AY 2008-09 to AY 2017-18, Navy students have been significantly underrepresented at the Eisenhower School (ES) and National War College (NWC), as indicated in Figure 1.

In discussions with the heads of naval graduate programs, as well as the leaders of other military education institutions, naval officers' participation was a significant concern. Leaders candidly observed that the Navy often sends poorly qualified officers to fill quotas. This practice includes sending non-due course officers, junior officers to senior programs, and restricted line officers, such as dental officers and chaplains, to fill quotas meant for unrestricted line officers. These

indicators raised significant concerns among members of the Executive Panel that the Navy, as an organization, undervalues formal education and gives staff assignments higher priority than it does formal education.

Performance

When examining the performance of naval officers in graduate education programs, Navy officers consistently underperform the officers of other services. Figure 2 illustrates the performance of military officers from the four services at the College of Naval Warfare, while Figure 3 illustrates similar performance at the College of Naval Command and Staff.

These data were of concern to the Executive Panel. Recognizing fairly equal service accession quality over a long period of time, it is a known fact that US Navy officers are potentially as intellectually capable as the officers of the other military services. Therefore, such capability cannot be the cause of this poor performance. Anecdotal evidence collected through the course of this study, and collected from multiple expert interviewees, suggests that Navy career incentives do not align to academic performance, leading us to believe that Navy officers, in general, do not put forth a full effort while enrolled in formal academic programs.

Organization

The concept of a university, or an organizing entity to teach a universe of knowledge and coordinate among smaller colleges, has been used successfully outside the military for centuries. Inside the Department of Defense, the Joint Staff, U.S. Air Force, and U.S. Army each have implemented this organizational design successfully for their education programs. The Army University concept in particular seems to allow the scaling up of agility throughout the institution, by combining organizational and individual learning authorities in a manner which aligns a wide variety of curricula to a unified strategic goal. The uniqueness of the Naval Services seems to demand a similar integrating body that is absent from the current organizational design.

All officers in the US Navy and US Marine Corps begin their careers as naval officers, graduating from accession programs with an education founded in naval science. However, the unique unifying characteristics of naval service often are lost during the course of a career as individual warfare communities train their officers and enlisted personnel in the narrow technical aspects of their respective

Figure 1 | US Navy Students at ES and NWC: AY2009-09 to AY2017-18

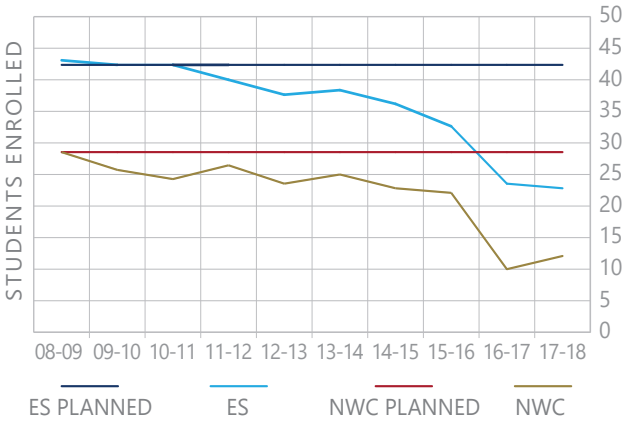


Figure 2 | College of Naval Warfare: Percent of Graduates with Distinction or High Distinction

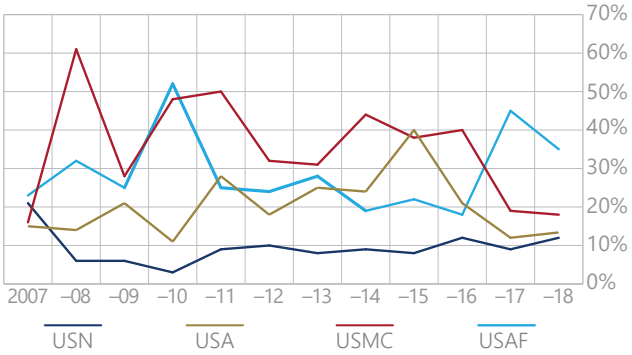
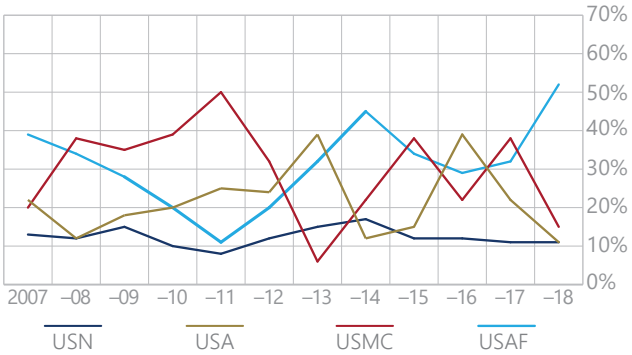


Figure 3 | College of Naval Command and Staff: Percent of Graduates with Distinction or High Distinction

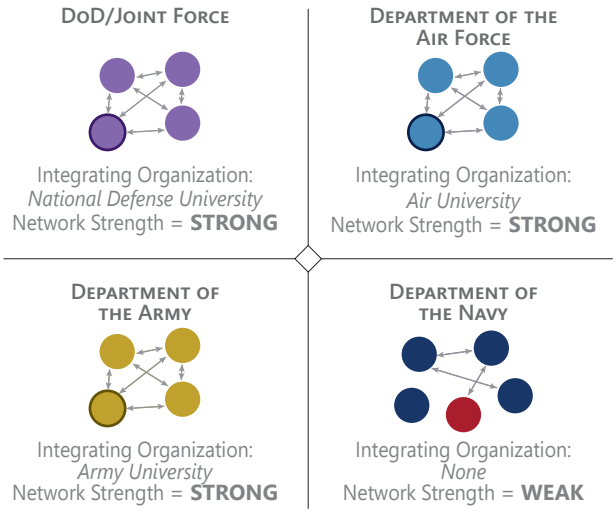


professions The Naval Education Enterprise consequently must be viewed as a single system, as it falls completely under the authority of the Secretary of the Navy, although it is administered by the two Service Chiefs. Furthermore, the three Navy education programs, the US Naval Academy, Naval Reserve Officers Training Corps, and the Naval Postgraduate School provide direct education support to both Services.

Information sciences have proven the benefits of network analysis. Networks, the links and nodes between entities, provide inherent benefits. In general, strong networks provide improved information sharing, while nodes in weak networks operate more as independent entities. Figure 4 depicts a basic network analysis across the four DoD education systems.

In formal discussions between the E4S Executive Panel and leaders of the five naval education institutions, **it was unanimously recognized that each one could improve naval education by working outside its organization boundaries and collaborating in research, faculty exchanges, and alignment of curriculum with the other naval education institutions.** However, the only forum which might be used for such an alignment is the Advanced Education Review Board (AERB), used as a reporting mechanism to the four-star level (Vice Chief of Naval Operations) for a wide variety of initiatives and issues. Until the most recent meeting on June 12, 2018, the Marine Corps was not involved in these meetings, and even in this one, the President of Marine Corps University was not given a speaking role. The E4S Executive Panel observed that the changing character of warfare and the uncertainty of the external environment demands a cross-disciplinary approach to education, which is another deficiency of the current naval organizational design.

Figure 4 | Comparative Network Analysis



Diagrams depict persistent links among education institutions (nodes)

Comparative Analysis of Education Systems

System	Network Strength	Unified Vision	Integrated Academic Programs
Joint Staff	Strong	Yes	Yes
Army	Strong	Yes	Yes
Air Force	Strong	Yes	Yes
Navy	Weak	No	No

Table 2

Part 2. Educational Reform Study Meta-Analysis

Hundreds of articles, studies, and reports on military education have been published over the past several decades, particularly since the *Goldwater Nichols Defense Reform Act of 1986* identified shortcomings in military officer education. Appendix C-1 provides a list of previous boards and studies relevant to naval education. A sample of the most relevant of

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these were examined to draw upon the benefits of previous research. The studies and reports selected for this section are not exhaustive and were primarily derived from the expert interview process.

Seven recent studies of DON and civilian education allow us to understand the current state and past history of educational reform. All but one focused on military education, examining policies and recommendations implemented in the past. The lone civilian educational reform study referenced here was conducted by Georgia Tech, incorporated into the E4S Study because it specifically addressed future technological advances relevant to education reform and possible paradigm changes regarding degrees and content delivery. The studies used in this meta-analysis are:

1. Deliberate Innovation, Lifetime Education (GA Tech, 2018)
2. Evaluating Navy's Funded Graduate Education Program, A Return-on-Investment Framework (RAND, 2010)
3. Another Crossroads? Professional Military Education Two Decades After the Goldwater-Nichols Act and the Skelton Panel (HASC, 2010)
4. Developing Senior Navy Leaders Requirements for Flag Officer Expertise Today and in the Future (RAND, 2008)
5. Developing an Education Strategy for URL Officers (CNA, 2008)
6. USMC Wilhelm Study (2006)
7. A Bottom-Up Assessment of Navy Flagship Schools (CNA, 1998)

A broad list of problems and recommendations were identified in these reports. The most relevant recommendations for the E4S Study are highlighted below:

GA Tech: Deliberate Innovation, Lifetime Education

- Better use of available technology to deliver education outside of the standard brick and mortar classroom.
- Instead of traditional degrees look at smaller certificates/micro credentials as a demonstration of educational achievement.
- Provide relevant experiential learning opportunities to reinforce educational objectives.

RAND: ROI Framework Study

Change recommendations to existing policy:

- Funded graduate education programs are offered to develop a cadre of qualified officers in areas where advanced proficiency and/or readiness are instrumental to the Navy's current mission or future capability.
- Officers are educated to the graduate level for optimum performance of duty in all follow-on assignments and in particular those assignments requiring the subspecialty designation.
- Officers who have received Navy funded graduation will serve at least one tour in a validated subspecialty position as soon as possible following graduation.

Culture:

- Increase emphasis on graduate education as a benefit to the community and to the Navy at large.
- Set goals for graduate degrees, such as "90 percent of all officers advancing at the O-5 board" will have a graduate degree.
- Take some tactical steps to improve its utilization efficiency immediately by increasing utilization rates and reutilizing officers in validated billets, thus increasing net quantitative ROIs.

Monitoring and Evaluating:

- The Navy should expand its utilization metrics and enhance monitoring and evaluation of its graduate education program.
- Enhance data collection and periodically evaluate graduate education programs under a hierarchy of outcomes.

HASC: Another Crossroads? Professional Military Education Two Decades After the Goldwater Nichols Act and the Skelton Panel

- The Secretary of Defense, the Chairman of the Joint Chiefs of Staff (CJCS), and the Service Chiefs must either implement policies, procedures, and practices for reinforcing the relationship between JPME and in preparation for joint duty assignments or show justifiable cause as to why they cannot. In doing so, they should evaluate how a sequential linkage between prerequisite JPME (at each successive phase) and appropriately corresponding joint duty assignments could be established. They should also evaluate how JPME content, and especially JPME II content, should be structured to better fulfill its statutory purpose as preparation for effective performance in joint duty assignments. The Secretary of Defense should report to Congress on the findings and recommendations of this departmental effort.
- The Secretary of Defense, the CJCS, the Service Chiefs, and the Joint Staff should develop remedies for the shortcomings identified by these studies that targeted education, training, and modifications to relevant personnel processes. Officers should complete appropriate education before they are assigned to a joint or senior service staff.
- The services should review their officer development timelines from a holistic perspective to explore innovative avenues to develop their respective officer corps through education, training, and assignments or experience.

RAND: Developing Senior Navy Leaders Study

- The Navy must keep pace with the changing demands for expertise in flag billets, and the Navy must maintain an up-to-date database of requirements.
- Some areas of expertise for success in Navy billets are not yet well defined but it is necessary for the Navy to understand the nature of the developmental opportunities its flag officers require to meet these ambiguous requirements.
- The Navy needs to develop a number of primary/secondary domain expertise pairs among pre-flag officers who are deemed to be competitive for flag selection, that analysis also demonstrates that the Navy is for the most part doing a good job in providing pre-flag officers with the necessary domain expertise characteristics to serve effectively in flag billets.
- CNA: Developing an Education Strategy for URL Officers
- First, every officer should have an opportunity for graduate education that focuses on the needs of the Navy, and the education establishment and community leadership should work together to attain executable programs that will enable this objective.
- The Navy should expand efforts to deliver graduate education in a variety of ways, including resident, online, satellite campuses, and short certificate courses that fit into officer career paths.
- The Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.

CNA: Developing an Education Strategy for URL Officers

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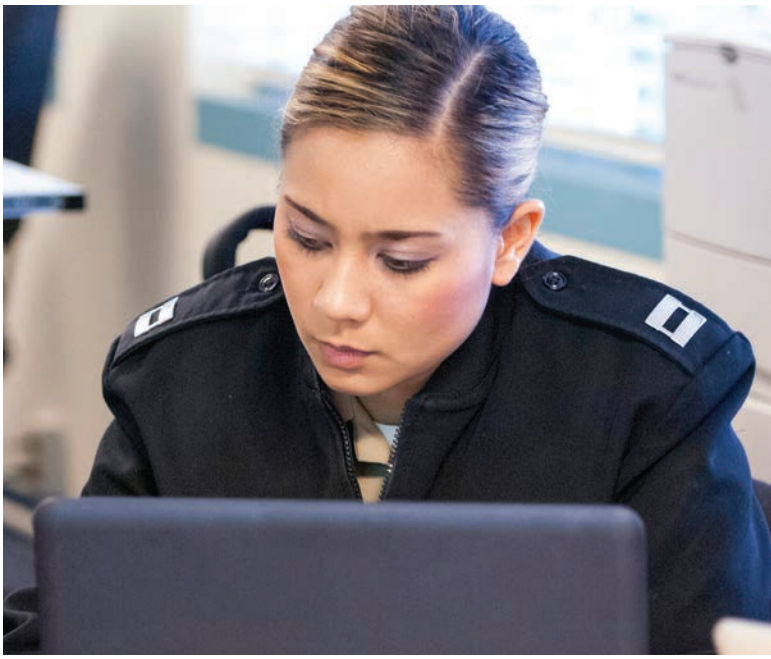


- The Navy should expand efforts to deliver graduate education in a variety of ways, including resident, online, satellite campuses, and short certificate courses that fit into officer career paths.
- The Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.
- The services should review their officer development timelines from a holistic perspective to explore innovative avenues to develop their respective officer corps through education, training, and assignments or experience.

USMC Wilhelm Study

- Obtain from the Commandant of the Marine Corps, a policy statement on Professional Military Education. This statement must elevate the importance of PME within the institution and place it on an equal or higher plane with other priorities such as physical conditioning.
- Ensure continuity in essential PME programs by stabilizing key positions. The practice of obtaining the services of retired officers with special aptitude in the regimes most necessary to build and sustain a PME program of the highest quality, and exploiting the flexibility that is inherent in Title X hiring authorities, should be sustained.
- Unite all educational functions under a single three-star rank or equivalent.

CNA: A Bottom-Up Assessment of Navy Flagship Schools

- The present Navy process for determining curricular content and program length adds costs to education without recognition of those costs by curriculum sponsors. Revising the requirements process could improve cost-effectiveness.
- The Navy could reduce the level of detail in defining subspecialty requirements to enable NPS to streamline curricula and gain efficiencies through merger of small programs that are expensive to maintain.
- In addition, more general requirements will allow greater consideration of civilian alternatives. Introducing competition will provide incentives for NPS to seek efficiencies and reduce costs, or risk losing their students.

Part 3. Expert Interview Analysis

Expert interviews provided great insight to all aspects of the naval education system. During the course of this study, the E4S staff formally interviewed fifty-five individuals, including, not only current and retired senior military leaders, but also leaders from business, academia, think tanks, and consulting firms in order to produce a well-rounded and universal set of responses (interviewees are noted with an asterisk (*) in the acknowledgment section of this report). The E4S staff identified and sought a diverse set of outlooks and ideas pertaining to education reform, the military personnel system, and the development of strategic leaders.

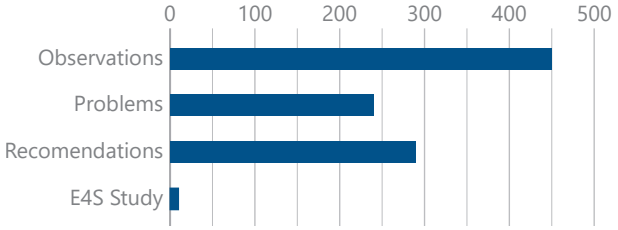
To ensure the E4S Study included candid and forthright opinions, we had to ensure anonymity and protect the identities of respondents. Therefore, qualitative coding analysis was conducted on the field notes from interviews and the results

are included here. The definitions of coding terms are included in Appendix C-2. In general, responses could be grouped into four categories: general observations, recommendations for how to conduct this study, problems with the current education system, and recommendations for improvement.

Qualitative Analysis Coding Hierarchy

In order to gather objective insight from the interviewees, each interview was broken down and categorized via a set of codes, which represent the high level themes introduced. The 4 major categories within the coding hierarchy were Observations, Problems, Recommendations, and E4S Study, where each category consisted of additional codes to further classify the interview content. Figure 5 displays the occurrence of each code across the high level categories of the coding hierarchy.

Figure 5 | Distribution of Codes (total: 1012)



This analysis reveals that although the interviewees have identified many problems with the existing education framework, they have also provided equally as many, if not more, recommendations for improvement. (The data indicates that 23.1% of responses were identified as "Problems" and 28.9% as "Recommendations.") This suggests that improvement is possible, that many distinguished individuals are optimistic and able to provide guidance on means for improvement. This analysis allows us to extract the insights from these individuals and is a means for the ultimate goal of making those ideas. For the complete list of codes, the coding hierarchy, and a detailed quantitative breakdown of the occurrence of each code throughout the interviews, see Appendix C-3.

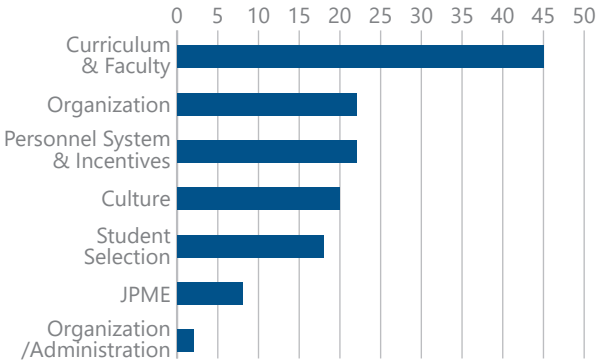
The following sections exhibit how the high level themes were divided further, to allow for a more direct approach toward improvement. The major problems and recommended improvements are identified and discussed in further detail.

Problem Areas

The analysis of these 55 interviews identified four general problem trends[2]:

1. Culturally, the Navy places significantly more value on operational and staff experience than it does on formal education.
2. There are not enough incentives for the personnel to continue higher education.
3. There is a problem with funding and administration within the organization.
4. The current curriculum and faculty are not conducive to the ultimate goals of the educational system.

Figure 6[3] | Distribution of Problems (total: 137)



A detailed spread of the problem areas in the current naval education system is illustrated in Figure 6.

[2] It is also worth noting that numerous interviewees identified several negative impacts of the current Joint PME system. However, since JPME is out of the direct control of the SECNAV, it was not listed a significant trend in DON education.

[3] The remaining 99 identified problems fall into extraneous categories which do not represent major themes or are beyond the scope of the E4S study.

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For each of the major identified problems, the study analyzed the most frequently used words within each code, and the quotations from the interviews in which those words appear. This helped to narrow down and further categorize the interview responses. Through this analysis it was recognized that there was a consistent trend of topics within each category discussed by the interviewees. With this insight, strong specific themes were elicited from the responses. For the detailed analysis of the word frequencies per codes and the breakdown of the trends discovered from the analysis, please refer to Appendix C-4.

Recommendations for Improvement

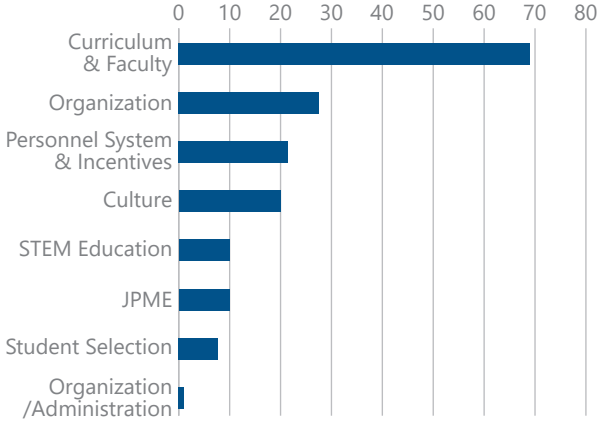
The analysis of the 55 interviews identified four general trends to improve naval education:

1. The culture throughout the educational system should connect the importance and value of education as it applies to the goals of the DON.
2. Wider use of incentives will help engage students and faculty.
3. The DON should create a stronger organizational framework surrounding the educational system that produces a more focused administration.
4. The curriculum should be more practical so that it aligns with the DON's goals, and allows students to find more career-oriented value in education.

A detailed spread of the recommendation categories to improve the current naval education system is illustrated in Figure 7.

For each of the top identified recommendations, the study analyzed the most frequently present ideas within each code and the quotations from the interviews in which those ideas appear. This helped to narrow down and further categorize the interview responses. Through this analysis it was discovered that there was a consistent trend of topics within each of the categories discussed by the interviewees. With this insight, strong specific themes were elicited from the responses. For the detailed analysis of the word frequencies per codes and the breakdown of the trends discovered from the analysis, please refer to Appendix C-5.

Figure 7[4] Distribution of Recommendations (total: 167)



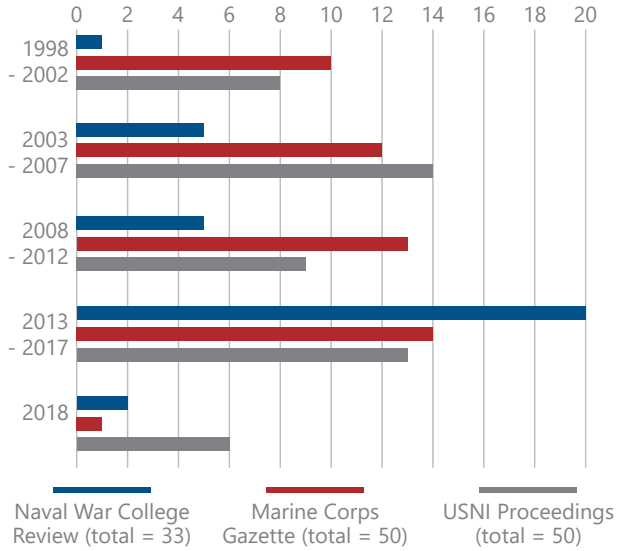
[4] The remaining 125 identified recommendations fall into extraneous categories which do not represent major themes or are outside the scope of the E4S study.

Part 4: Professional Journal Analysis

Within the Naval Services, there are three main professional journals: Naval War College *Review*, *Marine Corps Gazette*, and the United States Naval Institute's *Proceedings*. Each provides a forum to consider topics relevant to the naval profession. As part of this study a sample of articles related to education was taken from each journal. Figure 8 represents the distributions of articles (sample size was limited to 50) over the past 20 years.

Proceedings was selected for further content analysis, as it was found to be most representative of the naval services and represented the interests of the total force. The United States Naval Institute's *Proceedings* has been the independent forum for the sea services since 1873. Created to help professionalize and increase the education of the naval officer corps, the Institute's journal is the world's leading naval professional publication and one of the longest continuously published periodicals in the United States. From a research perspective it does not meet the rigorous requirements of a peer-reviewed academic journal, but articles are reviewed by an editorial board made up of naval practitioners. *Proceedings* articles contain the pragmatic observations of Sailors, Marines, and civilians associated with the Department of the Navy largely based on operational and professional experience. The historical and recent observations provide important insights into the state of education today and recommendations for the future.

Figure 8 | Distribution of PME Related Proceedings Articles



A sample of fifty *Proceedings* articles related to education over the past twenty years was taken (listed in Appendix C-6). Figures 9 and 10 illustrate categories and frequencies of problems and recommendations identified from these articles.

Figure 9 | Problems Identified in Proceedings Articles

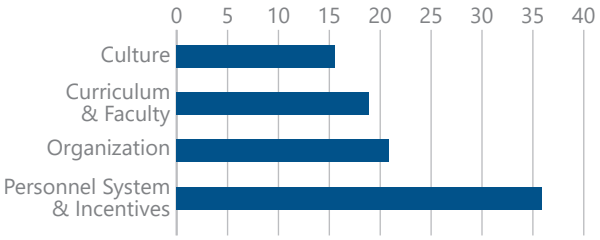
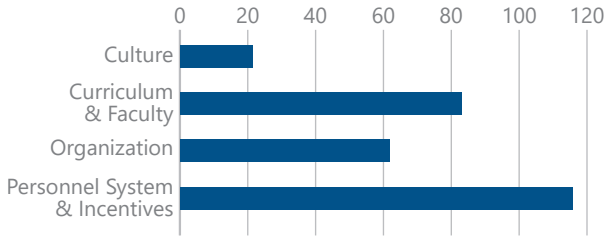


Figure 10 | Recommendations from Proceedings Articles



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An analysis of these fifty articles identified three general trends:

> Enlisted education needs to be addressed; valuable talent from the largest part of the services is not being utilized.
>
> The curriculum should be updated to provide more theoretical education in order to develop true critical thinkers and leaders. New ways of learning need to be provided so that naval personnel can learn while in the operational forces; reading lists are important but not sufficient. War-games, decision games, and simulations add value.
>
> Education is currently viewed as an obstruction in naval career paths by the majority, an obstruction exacerbated by the needs of the personnel assignment system. Education should instead be valued as a means for gaining knowledge and experiences which could enrich careers. This would also incentivize it and improve the cultural perception of education within the system.

The concerns raised by *Proceedings* authors are consistent with data collected elsewhere. Their recommendations for improvement were included in the deliberation process.

Part 5: Officer and Faculty Perspective[5]

Two surveys collected additional data of the perception of effectiveness of the naval education enterprise from key groups; faculty and naval officers. The first survey solicited feedback from the faculty members of the naval education enterprise. It asked general questions regarding the behavior of students, the value they place upon education, and how the current system prepares naval leaders for a successful career. This survey was not intended to identify issues within individual institutions or programs, although faculty did provide specific recommendations for improvement by answering an open-

[5] A portion of this analysis was conducted by experts at the Center for Naval Analyses.

ended question on ways to improve naval education. The analysis of these anonymized responses are included in the Appendix.

The second survey targeted three different populations of naval officers: officers with 6-10 years of service, post O-5 command naval officers, and general and flag officers. One premise of the E4S study was that there were three components to education: formal, experiential, and self-directed study, per Figure 11.

The rationale for selecting these three groups is the first group represents how well accession programs prepared them for the Fleet and how well education was occurring in there. The second population assesses the critical thinking skills of the junior officers produced by the accession training and what types of education/training techniques work best in a deployed environment. Finally, General and Flag Officers were asked to assess the impact naval education had on their careers and to assess the critical thinking skills and the educational preparedness of senior naval officers they have observed in fleet commands and staff assignments. They were asked to assess the effectiveness of their past 15-20 years of continuous learning in the Naval Services. The complete survey reports are included in Appendix C-7.

Distribution of Responses

220 naval officers responded to the survey, and the distribution of responses by rank and service is illustrated in Figure 12; 524 faculty members at naval education institutions responded to the survey, with the distribution of responses among the five institutions illustrated in Figure 13.

Structured Questions

The responses provided significant insight into the educational system and allowed the E4S team to understand viewpoints from across the entire organization. Major highlights discovered from the survey data are discussed below.

When officers were asked (O.Q.8) how prepared they believed they were to succeed in the Fleet after completing their accession training and education, 93-94.5% of

Figure 11 | Premise for Three Components of Education Under E4S

Figure 12[6] | Distribution of Officers (total = 220)

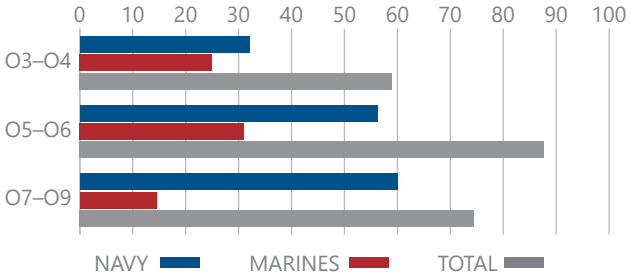
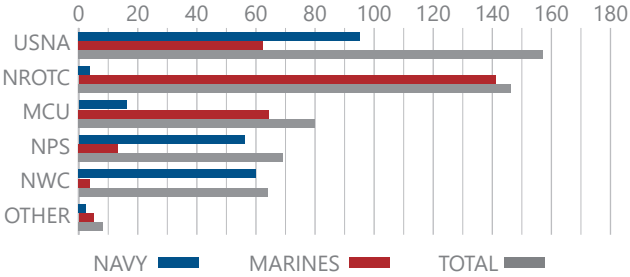


Figure 13[7] | Distribution of Faculty (total = 524)



[6] One O4 officer did not provide their service. One Marine Corps officer did not provide their rank.

[7] One NROTC University participant did not provide their military/civilian classification.

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participants from the ROTC Program and the Naval Academy responded "Very" or "Moderately Prepared", whereas only 70% from OCS/Enlisted Commissioning Sources responded the same way. Those from OCS/Enlisted Commissioning Sources predominantly saw themselves "Moderately Prepared" as opposed to those from ROTC/ Naval Academy predominantly feeling "Very Prepared," as depicted in Figure 14.

When O-5/O-6 officers were asked (O.Q.14) how prepared junior/company grade officers are to perform successfully when arriving at their first operational command, both Navy and Marine Corps officers responded that the junior/company grade officers were mostly "Somewhat Prepared" (57-58%). However, the remaining Marine Corps officers skewed more towards "Very Prepared," while the remaining Navy officers skewed more towards "Somewhat Unprepared," as shown in Figure 15.

The survey demonstrated that 16.5% more Marine Corps officers responded that junior/company grade officers were "Very Prepared" compared to Navy officers, and 10.3% more Navy officers responded that junior/company grade officers where "Somewhat Unprepared" compared to Marine Corps officers. This indicates that the Marine Corps students saw they had received an education better applied to their careers than Navy students. The same trend was discovered when Flag and General officers were asked (O.Q.22 & 23) how well the naval education enterprise prepares officers for operational and staff assignments. The results show that 53.5% of all officers answered with "Somewhat Prepared." Meanwhile, 16.4% more Marine Corps officers responded with "Very Prepared" compared to Navy officers, and 12.5% more Navy officers responded with "Somewhat Unprepared" compared to Marine Corps officers. Exactly 100% of the Marine Corps officers' responses were either "Very" or "Somewhat Prepared," whereas the Navy officers' responses ranged from "Very Prepared" to "Very Unprepared," as shown in Figure 16.

Officers were asked (O.Q.20) how useful formal education has been in their naval careers. Both Navy and Marine Corps officers agreed that it had been "Extremely Useful" and the responses decreased for each choice thereafter. The main difference was that the Marine Corps officers' responses declined further than the Navy officers' responses, which was more linear, suggesting that the majority of Marine Corps officers more highly value education in regards to its usefulness in career paths, while Navy officers place value in

Figure 14 Officers' View on Their Preparedness After Training/Education

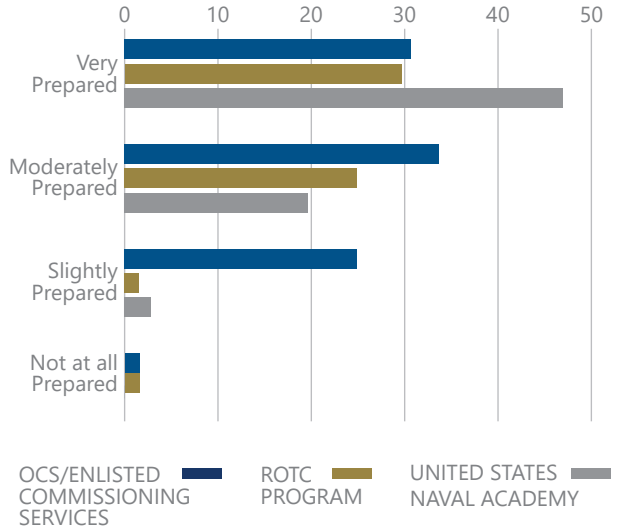


Figure 15 Officers' View on Their Preparedness After Training/Education

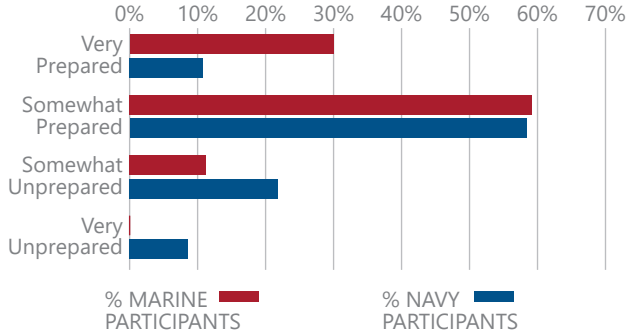
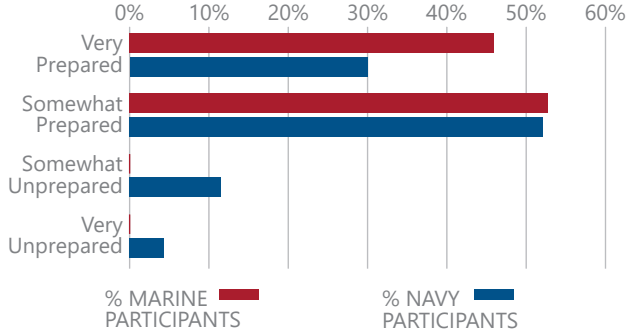


Figure 16 FO/GO Views on Education's Effect on Officer Preparedness

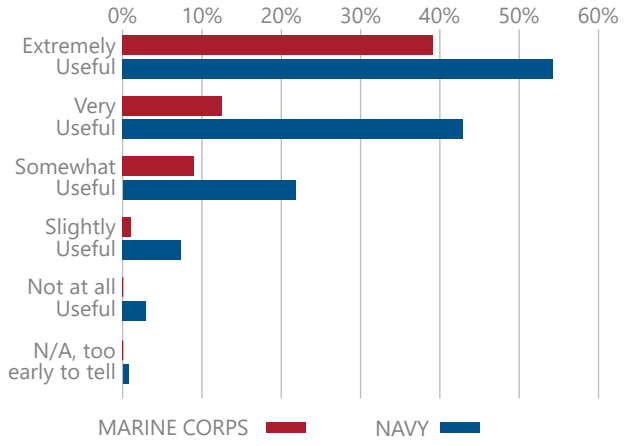


education across a wider range (this theme of the value of education was also discovered and further explored in the open-ended question analysis in the following section of this report.) Figure 17 illustrates this finding. Notice that the ratio of "Extremely Useful" to "Very Useful" is much smaller for Navy officers (1.2:1) than for Marine Corps officers (3:1).

A similar trend was noticed when the officers were asked (O.Q.21) how satisfied they are with the quality of the education provided in the programs they attended, but the variances were not as extreme. This suggests that while a large portion of Navy officers did not see that education had aided in their career, they also believed that the quality of their education was high.

Faculty were asked (F.Q.11) to select which educational factors they felt needed to change most critically to improve the naval education enterprise. Table 3 lists the factors from most selected to least selected. The factors considered most critical are those involving faculty and other personnel, while

Figure 17 | Officer's View on Usefulness of Formal Education in Naval Career



Education Factor to Change	% of Faculty who Selected
Increase resources	40.65%
Improve personnel system	22.52%
Increase DON/sea service support or encouragement for education	21.95%
Increase number of faculty members	20.23%
Increase education incentives	19.27%
Update curriculum to reflect fleet needs	18.89%
Provide more opportunities for experiential/fleet learning	17.37%
Improve student preparation	17.18%
Improve alignment of education to strategy	15.84%
Integrate emerging technology	15.84%
Increase individual professional development opportunities	14.31%
Increase opportunities for participation in experimentation/war games	12.60%
Improve enterprise coordination	10.69%
Increase utilization of civilian educational opportunities	9.73%
Adopt a new learning model	6.68%
Eliminate degree programs that are no longer relevant	5.15%

Table 3

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those least critical are major changes to the organization/curriculum, such as looking to civilian opportunities and adding/removing entire learning models or programs. This suggests that the DON has the tools needed to conduct change, and it needs to come from within.

Significant Findings

The following statistically significant findings were revealed from the faculty survey results:

- Military personnel have more positive perceptions of their institutions than civilian personnel.
- The faculty at the Naval Academy perceives their institution as better at preparing naval officers to be more effective leaders, excel in their field of study, apply their education to real world situations, establish and manage effective teams, and understand critical strategies significantly more than any other institution.
- Time in position is not significantly associated with perceptions.
- Faculty and staff who have served in the military have a more favorable view of their institution than individuals who have never served.
- Quality of students, the value placed on education, the effectiveness of these institutions to adapt to change are similar across work location.
- NROTC university faculty perceive the need for DON/sea service support significantly more than other institutions.
- The Naval Academy and NROTC faculty strongly want to improve alignment of education to strategy significantly more than other institutions.
- The Naval Academy and the NROTC faculty feel more strongly about offering more incentives.
- The Naval Academy and the NROTC faculty feel more strongly about improving personnel system significantly more than other institutions.
- NROTC University faculty feel more strongly about the need for more faculty significantly more than other institutions.

The following significant findings were revealed from the officer survey results:

- O-6 through O-9 officers are significantly more satisfied with the quality of education provided in the programs they attended than are O-3 through O-5 officers.
- O-6 through O-9 officers are significantly more satisfied with the usefulness of their education than are O-3 through O-5 officers.
- O-5 through O-9 officers perceive the critical thinking skills of junior officers (O-1 through O-4) have decreased over time.

Open Ended Response - Qualitative Analysis

Both of the surveys concluded with an open-ended question asking how the participants would improve naval education. Exactly 65% (143 responses) of officers and 53% (279 responses) of faculty responded to this question. The responses were coded to reveal the most prominent suggestions. The coding hierarchy consisted of 4 codes: Culture, Curriculum & Faculty, Organization, and Personnel System & Incentives. Those codes were further split into lower level sub-codes where applicable and categorized into higher level categories: Problems, Recommendations, and Observations. A visual representation of the hierarchy and the code definitions can be found in Appendices C-2 and C-3.

The distribution of the codes across all Officer and Faculty responses is presented in Table 4.

Code	Officers	Faculty	Combined
Culture	39	89	**128**
Curriculum & Faculty	106	280	**386**
Organization	45	212	**257**
Personnel System & Incentives	101	179	**280**
Total	**291**	**760**	**1051**

Table 4

The percentage distribution presented in Figure 18 reveals a slight divide between the responses from Officers and responses from faculty. It is evident that Officers had a greater focus on Personnel System & Incentives than faculty did, while faculty had a greater focus on Organization than Officers (the Organization code included responses related to funding/budget, resource allocation, strategic goal definition, and administration). Both groups equally commented on Curriculum and Faculty, which happened to be the area of greatest concern overall. This further illustrates that faculty are feeling the effects of budget cuts across the organization, and that they see first-hand the impact which it has on education. This point is further examined in the following section "Overlapping Codes."

Overlapping Codes

Coding of the open-ended survey responses revealed that although most responses were short in length, they touched upon multiple topics. It is interesting to see which combination of codes were most prevalent and what that revealed about the educational system. A matrix of code occurrences throughout the open-ended responses has revealed that some codes overlap much more often than others (only 5% of all code combinations, where there were 231 total, consisted of greater than 10 overlaps), suggesting themes within the educational system and over-arching suggestions for improvement. Table 5 lists the top seven overlapping codes.

Code	# of Overlaps	Code
Recommendation | Curriculum & Faculty	39	Recommendation | Personnel System & Incentives
Recommendation | Curriculum & Faculty	31	Recommendation | Organization
Problem | Curriculum & Faculty	20	Problem | Organization
Problem | Curriculum & Faculty	18	Problem | Personnel System & Incentives
Recommendation | Culture	17	Recommendation | Personnel System & Incentives
Recommendation | Organization	14	Recommendation | Personnel System & Incentives
Problem | Personnel System & Incentives	13	Recommendation | Curriculum & Faculty

Table 5

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This analysis revealed that there is a connection between many of the discussed topics. For example, problems in one area may be causing problems in another, and applying changes to one area may improve another, by default. This information is insightful, because it draws connections and reveals the ultimate impact the DON's actions will have. With this information, the DON can improve its educational system strategically and effectively. The complete analysis can be found in Appendix C-8. The following are the high level themes elicited from this analysis.

1. There is a correlation between the topics of Organization and the Curriculum & Faculty. Many of the problems discovered relating to Curriculum and Faculty stem from the Organization.

Organizational Vision:

The curriculum and the hired faculty are an extension of the organization's mission and goals. Many of the curriculum- and faculty- related problems are manifested as products of an outdated structure. The mission and goals of the organization need to be updated in order to place more value on education, and specifically on creating critical and strategic thinkers for the purpose of serving the DON. In turn, it would appear that the curriculum should be updated to reflect this change, strengthening it because the organizational values will be backing it.

Funding:

Faculty are not receiving enough funding to teach effectively, develop professionally, and conduct research. This is manifested as a lower quality curriculum.

Administration:

The lack of administrative resources available to faculty is causing the faculty members to take on burdensome administrative tasks, which deter from teaching and mentoring students.

2. There is a disconnect between the Curriculum & Faculty and the Personnel System which needs to be resolved in order to create improvement within the educational system.

Career Paths and Educational Relevance:

The existing educational system does not adequately prepare students to become successful officers.

Mentorship:

Students would benefit from a mentorship program within the educational system to guide them through it and provide deeper insight into their education and how it would be used during their careers.

Navy Presence:

There need to be more Navy personnel serving as faculty members. In the current situation, it is frowned upon for Officers to take time away from one's career to teach.

Summary

This five-part analysis includes (1) organizational questionnaires, (2) a historical Educational Reform Study Analysis over a number of past studies, (3) expert interview analysis across internal and external industries, the private sector, and academia, capturing a global perspective of education, (4) an analysis of professional journal articles offering views of the educational system, and (5) a survey measuring the producers and consumers of the naval education enterprise. These methods have helped to identify problems that currently exist within the system from a broad and objective perspective, recommend means for making lasting improvements, and measure the severity of each challenge, allowing better understanding and determination of how much focus to place in each area.

By leveraging multiple avenues for analysis, the study allowed for a greater number of factors to be investigated and revealed a wider assessment of the educational system. While a major intention of the study was to be objective (in the pattern by it was conducted), the responses and content gathered in each of the four parts of the study leaned towards certain aspects of education. By combining the results and insights from each, some general observations were determined. Given the sequence of the data collected, the E4S Study established priorities based on responses to the organizational questionnaires and interviews with institutional leaders. Table 4 lists the highest priority areas for improvement within the system, as determined by this study. These areas are listed in descending order of their relative frequency as observed as an average across all four parts of the analysis.

E4S Executive Panel Priorities (from questionnaire)	Educational Reform Studies	Expert Interviews	USNI *Proceedings* Articles	Faculty/ Officer Survey	Relative Frequency Rating
Education as a Warfighting Competency	Medium	High	High	High	2.75
Personnel System	High	Medium	High	High	2.75
Modernize Education Methods (Wargaming, Simulation, etc.)	Medium	High	High	High	2.75
Organization	High	Medium	Medium	High	2.50
Incentivize Education	Low	Medium	High	High	2.25
Enlisted Education	High	Low	High	Medium	2.25
Naval Integration	High	Low	Medium	Medium	2.00
Modernize Curriculum	Low	High	Low	High	2.00
Life-Long Learning	Low	Medium	Medium	Medium	1.75
Organizational Learning	Low	Medium	Medium	Medium	1.75

Table 6

To summarize, the data have shown that the biggest problems lie within the categories of Faculty/Curriculum, Students/ Personnel System, and Culture. The top recommendations for improvement are in the categories of Faculty/Curriculum, Policy/Process, and Organization/Culture. With these observations in hand, the Board feels that clearer insight may be achieved to develop the right strategies for implementing effective strategic and institutional changes for improvement.

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CHAPTER 5:
Education for Seapower (E4S) Recommendations

"I was lucky enough to earn a Navy-funded PhD in international law and finance from The Fletcher School of Law and Diplomacy at Tufts University early in my career. There were certainly moments in the long decades of my career that I could sense a kind of quiet ambivalence from other naval officers about my advanced degree, a sense that I was somehow more of an academic, not a destroyer officer. But as the years went on, and I was able to prove myself at sea, the Navy came to value the degree as much as I did. Ultimately it allowed me to make a vastly greater contribution to the nation's security -- from the deck of my flagship at sea to the halls of the Pentagon to the corridors of NATO. In the end, 21st century warfare is brain-on-brain conflict, and we must build our human capital and intellectual capacity as surely as we produce the best pure war fighting technology if we are going to win the nation's wars and advance its security.

— Admiral James Stavridis, USN (Ret)
Former Supreme Allied Commander Europe"

In order for the Secretary of the Navy to lead the Naval Education Enterprise as an integrated organization, while retaining the special characteristics and strengths of each of the Department's educational institutions, a new, unified structure is needed to provide policy, budget, and acquisition authority and agility in all matters regarding naval education.

Organization

Naval University

We recommend that the Secretary of the Navy create a Naval University, led by a President, a three-star Naval Officer who is dual-hatted as President, Naval War College, located in Newport, Rhode Island. We also recommend that the office of President have an initial term of five years, and then renewed, if the Secretary so prefers, for subsequent terms of two years, and that this position be rotated between the Navy and Marine Corps. The President would have overall responsibility for educational policy, programming, acquisition, and report through the Chief of Naval Operations and the Commandant of the Marine Corps to the Secretary of the Navy.

The President of the Naval University would integrate all education institutions in the Department of the Navy, to include the Naval War College, Naval Postgraduate School, Marine Corps University, and the United States Naval Academy, as well as the academic curricula of the Naval Reserve Officers' Training Corps, Federal Executive Fellowships, Officer Candidates School, and all Flag/General Officer Education.

The President of the Naval University would be responsible for the following:

- Create a single educational POM input to the Budget Submitting Office in the Department of the Navy during the planning and programming cycle.
- Coordinate and synchronize academic curricula, faculty policies, admissions criteria.
- Represent naval education to the Joint Chiefs of Staff and the Office of the Secretary of Defense.
- Lead overall acquisition of educational systems for the entire Naval Education Enterprise.
- Coordinate Naval University-wide educational policy recommendations submitted through the Chief of Naval Operations and the Commandant of the Marine Corps to the Secretary of the Navy.

Chief Learning Officer, Department of the Navy

We recommend that the Secretary hire and/or nominate a senior civilian staff assistant, with educational leadership experience headquartered in the Pentagon, with a small supporting staff transferred from members of the Navy's current Chief of Naval Personnel's education team (OPNAV N12) and others as directed by the Director, Marine Corps Staff, as appropriate, to serve as Chief Learning Officer (CLO) for the Department of the Navy. The duties of the CLO would include, but not be limited to, the following:

1. Take direction from the President, Naval University in order to devise a naval educational strategy for the Secretary's signature, and then provide a regularly updated strategic assessment of the naval domain in order to update that strategy. These assessments should result in published expected requirements for the entire Naval Education Enterprise, along with expected levels of knowledge, skills, and abilities to be learned by respective graduates.
2. Act as the Budget Submitting Office for all program lines for the Navy and Marine Corps with regard to education funding. The CLO will be the action arm for the President, Naval University for all education budget plans, and should report to him/her for concurrence as the POM is built.
3. Submit recommended educational policy documents, instructions, ALNAV messages, and statutory board precepts regarding educational requirements to the Secretary of the Navy throughout the year, as coordinated with the President, Naval University.

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4 Coordinate with private and public university systems, private sector learning offices, and the like in order to provide a naval connection to the leading edge of all educational practices in the nation.

Program Executive Office, Naval Learning Systems

We recommend that the Secretary name the current Commander, Naval Air Warfare Center – Training Systems Division, as a concurrent command responsibility, the duties and responsibilities of Program Executive Office, Naval Learning Systems (PEO-L). The PEO-L would act as the unified acquisition and execution office for all educational systems required by the President, Naval University and approved by either the Chief of Naval Operations or the Commandant of the Marine Corps, as appropriate. The duties of the PEO-L would include, but not be limited to, the following:

1 Serve as the Naval Education Enterprise acquisition arm for all education technological needs, to include electronic continual learning aids online, website design and maintenance, virtual reality, gaming, and other interactive learning systems; act as the main conduit for the Naval Education Enterprise to civilian education and learning system technology and design.

2 Provide research and development options for the President, Naval University with respect to single-buy solutions which reduce overlap and inefficiencies across the Naval Education Enterprise.

3 Maintain all legacy education technologies through efficient management contracts, ensuring economic order quantity and proper scale to reduce costs of education and learning systems throughout the Department.

Naval Community College

We recommend the Secretary of the Navy create the Naval Community College under the leadership of the President, Naval University to facilitate education and certifications for enlisted Sailors and Marines which are relevant to the lethality of the naval services.

- The Naval Community College will design rigorous associate of science degree programs for naval sciences, with concentration areas such as data analytics, organizational behavior, and information systems, while maximizing credit for existing educational and training programs.
- Through a united Naval University, we recommend that a universal transcript system be created for service members that will assist in developing increased partnership with regional college accreditation organizations and private/public civilian university systems.

Governance

We have reviewed the current Board of Advisors arrangement for the Naval Postgraduate School and Naval War College, as well as the statutory requirements for the Boards of Visitors at the United States Naval Academy and Marine Corps University, and offer the following recommendations:

- Institute a single Naval Education Board as a governing function for the Naval University, headed by the Secretary of the Navy, with the Chief of Naval Operations and Commandant of the Marine Corps as co-chairs. This board will also include on a rotating basis one of the Navy's four-star fleet commanders and Commanding General, Fleet Marine Forces Atlantic and Pacific. Other senior commanders should be appointed to bring specific skills such as cyber, space, or intelligence.

- Create a Board of Advisors of distinguished persons, to include as ex officio members the chairs of the Naval Academy and Marine Corps University Boards of Visitors. This board will have the primary duty of providing oversight for the Secretary of the Navy and for providing support, guidance and advice for the entire educational enterprise. The President of the Board of Advisors should be a retired four-star military or naval officer, or civilian equivalent with national stature with a renewable four-year term.

Policy

The following policy changes for naval education must be implemented by the new Naval Education Enterprise. We recommend that they first be evaluated by the new Chief Learning Officer and his or her staff in the Secretariat while the Naval University and PEO-L are organizing, and signed out by the Secretary as implementing orders and instructions. It is vital that the new CLO start as soon as possible after the Secretary makes his decision on implementing the recommendations in this report. The policy recommendations are:

1. Require the President, Naval University to develop a comprehensive naval education strategy for review by the Chief of Naval Operations and the Commandant of the Marine Corps, and final approval by the Secretary of the Navy.
2. Authorize the President, Naval University to develop all naval educational budget requirements (Program Objective Memorandum, or POM), through the Chief of Naval Operations and the Commandant of the Marine Corps to the Secretary of the Navy.
3. Require the President, Naval University and Naval Education Board to develop selectivity standards and admissions requirements for each of the Naval University institutions, as well as opportunities for civilian and private sector education.
4. Require Reporting Seniors of each Service to comment upon learning achievements as a separate category in officer fitness reports and enlisted evaluations, and make continuous learning achievements an essential part of promotion precepts signed by the Secretary of the Navy. The newly-created selection boards for in-residence graduate education by the Navy, and as established earlier by the Marine Corps, support this objective and are recommended for permanence.
5. Require in-residence, strategically-focused Master's Degrees of all future unrestricted line Flag and General Officers, with waiver authority solely invested in the Secretary of the Navy.
6. Develop a naval education enterprise digital network for continuous learning by all Sailors and Marines, from E-1 to O-10, that shares the educational assets and learning opportunities of the entire Naval University, as well as those of the American university system and private sector.
7. Institute naval war-gaming and competitive team learning as a necessary part of a continuum of learning at the junior, middle, and senior stages of a naval officer and enlisted person's career path, as well as "just-in-time" education as new conditions arise.
8. Begin the process of developing a differentiated talent management system that uses education, among other tools, to reveal, groom, and develop a deep bench of leadership in the services and the civilian workforce, acting as a retention

and permeability tool in concert with the Blended Retirement System and new officer promotion flexibilities granted in the 2019 John S. McCain National Defense Authorization Act.

9. Pursue changes in the Joint Professional Military Education system that meet the unique, sea-centric, forward operational requirements of the Navy-Marine Corps team, and provide essential Joint operational doctrine training earlier in the careers of its personnel.
10. Activate an organizational learning continuum as part of the Naval Education Enterprise, with accountability and ownership in the person of the President, Naval University, reporting to the Commander, Fleet Forces Command, Commander, U.S. Pacific Fleet, and the Deputy Commandant for Combat Development and Integration, creating positive accountability and resources for institutional advancement.
11. Implement new curriculum reviews for all educational institutions, with overarching strategic guidance and expectations to be issued by the Secretary of the Navy that are informed by a continually-adapting strategic estimate of the global situation in technology, economics, and geopolitics, created by the President, Naval University.
12. Create more flexible education model based on "stackable" certifications and courses that have the potential to be aggregated for graduate degrees along the course of a sea-centric naval career, in addition to greater in-residence opportunities, for both officers and enlisted personnel, administered by the Naval University.

Follow On Study

Several issues were identified during the course of this study that require further analysis. We recommend that the CLO take the lead to examine these issues and report back to the Secretary of the Navy by the end of the calendar year 2019. Issues include:

Commission a short-term study on improving the facilities of the Naval Postgraduate School, with emphasis on its core mission of research, science, and technology. Study feasibility of building new facilities either on the current campus of NPS or annexes at other locations in proximity to private-sector technological research hubs. This study should have as its goal world-class facilities, ready for technological exploration in the cognitive age, as well as better coordination with the innovation engines of America.

Many experts identified the need to distinguish pursuing graduate degrees as the sole measure of education for naval officers, compared to developing an educated naval force, as the latter option may benefit from completing different models of formal education. The Department should consider a more flexible education model based upon "stackable" certifications and courses that could be aggregated for graduate degrees along the course of a naval career for both officers and enlisted personnel.

Numerous administrative problems, such as timekeeping, publication standards, and faculty tenure were identified during the course of the study. Standardizing administration across the Naval Education Enterprise should be an area of further review and goal for the new President, Naval University.

To develop a truly integrated Naval Education Enterprise, a modern information back-bone is required that is compatible between .edu domains and with .mil domains. Explore options for a modern Naval Education Enterprise digital network.

Report Conclusion

Tasked with a clean sheet review, the E4S Study's first order of business was to understand the current state of each education institution and the Navy and Marine Corps' organizational approach to learning in general. It was evident that each institution excelled during a time of fiscal uncertainty and a rapidly changing strategic environment. It was also apparent that the Navy and Marine Corps have two distinct cultures with respect to education and personnel management.

The E4S Study next consulted military leaders, civilian academics, and business heads who provided valuable perspective in understanding how individuals and organizations learn (See Appendix A). To gain a better insight into how naval education evolved to where it is today, the E4S Study conducted an ambitious historical analysis of military education, surveyed Navy and Marine Corps personnel and faculty at all naval education institutions to understand the cultural perceptions of education, and referenced numerous studies and previous military education reform initiatives. What was learned from this approach was that there was considerable room for improvement and an opportunity to provide strategic alignment commensurate with the 2018 National Defense Strategy which outlines new challenges for the Department and most notably a return to peer competition.

The creation of a Naval Education Enterprise and corresponding policy recommendations best addresses the strengths and individual cultures of the Navy and Marine Corps while also providing strategic guidance directly from the Secretary of the Navy. A Naval Education Enterprise, enabled by an acquisitions component, designed to deliver cutting edge educational services and a coordinated strategic vision for all Naval education institutions would be a transformational change for the Department. Establishing a Naval Education Enterprise is an opportunity to leverage already cultivated strengths, incorporate lessons from the operating forces as well as private industry, and strategically reinforce individual and organizational learning for the Department in preparation for an uncertain future.

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Mr. Doug Moses
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Captain (Ret) Gabe Salazar
Captain David Sauve
Major General (Ret) Bob Scales*
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Dr. David Wilson
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Dr. James Wirtz
Mr. Bryan Whitman
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General (Ret) Anthony Zinni

* interviewee

Glossary of Terms

Attitudes

The opinions and beliefs that influence action.

Cognition

The mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.

Cognitive Age

An era in human evolution when individual and organizational prosperity and survival are predicated on one's ability to keep pace with a rapidly changing information environment. As the limits of human ability to process information, reason, and use knowledge are reached, technology will begin replicating, and exceeding, the human mind in specific domains of expertise.

Cognitive Science

The study of thought, learning, and mental organization, which draws on aspects of various fields, including: psychology, neuro-science, linguistics, philosophy of mind, computer science, anthropology, sociology, and biology.

Cognitive Skills

A set of human capacities that enable cognition: perception, action, learning, memory, reasoning, decision-making, concept-forming, language, emotion, and consciousness.

Critical Thinking

Investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion that integrates all available information and that can therefore be convincingly justified.

Experiential Learning

Learning by doing. This requires the synthetization of education, training, and knowledge gained from practical experience. Medical doctors and Naval Aviators, for examples, gain and maintain proficiency through experiential learning.

Knowledge

A familiarity, awareness, or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning.

Learning

The pursuit of professional mastery requires naval professionals to constantly adapt and learn. Learning involves acquiring new knowledge, behaviors, skills, values, preferences and understanding, and may involve combining different types of information. Learning can be an individual, team or organizational pursuit.

Organization Learning

The process by which knowledge about the action-outcome relationship between the organization and the environment is developed.

Naval Education

The intellectual, moral and social instruction in the profession of arms. It provides individuals with the enabling skills, knowledge and attitudes necessary to under-take naval tasks, and includes activities that aim to develop thinking, decision-making and problem-solving skills. Education also develops knowledge of the profession of arms, and the general knowledge that supports situational understanding. *Education prepares for the unknown.*

Naval Training

A planned process to inculcate and modify skills, knowledge and attitudes through learning experience in order to achieve effective performance in an activity or range of activities. Training enables individuals to carry out their assigned roles across the spectrum of military activity, and enables groups of soldiers to work collectively towards a military objective. *Training prepares for the known.*

Reasoning

The process of drawing conclusions to inform how people solve problems and make decisions.

Skill

The ability to carry out a function.

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Appendix A: E4S Timeline / Decision Brief / Decision Memorandum

Education for Seapower Executive Board Schedule

May 14, 2018: Kickoff Meeting of the E4S Executive Board

- Study direction provided by the Secretary of the Navy, Richard V. Spencer and the Under Secretary of the Navy, Thomas B. Modly
- Initial discussion on scope of study
- Proposed timeline of events for the Study
- General discussion of the state of education in the military and civil society

June 26, 2018: Final Study Scoping Meeting

- Finalize scope and breadth of E4S Study
- Compile lists of experts, leaders, and others for study interviews
- Discuss problem statement
- Agree upon study methodology

July 13, 2018: Discussion with Naval Educational Leaders

- Presentations by
  - Superintendent, United States Naval Academy
  - President, Naval War College
  - President, Naval Postgraduate School
  - President, Marine Corps University
  - Commander, Naval Service Training Command (Naval Reserve Officers' Training Corps academic syllabus)

August 10, 2018: Discussions with Manpower and Personnel Leaders

- Presentations by
  - Chief of Naval Personnel
  - Deputy Commandant, Manpower and Reserve Affairs
- Discussion / Mid-term review with the Secretary of the Navy
- Expert roundtable
  - Mr. Bran Ferren, Co-Founder, Applied Minds
  - Dr. Suzanne Fry, National Intelligence Council
  - Dr. Michael Horowitz, University of Pennsylvania
  - Dr. Ray Perez, Office of Naval Research
  - Dr. Roger Schank, Northwestern University
  - BGen Christian Wortman, USMC, Vice Chief of Naval Research and Commander, Marine Corps Warfighting Lab

September 7, 2018: Executive Board Initial Discussion of Study Recommendations

- Organizational Changes
- Governance Changes
- Policy Changes

October 16, 2018: Executive Board Final Discussion of Study Recommendations

October 19, 2018: Executive Board Debrief with the Chief of Naval Operations

October 24, 2018: Executive Board Debrief with the Secretary of the Navy

November 5, 2018: Executive Board Debrief with the Commandant of the Marine Corps

December 5, 2018: E4S Study Report delivered to the Under Secretary of the Navy

Education for Seapower Study Staff Visits: Members of the study staff physically visited the following institutions, conducting leadership and faculty interviews

- Marine Corps University, Quantico, VA
- Naval War College, Newport, RI
- Naval Postgraduate School, Monterey, CA
- United States Naval Academy, Annapolis, MD
- Yale University, New Haven, CT
- Johns Hopkins University School of Advanced International Studies (SAIS), Washington, D.C.
- Johns Hopkins Applied Physics Laboratory, Fort Meade, MD
- Air University, Maxwell AFB, AL
- Army University/Combined Arms Center, Fort Leavenworth, KS
- National Defense University, Fort McNair, Washington DC
- Joint Staff, J7, Pentagon

Key Deliberations

The following slides provide details from key September 10th, 2018 meeting.

E4S Executive Board Meeting Debrief

10 • SEP • 2018

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Premises of the E4S Study

- Seventeen years of combat, Budget Control Act, Sequestration, and Continuing Resolutions made planning difficult, yet institutions performed admirably

- All priorities are not equal, and readiness and people take top place for funds, especially in war

- Naval services must react to "blended retirement" with strategies for identification and retention of talent in order to groom a deeper bench for senior leadership

- Applaud CNO's directive for resident graduate and war college education prior to Major Command; USMC has used "Top Level School" selection to excellent effect

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It is in this context that we offer what the Under Secretary requested as a "clean-sheet" review of naval education, and, as the Secretary of the Navy expanded, conducted with absolutely no boundaries in our examination

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Recognizing Cultural Differences

Navy	Marine Corps
Education undervalued by the Warfighting Communities	**Education valued, but more integration necessary**
Warfighting doctrine less valued, organizational learning without defined process/lead	Doctrine more valued, organizational learning needs more attention
Education under-resourced overall, a function of Continuing Resolutions, BCA	Education fenced throughout budget process, but single-dimensional (MCU)
War-gaming a traditional asset but not widely used nor integrated into education	War-gaming used on smaller scale, integrated as a planning tool
Enlisted training the target of large-scale transformation (RRL) – not education	Enlisted leadership education a focus of MCU programs

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Vision

The Naval Educational Enterprise must produce leaders of character, integrity, and intelligence steeped not only in the art of war, the profession of arms, and the history and traditions of the Naval service, but also in a broader understanding of the technical and strategic complexities of the cognitive age, vital to assuring success in war, peace, and the grey zone in-between; officer and enlisted leaders of every rank who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action.

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Cognitive Age (Tentative Definition): A new era enabled by artificial intelligence and human-machine teaming that will transform the character and nature of warfare, particularly when we will begin replicating, and exceeding, the speed and ability of the human mind in specific domains of expertise.

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Driving Factors

- UNDER-VALUED: Overall current "Naval Educational Enterprise" under-valued, under-exploited, and under-resourced; disparate lines of effort without strategic focus or aligned intent by the Secretary

- INTEGRATION: Opportunity now to integrate lifelong individual and agile organizational learning through institutionalizing hard-won lessons and feedback loops

- STRATEGIC DIRECTION: Iterative, united naval strategic direction for educational enterprise necessary to remain ahead of peer competitors, orchestrate learning across the naval forces

- JOINT EDUCATION: JPME not effective/efficient for sea-centric Services, need Joint education much earlier, use war-gaming throughout naval careers

- ENLISTED AGILITY: No coordinating method for Enlisted education or enabling scale (Naval Community College); align "best of" naval solutions

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Organizational/Governance Options

Increasing Change

Option 1: Steady As You Go/Enhanced AERB

Option 2: Empowered Naval Education Board

Option 3: Create an Education Czar in the Secretariat

Option 4: Create a Naval University System

Option 5: Create Commander, Naval Education and Training Command

Option 6: Create Training and Doctrine Command (TRADOC) for DON

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Board Recommended Option:

COA 4: Create a Naval University (NU) System: **Orchestrate (not C2)** a continuum of learning (both individual and organizational) for USNA, NPS, NWC, MCU, NROTC, Flag Education, Naval Fellowships

- Enterprise includes President (or Chancellor), Naval University, a small supporting CLO in the Secretariat, and united Acquisition arm at current NAWC-TSD in Orlando, FL, dual-hatted as PEO – Learning.

  - Leadership: Create a billet for a 3-star naval officer (rotate USMC/USN) as President, NU, with 3-year tenures, (or a Chancellor, retired three/four star, with five-year term) reporting to Secretary of the Navy (much like ONR/NRL), with responsibility for **POM, policy, and curriculum coordination.**

  - Governance: **Orchestrates** educational strategy, curricula, policies, lessons learned, and coordinates with ONR to ensure emerging technologies are integrated within the educational enterprise; serving Fleets/Marine Op Forces.

  - Budget Authority: The President (or Chancellor), NU would assume **resource sponsorship coordination,** with each institution retaining autonomy in implementing policy directives, and direct PEO-L for unified acquisition efforts.

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Major Topics

Building the Foundation:

- President (or Chancellor) Naval University (NU) as Enterprise Lead for Education, a warfighting enabler with a seat at the budget table with rest of 3-star community leadership

- NU orchestrates learning and warfighting effectiveness in the cognitive age; — connected to analytics office to make real and institutionalize hard-won lessons through the "virtuous cycle" of more agile organizational learning

- NU not a C2 org — rather, a nexus of coordination between all schools (NWC, NPS, MCU, NROTC, and USNA) for policy, programming, and execution — and the first place for better synchronization between the Navy and Marines, as well as technology and strategy

- Disrupting our legacy stove-piped educational approach, lifting it out of the 20th C, and becoming a more agile learning organization for our national security

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Major Topics

Building the Foundation (con't):

- Selectivity rather than "checking the block": A united naval policy for top cohort (30%) requirements for in-residence war college; ensure sufficient education and time to develop strong strategic thinking and analytical skills for senior levels
- Iteratively establish strategic standards of learning, with feedback loops informed by deployed ops and exercises, intel on peer competitors, at least biannual basis;
- Align and integrated educational enterprise with Fleet/Marine Operating Forces, emphasize war-gaming at junior, mid, and senior levels of officer/enlisted career
- Recommendations to SECDEF to revise Joint PME to meet agile and dynamic needs of naval services, receive Joint training earlier, unify phases
- Naval Educational Enterprise direct link to SECNAV/UNSECNAV for policy, precept, confirm resources, strategic intent delivery to entire DON

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Proposed Next Steps

- **Next two weeks:** Board members brief CNO and CMC independently at next possible opportunity; use 2-page information paper for discussion
- **First week October:** All Board Members meet with SECNAV for interactive debrief of Study, present Action Memo for consideration and decision
- **When ready:** SECNAV make decision and direct action
- **Upon decision:** Publish Executive Summary and Report for public rollout and begin implementation phase within 30 days of SECNAV decision

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14 November 2018

MEMORANDUM FOR DISTRIBUTION

Encl (1): Action Items for Establishing the Naval University
Encl (2): Summary of the Deliberations, Findings and recommendations of the E4S Board
Encl (3): Education for Seapower Final Report

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

1. In World War II, Winston Churchill weaponized words and sent them into battle. Today, in dealing with the new defense strategy, and near and peer competitors, the Department of the Navy must weaponize education and also send it into battle.

2. Effective immediately, I am directing the establishment of the Naval University with the missions of coordinating, integrating and better utilizing all our educational assets to ensure that we, the naval services, are prepared for changing circumstances and the direction of the recent defense strategy to the maximum extent possible.

3. Enclosure (1) contains the specific actions that will be required in reorienting our educational enterprise and assuring that the Naval University will be able to meet its demands. Enclosure (2) summarizes how the Educational for Seapower board arrived at its recommendations, including its review of alternative organizational options. Enclosure (3) is the full report that contains detailed analysis, significant interviews, and surveys that buttress its findings.

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4. The Naval University will be organized on a collegial basis, much as the Joint Chiefs of Staff, and will consist of: The US Naval Academy, NROTC and Navy OCS programs; the Naval Postgraduate School; the Naval War College; the Marine Corps University; and heads of the Federal Executive Fellows and Flag Officer educational programs.

5. The Naval University will be governed by a board chaired by the Secretary of the Navy with the Chief of Naval Operations and Commandant of the Marine Corps serving as vice chairs. One of the Navy four-star operational commanders shall serve on a rotating basis along with either Commanding General Fleet Marine Force Atlantic or Pacific. Other senior commanders such as Commander Naval Space Command or Cyber Command may also serve as needed.

6. A Board of Advisors will be established of 10-12 distinguished persons including the President of the Naval University. Keeping with Title 10, the chairs of the Naval Academy and Marine Corps University boards of visitors will be ex-officio members.

7. The role of the Board of Advisors will be to conduct oversight of the educational enterprise for the Secretary of the Navy and to support, guide and assist the university and its

components in carrying out to the best of its abilities its duties. The Board shall also ensure that the Strategic Vision for education referenced in Enclosure (1) is used to guide the enterprise.

8. The President of the Naval University will be a vice admiral and will be dual hatted at President, Naval War College and will serve for 3-5 years. It is intended to rotate this presidency with the Marine Corps.

9. This structure in no way limits the authority or responsibility of the heads of the institutions that comprise the Naval University in carrying out their duties.

10. A parallel office with a Chief Learning Officer will be created in the Secretariat with appropriate staffing to ensure that the Naval University and its components receives adequate personnel and financial resources.

11. Finally, I wish to thank the Under Secretary of the Navy, who chaired this effort, along with the Vice Chief of Naval Operations and Assistant Commandant of the Marine Corps, who served as vice chairs, and of course, the five members of the Education for Seapower Board for their dedication, efforts, and contributions to helping us weaponize education and send it off to war.

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Distribution:
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DMCS
JAG
DON CIO
CHINFO
CLA

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

CNP
MCCDC
Superintendent, USNA
President, NPS
President, NWC
President, MCU
SECNAV FRONT OFFICE
SECNAV PA
SECNAV SAL
SECNAV AA

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E4S ACTION ITEMS

Based on the Education for Seapower effort led by the Under Secretary and supported by the VCNO and ACMC, I am issuing the following action items for the Department to execute and am placing the oversight of the educational enterprise directly under the supervision of the Under Secretary of the Navy.

I fully understand and appreciate the most difficult circumstances under which this Department and the rest of the Pentagon have been laboring. Seventeen years of stressful combat operations; the Budget Control Act; Sequestration; and Continuing Resolutions have made short and long-term planning at times seem impossible. The Department has responded admirably.

That said, this "clean sheet review" with my suggestion to have no legitimate boundaries to impede the findings has produced extremely important recommendations for action that follow.

In particular, the fundamental reorientation of the Department of Defense's strategy to deal with countering near and peer competitors will require commensurate change in our strategic thinking and analysis. Education is a major asset in aiding in this transformation.

The purposes of naval education are to prepare all ranks and ratings for an uncertain and complex world requiring more than professional naval and operational skills in which critical strategic analysis, thinking and judgment are essential for the naval services to carry out their responsibilities successfully, effectively and efficiently in dealing with near or peer competitors often armed with weapons systems equal to or even superior to ours. Setting standards for achieving certain levels of understanding and knowledge across many skill sets are the foundation for focusing the naval educational enterprise.

The current educational enterprise includes the Naval Academy; NROTC; OCS; the Naval Postgraduate School; the Naval War College; the Marine Corps University; the Federal Executive Fellowship programs; and flag officer courses. It is largely well-managed, well-run and produces capable and motivated graduates. However good it may be, it is still based on a 19th or 20th century system of vertical education that does not fit the complex and dynamic security environment, the very likely constraints on both financial and human resources and fundamental changes to retirement.

Hence, this enterprise can, and must, be elevated to a higher level of performance.

Reinforcing the urgency for this effort is the correct conclusion of the Secretary of Defense that "military professional education is stagnant" and the Chief of Naval Operations' requirement for "high velocity outcomes," referring to the need for continuous learning. And as Churchill reportedly advised, now that we have run out of money we will have to use our brains to think our way clear of danger. Further, changes to the retirement options may indeed lead to education being a major incentive for retaining our very best people. And the requirement for "resident education" prior to selection for major command may cause us to review whether a nominal twenty-year career is sufficient to accommodate these and other operational requirements vital to assuring competence at sea and in war and in peace.

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

In summary, the current educational structure needs to be revitalized. Because of the constraints noted above, over the past seventeen years of conflict in some ways this asset has been under-prioritized, undervalued, underexploited, underfunded and under-resourced. Further the need for greater alignment, coordination, integration and cooperation among and between these fine assets is essential.

To that end, the Department needs to improve and correct these shortfalls and in particular respond to a strategy designed to counter near and peer competitors. First, the enterprise must be better organized to resolve some of the issues noted above to align, coordinate and integrate and elevated its importance and priority for the naval services. Second, it must be adequately funded for at least two years and resourced with the top people as students and faculty. Third, it must be based on standards of knowledge and learning required for every rank, set by the most senior civilian and military officials. Finally, and this is outside the department remit but must be addressed, JPME I and II must be redefined in keeping with 21st and not 20th century demands and realities.

To these ends both a vision and definition of critical strategic thinking are essential:

The Naval Education Enterprise must produce leaders of character, integrity, and intelligence steeped not only in the art of war, the profession of arms, and the history and traditions of the Naval service, but also in a broader understanding of the technical and strategic complexities of the cognitive age, vital to assuring success in war, peace, and grey zone conflict; officer and enlisted leaders of every rank who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action.

Critical thinking is the ability to know how to think, not what to think. Critical thinking means to be able to understand, comprehend and analyze in a timely manner conditions, situations and problems with clarity, conciseness, objectivity, rigor and intellect in order to respond appropriately and when necessary with decisive action that ethically matches ends and means with available resources.

The purposes of these actions are to put in place the structure and process for maximizing the value added of these priceless institutions and provide the authority, support and latitude for each of the individual components of the educational enterprise to implement these changes as each sees best.

Action items:

1. A Naval University will be established on or before March XX, 2019. The Naval University will consist of the Naval Academy; OCS and NROTC; Naval Postgraduate School; Naval War College; and the Marine Corps University; Federal Executive Fellowships and civilian graduate programs; and flag officer education.

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

2. The President of the Naval War College will assume additional duties as President of the Naval University overseeing all educational assets of the Department; report to the Secretary of the Navy through the Under Secretary, keeping the chain of command informed; and represent the uniform side of the Department at JLDC and AERB meetings. The President of NU may be rotated with a Marine Lieutenant General.

4. The President of the Naval University (PNU) will be of at least three-star rank, active or retired; will serve a term of at least five years with extensions as granted to ensure continuity and follow-up; and will be provided the necessary additional personnel and financial resources to carry out these duties. In addition, the PNU will be supported by a PEO-for technology learning; a chief knowledge and learning officer (CLO) and a small staff to ensure alignment, coordination, integration and cooperation among the educational enterprise; operational commanders; OPNAV and HQMC staff; and external actors inside and outside government with educational responsibilities. The CLO will be located in the Secretariat in Washington, DC to ensure close coordination with OPNAV.

5. The Naval University governing board will consist of the Secretary of the Navy as the chair and the Chief of Naval Operations and Commandant of the Marine Corps as vice chairs. One of the four-star naval fleet commanders and either CG FMF Atlantic or Pacific will be part of the board on a rotating basis. Other senior commanders may be made members as appropriate.

6. The purpose of the governing board is to ensure that the University is meeting the demands of the services and the nation by providing the appropriate educational programs that will ensure that every uniformed member of the services from seaman to admiral and private to general and civilian counterparts are best prepared for the challenging and difficult environments each will face. This board will meet annually.

7. A Board of Advisors for the Naval University will also be established. That board will consist of exceptionally experienced and talented individuals and number 10-12. The first responsibility will be to provide oversight of the Naval University for the Secretary of the Navy. Other responsibilities will be to support, advise and assist the University and its components in carrying out their duties. The chairs of the Naval Academy and Marine Corps University will be ex-officio members in keeping with their Title 10 authorities.

The advisory board will also coordinate and integrate more closely the activities of each of these institutions to ensure the Department of the Navy is maximizing the impact of its educational enterprise on the forces to enhance combat capacity; to ensure that the needs of the operational and combatant commanders and services are fully met; to ensure that there is fungibility across and between this enterprise of its assets; and to ensure the Department is getting the appropriate value for money from the enterprise. The board will meet quarterly.

8. In collaboration with the heads of each institution, including NROTC, PNU may assign each with specific areas of excellence on which to focus such as strategy and policy at NWC; science, technology, Research and Development, and cyber at NPS.

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

9. The Naval University and each of the flagship institutions and NROTC/OCS will be adequately funded for at least two years.

10. A Naval Community College for enlisted personnel similar to the Air Force program will be established under the PNU.

11. None of the above is meant to limit the authority or responsibilities of the heads of each of these institutions.

12. The services will provide for me in concert with the operational and combatant commanders through the Under Secretary by March XX, 2019, a proposed list of learning and knowledge objectives for every rank from seaman to admiral and private to general. These requirements will form the basis for setting the standards of knowledge and learning for teaching and evaluating student and graduates attending the Naval University and the supporting educational enterprise to ensure each institution conforms with these objectives.

13. The CNO and CMC will provide separately an educational plan for all Flag and General Officers to ensure that each is properly prepared for next assignments by March XX, 2019. President NU will be responsible for the administration of this plan.

14. The CNO and CMC will provide separately a plan for Federal Executive Fellows Program with the option of expanding assignments to other government agencies and appropriate private sector corporation especially in the cyber/AI/ genetics/robotics fields.

15. The services will provide for me in concert with consultations with appropriate operational and combatant commanders through the Under Secretary by March XX, 2019, assignment, selection and promotion criteria to ensure that these knowledge and learning objectives are indeed made operational and effective.

16. The services will provide for me through the Under Secretary a plan for implementing a system of continuous knowledge and learning that becomes part of the service culture for every service member and civilian. Fitness reports will reflect this new requirement.

17. The services will provide for me through the Under Secretary a plan for managing assignments and career paths for personnel with advanced degrees and education in order that the services maximize these skills by March XX, 2019.

18. Each of the educational institutions will finalize a POAM to implement these changes and submit to the President of the NU and thence to the Under Secretary informing the VCNO and ACMC for comment not later than June 30th, 2019.

19. The Under Secretary will oversee the implementation of these plans supported by the VCNO and ACMC and President of NU and carefully review how each of the institutions have made these changes.

Subj: EDUCATION FOR SEAPOWER (E4S) DECISIONS AND IMMEDIATE ACTIONS

20. An annual review and assessment of the educational enterprise will be conducted by the Under Secretary of the Navy; the VCNO; and ACMC; and, as appropriate, consultations with the operational and combatant commanders and with the Naval University Board.

21. Naval and Marine students studying at NWC will be granted "joint service" duty.

22. The President of NU, in conjunction with the service staffs, will provide on an annual basis to me through the Under Secretary a report showing the value for money the services receive provided by the educational enterprise.

23. The POM planning process will incorporate a separate review of the educational enterprise and nominate appropriate resource sponsors to ensure inclusion in the FYDP under the control of PNU through the Under Secretary.

24. I will recommend to the Secretary of Defense that a major overhaul of Joint Military Education; JPME I and II; and the JCS Instruction 1800.1 E on PME be undertaken in close collaboration with Congress.

25. Fitness reports will contain a new section for officer and enlisted on educational interests, motivations and achievements

26. All the Navy warfare communities and HQMC will integrate the need for continuous learning and education to include assignment to NPS, NWC, MCU and civilian institutions as part of the career progression for officers and enlisted to meet the standards proscribed in the overarching education policy aims.

27. The appropriate Secretariat, OPNAV and HQMC offices will prepare briefings on this review for the other services, naval and Fleet Marine combatant commands and OSD as well as key constituents in Congress, the private sector and retired officer and enlisted communities.

The full E4S review is attached for information. It is also my intent to ask the E4S Board to continue for at least a year to help me and my staff ensure that these changes are indeed made to help in making them across the entire naval force.

Appendix B-1: Foreign Military PME Assessments

This assessment clearly shows the value of professional military education by allies and competitors. In the case of the UK for example, attendance to Higher Command and Staff applies only to the top portion of all officers and future promotion is often determined by performance in this school. The Royal College of Defence Studies has even higher standards for attendance and the current Chief of Defence General Sir Nick Carter has mandated that strategic thinking and analysis be the dominant aims of this school.

While the Russian and Chinese models do not apply to the U.S., education is clearly seen as vital. The path to general officer in Russia is through the General Staff Academy in Moscow, a two-year course. Similarly in China, examinations are vital in determining promotions. China is adopting a very entrepreneurial approach in demanding of its future officer to be highly innovative, particularly in IT and AI skills.

Professional Military Education in Russia and the Russian Navy

George Fedoroff

Preface

As the Russian Federation grapples with the challenges of the post-Soviet era, the importance of the military to the maintenance and defense of the sovereignty and security of the state remains high. In addressing military requirements Russia's leadership has constantly kept in mind both the lessons of the past and the realities of the present. Generalissimus Count Suvorov, perhaps Russia's leading historical practitioner of the military art, was quoted as saying: "Win not by numbers, but by knowing how." This clearly worked for him as he never lost a battle and was the most highly decorated military leader of Catherine the Great's time.

Conversations with senior Russian naval leaders in the post-Soviet era showed that they were keenly aware of the need to provide positive motivation to their subordinates and to move past the harsh physical discipline often the hallmark of the past. This was particularly true under today's conditions of a military, and specifically a navy, that is manned by contract sailors and not draftees[1] The words of another historically notable Russian naval leader, Admiral P.N. Nakhimov[2], are being taken to heart: "Of three ways of influencing subordinates: awards, fear, and example; the last is the surest."

Russians are fond of drawing a thread between the lessons of the past and today's challenges Speaking about the trauma of WW-II and the relevance and importance of improving military education, President Putin has said: "The reasons for much lack of success in 1941-1942 was tied specifically to military education in the pre-war period."[3]

Introduction

This paper describes key characteristics of Russian overall and specifically naval professional military education (PME).

Unlike PME in the U.S. military—which is the product of over 100 years of continuous evolution—PME in Russia, both overall and specifically the Russian Navy has developed over some 300 years and has evolved from beginnings under the Russian Empire, through the turbulence of the Soviet period, and now into the post-Soviet Russian Federation.

[1] Author's conversations with senior Russian naval leaders over several decades serve to inform much of the content of this paper.
[2] http://nvmu.info/about/history_nav_school accessed 2 August 2018.
[3] https://topwar.ru/36139-soveschanie-po-voprosam-razvitiya-sistemy-voennogo-obrazovaniya.html accessed 2 August 2018

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- From the establishment of the regular Russian army and navy under Peter the Great in the late 17th century to the current day PME has been a serious pursuit.
- The current trajectory of Russia's naval PME development can be traced back to 1701 and the establishment of Russia's first secular institution of higher learning, the "School of Navigation and Mathematical Sciences".
- After the disintegration of the USSR and the downsizing of the military the through-put of all officer commissioning schools was set at 8,500 officers per year. Prior to 1991, the number was about 60,000.[4]

Since the mid-2000s, the Russian armed forces have undertaken various reforms to reshape the PME system. These include:

- Restructuring a much, much larger system from 166 in 1991 into 10 military Education-scientific centers, with 15 branch and service academies and 45 higher military schools and their branches.[5]
- Focusing on ensuring effective and efficient training and education for a military increasingly equipped with new technology which is specifically applicable to the navy with its technologically complex submarine and surface platforms
- Evolving new ways to leverage the civilian academic system to attract capable and talented officer candidates.

This drive to improve the PME system has been actively endorsed by both Presidents Putin and Medvedev, and personally overseen by Defense Ministers Ivanov, Serdyukov, and Shoygu.

Key Characteristics of Russian Military and Naval PME

Focused on military art and science—not national politics and foreign affairs.

The Russian military cadre can be seen foremost as the defenders of the nation, steeped in the history and challenges of their predecessors whose actions historically were focused on dealing with repulsing invasions and securing historic Russian lands. Today's Russian officer is educated and trained to be a military professional, faithfully executing to the best of his ability and the capability of his equipment the orders received from higher authority. In their own way the Russian officer corps holds dear the same values of "Duty, Honor, Country" as do our own.

Seminal documents, such as the Russian Federation National Security Strategy and the Military Doctrine of the Russian Federation, are the product of serious long-term work by the highest-level academic institutions directly supporting the Ministry of Defense and government. These documents undergo periodic review and adjustment. They do not undergo radical changes but evolve, reflective of changing world circumstances and the advancement of technology. While there is an overall military strategy encompassing the interactive application of the Armed Forces and supplementing paramilitary and civilian organizations, there are no individual strategies for the use of the individual armed forces and branches. The responsibility for the development of military strategy lies with the General Staff supported by the General Staff Academy. Unlike the U.S. Joint Staff, the Russian General Staff is a career organization and is not populated by members of individual services on rotating assignment. Staff members representing individual services are permanently assigned, usually after they have reached the O-5/O-6 level and have completed their service academies. This approach provides for a high degree of stability and continuity in the thinking, planning, force development and maintenance, and operational approaches of the Defense Ministry. The Defense Minister is one of several heads of security ministries and agencies that report directly to the President. Heads of non-security ministries and agencies report to the Prime Minister.

As demonstrated in recent years, the use of the Russian military in combat abroad (not directly defensive or U.N. peacekeeping actions) requires legislative authorization. This was specifically illustrated with the State Duma (lower legislative house) authorizing the deployment and use of forces in Syria.

[4] http://edu.glavsprav.ru/spb/dov/journal/686/18.11.013 Voennoye obrazovaniye zhdut izmeneniya
[5] http://edu.glavsprav.ru/spb/dov/journal/686/18.11.013 Voennoye obrazovaniye zhdut izmeneniya

Maritime Doctrine, Naval Policy or Naval Strategy

In considering the overall development and current status of Russian naval PME, it is useful to better understand where the Russian Navy is relative to overall Russian military strategy and doctrine.

In addition to the documents mentioned above, there are documents on naval activity and a Russian Federation Maritime Doctrine but not a specific and separate "Naval Strategy" or "Naval Doctrine." The disintegration of the USSR and the ensuing organizational and financial crisis led to a discussion regarding the role and missions of the Navy. In the new Russian Defense Ministry organization, the CinC Navy is no longer a Deputy Defense Minister, consequently the Navy has lost the independent service standing achieved by Admiral Gorshkov. Influential and knowledgeable senior naval officers considered it essential to once again clearly define the role and status of the Navy, and a draft Naval Strategy was proposed to President Putin in 2000. However, staffing through the Security Council resulted in a document titled "The Fundamentals of Russian Federation Policy in the Area of Naval Activity for the Period Through 2010" approved by Putin in 2000. The development of a "naval strategy" was deemed inappropriate.[6,7]

Nevertheless, the "Fundamentals" was the first such document in Russian history. The following year (2001), a document entitled "Russian Federation Maritime Doctrine for the Period Through 2020" was approved by Putin. Also created was a Maritime Collegium, or Admiralty Board, headed by the Prime Minister with the Navy CinC as Deputy. It is charged with planning for the long-term development of the country's maritime dimension with oversight of the related shipbuilding and other programs. However, the navy continued to suffer a lack of specific governmental attention until 2009, particularly regarding its future development. As the "Fundamentals" document was coming up for its ten-year review, the Maritime Collegium re-focused its attention on the development of an update— " … through 2020." An updated "Fundamentals" document was finally approved by Putin in 2012. A new edition of the Maritime Doctrine was approved in 2015.[8]

Russian Naval PME

Centered on schools and academies. As in the U.S., Russia's overall PME system consists of five categories of institutions: preparatory schools, officer commissioning schools, service and branch academies, and a capstone General Staff Academy responsible for transmitting and developing professional knowledge that is unique to the military profession. Russia's armed forces have some two dozen major military academic institutions as of late 2017. In 2008, the Defense Ministry consolidated most PME institutions into service/branch centered entities called Military Education-Scientific Centers (Russian abbreviation—VUNTs). These entities now encompass all service-focused military training and Education institutions, not just those focused on developing and enhancing the knowledge and capabilities of the officer corps but also including training for contract service (enlisted) specialists.

The Russian Navy's PME system began in 1701 when Peter the Great established the School of Navigational and Mathematical Sciences. This institution is known today as the Peter the Great Corps—St. Petersburg Naval Institute. All of the Russian Navy's military Education and training institutions are now under the overall management of the Military Education-Scientific Center "N.G. Kuznetsov Naval Academy" (Russian abbreviation VUNTs "N.G. Kuznetsov Naval Academy").

Required at set points in an officer's career. Similar to the US, where PME progresses in five stages (pre-commissioning, primary, intermediate, senior, and GO/FO), Russian PME also consists of five stages (preparatory, pre-commissioning, junior, intermediate, and senior). Russia's preparatory level comprises military schools that educate youths through seven classes/years at the middle school/high school level. These are the Suvorov Schools (ground forces) and the Nakhimov Schools (navy). While they were originally established after WWII to provide education for the orphaned sons of servicemen, they are open to all today. Successful completion of these schools allows direct entry into the pre-commissioning

[6] http://www.morvesti.ru/analitics/detail.php?ID-64833 "Voyenno-morskaya doktrina Rossii kak budushchaya osnova morskoy politiki strany"
[7] Voyenno-morskaya strategiya Rossii, V.D. Dotsenko. A.A. Dotsenko, V.F. Mironov, Terra Fantastica, St. Petersburg 2005
[8] http://www.morvesti.ru/analitics/detail.php?ID-64833 "Voyenno-morskaya doktrina Rossii kak budushchaya osnova morskoy politiki strany"

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schools which specialize by service branch, similar to U.S. service academies. Normal entry is competitive through annually administered entrance exams and medical screening. Successful completion of a five-year program leads to a Bachelor's Degree equivalent and commissioning as an officer. The navy's pre-commissioning schools provide a five-year course of education. The next training/Education level comprises special classes to gain or enhance specific qualifications as officers proceed up the career ladder. An example would be the Russian equivalent of U.S. courses for prospective executive and commanding officers. In the Russian Navy, these were called Advanced Special Officers' Classes, now operating as the Naval Institute of Supplementary Professional Education. The nominal course of study lasts one year. Officers deemed promising for further advancement can take exams to attend individual service academies, equivalent to the U.S. service war colleges. For the navy, this is the N.G. Kuznetsov Naval Academy with a two-year course of study. Graduates of the academies go on to fill senior staff and command positions, generally at the O-5 and O-6 levels. The highest level of professional military education is attendance at the General Staff Academy (GSA), also with a two-year course of study. GSA graduates go on to take GO/FO positions on senior staffs or command major elements of the armed forces.

Admiral Lazarev (1788-1851), historically distinguished as an explorer, in naval combat with the Swedes and the Turks, and commander of the Black Sea Fleet, left the following admonishment to his successors: "Our naval business requires constant study …A naval officer who does not know his business down to the smallest detail is not good for anything."[9]

Comparatively limited use of civilian Education resources. The Russian officer corps is dominantly the product of the military Education system. Compared to the United States, Russia's use of civilian Education resources in professional military development has been extremely limited. However, new programs are underway to create a novel approach allow students at civilian institutions to gain obligated national service credit.[10] Historically, the Soviet/Russian Navy relied almost exclusively on higher military schools to provide an undergraduate-level education and commission officers for service in the operational forces. In the Soviet era there was a program to leverage the resources of the civilian education system for military requirements. There were "military faculties" at select civilian college/university-level institutions which provided successfully completing candidates reserve commissions intended to fill organizational vacancies in case of mobilization. Over time this program was deemed not to justify the resources expended and was curtailed. Responding to a proposal by the Bauman State University of Technology (Russia's MIT) in 2013, Defense Minister Shoygu initiated a program of "science companies." These are military organizations selectively created within chosen civilian college/university-level institutions wherein accepted undergraduates are credited with fulfilling their obligated military service by working on specific military-related research and participating in military drills while pursuing their studies. The intent is to attract the select "best and brightest" to work on militarily applicable research, receive military service credit, and entice them to continue in the military as commissioned specialists. Though still early in its execution, this program appears to be successful.

Limited involvement in foreign military education. The Russian General Staff Academy and the Russian Naval Academy (U.S. Naval War College equivalent) provide for military academic exchanges with other countries. However, while these institutions also provide military education for members of foreign militaries, those attending these courses are housed separately and the courses themselves are conducted separately and are not integrated with those for Russian officers. In a 2013 interview on military education, President Putin said that at that time 5,500 servicemen from 43 countries were studying in Russian military institutions.[11] A very limited number of Russian officers have studied abroad at foreign military institutions. Some have attended U.S. military Education institutions but only those completing courses at the U.S. Naval War College went home and had meaningful careers—they taught at the Kuznetsov Naval Academy. Russian military graduates of other U.S. service institutions were generally sidelined upon return home.

Service-specific academic organizations. Russia has a long tradition of service and branch specific military schools and academies. The only truly all-service institution is the capstone General Staff Academy.

[9] http://blackseafleet-21.com. news/6-06-2013_evoljutsija-sistemy-voenno-morskogo-obrazovanija-v-rossii

[10] Russian law requires all able-bodied males to fulfill a one-year military service obligation

[11] https://topwar.ru/36139-soveschanie-po-voprosam-razvitiya-sistemy-voennogo-obrazovaniya.html accessed 2 August 2018

Navy Institutions

All naval training and Education establishments are centrally administered as part of the Military Education-Scientific Center "N.G. Kuznetsov Naval Academy" (Russian abbreviation VUNTs "N.G. Kuznetsov Naval Academy"). In late 2012, the entire teaching staff of more than one thousand persons underwent a credentials recertification review. The dominant criterion was rich practical experience vice merely theoretical knowledge. Overall, the VUNTs and its subdivisions are responsible for training of highly qualified cadre, the development of the Navy overall, its new generation armaments and equipment, and guidance documents. Its personnel participate in: the development and trials of ships and submarines and their attendant equipment, various fleet and larger exercises, and select distant deployments.

The subordinate naval Education, training, and scientific institutions are:

Education

- Preparatory Schools—7 years
  - Nakhimov Naval School—St. Petersburg (1944)[12]
  - Kronshtadt Naval Cadet Corps—Kronshtadt (1995)[13]
  - Sevastopol Nakhimov Cadet School—Sevastopol (2016)
  - Vladivostok Nakhimov Cadet School—Vladivostok (2016)
  - Murmansk Nakhimov Cadet School—Murmansk (2017)
  - Kaspiysk Nakhimov Cadet School—Kaspiysk (projected for 2019)
    - Higher Naval Schools/Naval Institutes (pre-commissioning)—5 years
  - Peter the Great Naval Corps—St. Petersburg Naval Institute (1701)[14]
  - Naval Polytechnic Institute—St. Petersburg[15]
    - A.S. Popov Naval Radio-electronics Institute—Peterhof (1933)
    - Naval Engineering Institute—Pushkin (1798)
  - F.F. Ushakov Baltic Naval Institute—Kaliningrad (1948)[16]
  - P.S. Nakhimov Black Sea Higher Naval School —Sevastopol (1937)[17]
  - S.O. Makarov Pacific Higher Naval School—Vladivostok (1937)[18]
- Naval Institute of Supplementary Professional Education—St. Petersburg (1827)—1 year (formerly called Advanced Special Officers' Classes)
- G. Kuznetsov Naval Academy—St. Petersburg (1827)—2 years

Preparatory schools (7 years). These focus on instilling patriotism, dedication to military service, and acquiring the academic qualifications for entry to the several pre-commissioning naval institutes. Originally, several Nakhimov schools were established after WW-II to provide primary through secondary education dominantly for orphaned sons of naval servicemen. Over time, the number was reduced to just one in St. Petersburg, but now they are being reestablished. Outstanding graduates can enter pre-commissioning schools without sitting competitive examinations. Upper class students are provided an opportunity to participate in orientation cruises on one of the navy's two training ships.

[12] http://nvmu.info
[13] http://kmkk.edumil.ru/
[14] http://ens.mil.ru/education/higher/more.htm?id=8674%40morfOrgEduc
[15] http://вмпи.рф/
[16] http://ens.mil.ru/education/higher/academy/more.htm?id=8670
[17] http://chvvmu.mil.ru/
[18] http://tovvmu.mil.ru/

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Pre-commissioning schools (5 years). These provide a college/university-level education and educate future officers in a variety of military specialties making them fully qualified to assume duties as commanders of groups of enlisted at the division or department level. Progression through the classes includes training voyages on one of the navy's two training vessels and summer assignments to operational fleets and fleet units. The intent is to make the newly commissioned officer capable of fulfilling the duties of their initial positional postings upon assignment to fleet units immediately after commissioning. The Russian Navy does not have a program of warfare schools between officer commissioning and assignment to fleet units. The above applies to all surface and submarine officers. Accession to the ranks of naval aviation is through initial education and pilot training in Aerospace Forces schools. Accession to the ranks of the Naval Infantry and Coastal Missile and Artillery Troops (Navy subordinated) is through appropriate combined arms schools. Officers in other specialties such as medical, legal, logistics, etc. receive their commissions through pre-commissioning schools focused on these fields.

During the Soviet era many civilian higher education institutions had "**Military Departments**" that provided a very rudimentary U.S. ROTC-like exposure to military discipline and training. This program nominally awarded successful graduates a reserve commission and were put on the military roll in case of mobilization need. In practice, though the numbers likely satisfied some Communist Party goal, the reserve officer product rarely achieved any militarily useful capability and seldom actually performed any annual drills. With the disintegration of the USSR and the functional demise of the Party, virtually all of these "Military Departments" were eliminated.

The institution of "**Scientific companies"** (in the military organization not business sense) are a new approach begun in 2013 at the initiative of the Bauman State University of Technology in Moscow, Russia's equivalent to MIT in Cambridge, Massachusetts. This program continues to be selectively established at leading higher Education institutions. Its aim is to attract the "best and brightest" to engage in militarily useful studies and research projects and coincidently get credit for obligated military service. Participants undertake focused projects conducted at their institutions, are issued uniforms, and partake in military drills. It is hoped that upon graduation, participants will choose active military duty in their specialties. This program is still in its infancy but has received significant interest and response from college/university-level undergraduates.

The **Naval Institute of Supplementary Professional Education** (formerly called Advanced Special Officers' Classes) provides courses of varying length for various upgrading of command and technical qualifications. This institution includes among its individual curricula the Russian equivalents of the U.S. Navy's PXO and PCO, SWOS, and similar courses and programs. The active shipbuilding program that is renewing the fleet required a new approach to officer education. The Institute of Supplementary Professional Education has, in its scale and scope, already exceeded what existed in Soviet times. Currently, this program turns out more than 1,000 officers annually.[19]

The **N.G. Kuznetsov Naval Academy** (KNA)[20] is the rough equivalent of the U.S. Naval War College and the Naval Postgraduate School combined. The Academy provides graduate-level education for both higher command-staff assignments and more focused education in all other specific disciplines. It also trains its own teaching-professorial staff, grants higher academic degrees, and conducts extensive research. This latter function would be similar to including an organization such as the U.S. Center for Naval Analysis as part of its structure. The Academy is situated in St. Petersburg, the center of Russian naval education, ship design, and research, and has long been the venue for annual conferences of the senior naval leadership and the conduct of major war games. These normally take place in the winter, around February. KNA also hosts classes for foreign officers. As previously noted, these classes and students are not integrated into the overall KNA curriculum; they are taught and housed separately.

Training

- All Naval Institutes also host classes for professional (contract service) enlisted personnel—focused on technical specialties

[19] http://marine.gov.ru/upload/iblock/167/167c216968932ef15d3214682891e984.pdf
[20] http://vma.mil.ru/Novosti/item/127224/

- Naval Training Center—Obninsk (nuclear propulsion)
- Naval Training Center—Sosnovyy Bor (nuclear propulsion)

Scientific

- Scientific Research Center (NII) for Naval Shipbuilding and Armament (formerly Ministry of Defense Naval Institute No. 1)
- NII for Rescue & Submarine Equipment (formerly State Scientific-Research Institute No. 40)
- NII for Operational-Strategic Research and Naval Development (formerly State Scientific-Research Institute No. 24)

Armed Forces—Highest Education Level

The capstone of Russian PME is the completion of two-year courses at the **General Staff Academy** (GSA) in Moscow. The GSA is the only place where its students are taught how to conduct combined forces warfare, where operational-strategic and strategic thinking is developed. Whether in-person or by correspondence, completion of the course of study at the GSA is a requirement for advancement to flag and general officer rank. While the main focus is on command-staff studies, the GSA conducts courses applicable to all senior elements of the armed forces.[21] Most of the academic study and research base underpinning the successive editions of the Russian Federation Military Doctrine and Security Strategy is the product of the GSA and its semi-civilian analogue, the Military Science Academy. As Russia has focused on developing a whole-of-government approach to security issues, the GSA in the past decade has instituted courses for senior government civilians in both the executive and legislative branches in order to better acquaint them with the capabilities and needs of the armed forces.

Naval Education Developments

As the later years of the Soviet era unfolded, so did the decline of the Soviet military, including the Navy. Attempts at reform through "Glasnost" and "Perestroika" did little to avert a growing financial crisis, diminished confidence in government, and led to years of neglect within the armed forces. For the Soviet Navy this was reflected in curtailed time at sea, the neglect of ship maintenance, a virtual stagnation of shipbuilding required to renew an aging order of battle, an alarming deterioration of quality of life conditions in the navy's remote basing points, and a concomitant fall in the prestige and attractiveness of naval service. Service conditions quickly thinned the personnel ranks, and only the most dedicated officers managed to continue on. Overall conditions took their toll on the navy's entire Education establishment. From the 1980s through the mid-2000s, the entire system could be considered to be "surviving on minimal life support."

When stability began to return in the early 2000s, the navy leadership considered that the administration of naval education and training would be more effectively and efficiently run if all institutions were subordinated to a single entity reporting to the CinC Navy. However, this idea was ahead of its time, and such a move did not occur until 2009, when the VUNTs "N.G. Kuznetsov Naval Academy" was established as part of a nationwide military reform process. The planned military reform was to occur in phases: Phase I (2008-2011); Phase II (2012-2015), and; Phase III (2016-2020). For the navy the foremost consideration throughout was to reform both the navy and content and conditions of naval education to meet the requirements of the future 21st century navy. Accession to the naval pre-commissioning schools was suspended for three years (2009–2012) to work on the basic aims of overall military reform.[22] Very large overall personnel reductions throughout the armed forces had these institutions occupied with courses to retrain officers being separated from active duty for civilian jobs. Afterwards, the first post-reform commissioning class, entering in 2012, finally received their shoulder boards in 2017. These graduates will constitute the bulk of mid-grade officers when the Soviet legacy naval order of battle will be transformed by a large number of 21st century platforms.

[21] http://blackseafleet-21.com.news/6-06-2013_evoljutsija-sistemy-voenno-morskogo-obrazovanija-v-rossii
[22] https://regnum.ru/news/1565981.html

Current Day

By 2017, the naval Education and training establishment had achieved full enrollment in all of its institutions. The issue of attracting personnel to various levels of education evaporated with competition for enrollment equaling at least three applicants for each vacancy and in some instances reaching seven for each vacancy.[23] In a radical departure from the Soviet era, the competition among female applicants for enrollment in pre-commissioning schools reached 12:1.

Throughout this decade there has been a significant upgrading of Education institutions with modern equipment. Since September 2016 teaching at the pre-commissioning schools and the naval academy is supported by extensive use of the latest information technology with study materials now available digitally. Almost 25% of recent graduates completed their courses with honors. This has led to shorter timeframes for them to master their duties upon assignment to fleet units and high praise for their preparedness from fleet leadership. By 2050, today's midshipmen and junior officers will be at the helm of a technologically advanced and totally post-Soviet Russian Navy.

[23] http://marine.gov.ru/upload/iblock/167/167c216968932ef15d3214682891e984.pdf

Appendix B-2: Foreign Military PME Assessments

Professional Military Education in the Chinese People's Liberation Army

Brian Waidelich and Alan Burns

September 2018

Introduction

This paper describes key characteristics of professional military education (PME) in the Chinese People's Liberation Army (PLA). It also discusses China's self-identified weaknesses in the officers cultivated by the PLA's PME, as well as recent reforms aimed at improving China's PME system.

Unlike PME in the U.S. military—the product of over 100 years of continuous evolution—PME in the PLA has developed less linearly and has experienced several significant setbacks. Key stages of the PLA's early PME development include:

- **Decades of war.** From the establishment of the PLA in 1927 to the founding of the People's Republic of China (PRC) in 1949, the PLA was constantly at war and thus had little opportunity to focus on officer education.
- **Soviet influence.** After 1949, the PLA received guidance from Soviet instructors for about a decade, during which time Chinese PME developed into a highly specialized, stovepiped system of hundreds of academies and schools.
- **Cultural Revolution.** The majority of the PLA's academic institutions were shut down from the late 1960s to the early 1970s, during the Cultural Revolution, an anti-capitalist ideological campaign of Mao Zedong. During this time, officer promotions were based largely on political criteria rather than academic or professional accomplishments.
- **Reopening.** After the Cultural Revolution ended, the PME system experienced enormous stresses as reopened schools worked to educate both new officers and the "lost generation" of officers who had received little or no formal education during the previous decade.

The current trajectory of the PLA's PME development can be traced back to 1985, the year in which Chinese leader Deng Xiaoping announced his "Strategic Decision," which shifted the PLA's focus away from a wartime footing and toward peacetime army building. Deng's decision opened the door for new thinking on how the PLA could best prepare officers for future operations. As they observed the changing nature of warfare and real-world conflicts, Chinese leaders became convinced that the PLA lacked the fundamental capabilities to fight modern wars and therefore needed to produce a "new type of officer" that could effectively leverage complex technologies.

Since 1985, the PLA has undertaken various reforms to reshape the PME system:

- Increasing the number of officers who attain advanced academic degrees;
- Consolidating military academies in a bid to achieve greater efficiencies;
- Revising curricula to adapt to new operational requirements; and
- Leveraging the civilian academic system to cultivate higher caliber officer candidates and make greater use of civilian instructors.

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This multi-decade drive to improve the PLA's PME has continued under Xi Jinping, China's current leader. While inspecting the PLA National Defense University (NDU) in 2016, Xi said that there must be a "great strengthening" of military academies in order for the PLA to achieve its goal of becoming a world-class military by mid-century.

Key Characteristics of Chinese PME

The mission of the PLA's PME system is much broader than that of most Western militaries. This mission can be broken down into four main tasks:

- First, the PLA depends on its PME system to instill the professional military ethos and military competencies that its officers require from the time of initial commissioning and throughout their military career.
- Second, unlike most developed militaries in the West, the PLA has traditionally depended nearly exclusively on its PME system to provide its officer corps with a basic undergraduate-level education as well as continuing education.
- Third, the PLA depends upon its PME system's many organic research institutes to advance reform and modernization through both theoretical research in "soft" subjects such as military science and through applied research in highly technical fields.
- Fourth, China depends upon its PME system to maintain critical linkages between the Chinese Communist Party (CCP) and the PLA. Political instruction conducted in PLA military academies is considered as important as the academic and professional military topics taught.

Unlike the U.S., where the majority of military officers receive their postsecondary degrees from civilian institutions, the majority of Chinese officers receive academic degrees from military academies. As of late 2017, China's armed forces have 43 military academic institutions, the majority of which are directly subordinate to a specific service or force. These academies offer bachelor's, master's, and doctoral degrees. Chinese high school graduates apply to PLA academies through an annual, nationally administered exam. High-performing enlisted personnel may also be selected to attend military academies.

Despite ongoing efforts to advance civil-military resource sharing in the field of education, the PRC's use of civilian Education resources in PME is quite limited. Prior to the late 1990s, the PLA relied almost exclusively on military academies to provide officers with an undergraduate-level education. Since then, the PLA has experimented with various ways of leveraging civilian resources for PME. One related measure was the creation of the National Defense Student program in 1999, a reserve officer program modeled after the U.S. ROTC. By 2009, the program had a total of 117 partner civilian institutions, with nearly 48,000 in-school reserve officers. However, due to various administrative difficulties, the program was canceled in 2017. The PLA has also increased efforts to hire civilian instructors at military academies, yet sources indicate that retention has been a problem. According to a 2018 article in a PLA journal, recent civilian hires are "much more likely" to drop out of jobs at military academies than those who are employed at civilian universities.

China's Leaders Critical of PLA Human Capital

When assessing the human capital developed through the PLA's PME system, China has been remarkably self-critical. Since the 1980s, complaints about the PLA's shortcomings have been a recurring theme. These complaints have come from China's top leadership, including Xi Jinping, who currently leads the Chinese Communist Party, the PRC government, and the PLA).

In a recent criticism put forward during a 2014 meeting with senior PLA leaders, Xi Jinping stated that PLA officers lack five fundamental command capabilities. These shortcomings, known as the "Five Incapables," refer to PLA officers' inability to:

1. Judge the situation
2. Understand the intention of higher authorities
3. Make operational decisions
4. Deploy troops
5. Deal with unexpected situations.

China has launched a new round of wide-sweeping reforms intended to address the "Five Incapables" and other perceived shortcomings in the country's PME system.

Changes Underway in Chinese PME

In November 2013, the Chinese Communist Party's Third Plenum laid out a comprehensive program of political reform that included a military component. In a section on personnel and human capital issues, two recommendations relevant to PME were included: (1) improving military human resources policies to meet requirements of modern military operations, and (2) improving the standards for professional military officers.

Another document issued by the CCP in February 2015 stated that cultivating five particular groups of officers would address what the document referred to as the PLA's "insufficient capability" to "win a modern war." An article in a PLA journal described this effort as an important part of supporting the major reorganization of the PLA. The five groups of officers to be cultivated were identified as:

- Joint operational commanders
- Staff officers proficient in military strategy
- Operators who are proficient with modern equipment
- Scientific experts who can accomplish "crucial" innovation
- Support officers who have excellent technical skills.

In January 2016, the PLA Central Military Commission issued a document titled "Opinion on Deepening Reforms of National Defense and the Armed Forces." The document included several recommendations specific to PME reform:

- Integrating military academy education, troop training, and military professional education
- Optimizing the scale and structure of the military academy system
- Improving the three-level system of junior, intermediate, and senior academies
- Improving the management of the Central Military Commission over the military academy system.

Ongoing Reforms to the PME System

Official PRC statements describe a need to reform the PLA's PME system to meet the needs of modern warfighting, especially with regard to conducting joint operations. In line with the goals outlined in official PRC government documents, Chinese open source materials describe several reforms to the PME system that are either proposed or already in progress.

Emphasizing the importance of joint operations in the PME system

Chinese sources state that conducting joint operations is a key requirement of future warfare and that the PLA needs an officer corps that is up to the task. Xi Jinping himself stated in April 2016 that the PLA must stress the cultivation of "joint operations command personnel." The admonishment was likely aimed at preparing officers to serve within the PLA's new system of theater commands, which are designed to support joint operations by unifying command over

multiple service components to prosecute specific contingencies. Joint command personnel also make up the first of the five groups of officers that the PLA states are key to winning modern warfare.

Adjusting the number of students studying in different fields. One way that the PLA PME system can support joint operations capability is by adjusting the number of students studying in different fields. In April 2016, China Daily cited the CMC's Training Administration Department in a report stating that 24 percent fewer students would be admitted in the fields of infantry and artillery, and recruits in logistics and support classes would also fall by 45 percent. In contrast, the number of students studying in the aviation, missile, and maritime fields would increase by 14 percent, and recruits in fields such as space, radar, and drones would rise by 16 percent. These figures represent major decreases in classes and schools focused on ground forces, and major increases with regard to maritime, air, and space domains. The China Daily report quoted a researcher at the PLA Xi'an Political Academy who explained that these reforms must address a shortage of officers who have "deep knowledge" of joint operations.

Changing coursework. Another effort focuses on innovating new types of coursework focused on joint operations. For example, in March 2016, PLA Daily reported that the PLA NDU has created six new courses that are "closely related" to joint operations, with the intention of creating an Education model centered on joint operational capability. The article added that NDU has established a "breakthrough" class for commanders that for the first time focuses on seven major fields simultaneously: land, sea, air, space, electromagnetic spectrum, cyber, and nuclear.

Improving the quality of joint education in junior-level command academies. PLA observers have specifically pointed to junior-level command academies as a particular weak point for education on joint operations in the three-level command academy system in the PLA. Some challenges noted by one PLA officer include:

- Some in the PLA believe that joint education is the task of intermediate- and senior-level academies only and not junior-level academies.
- The goals of junior-level education are either too ambitious or too narrow.
- There are too few military academies for too many students compared to other countries, including the U.S., and this gap is particularly stark at the junior level.
- A lack of standards across military academies limits the effectiveness of joint education.
- Few qualified teachers are available, and at some academies, the number of educators with staffing experience or experience at the company or battalion level is less than 3 percent.
- The need for new training equipment and appropriate training sites is not being met.

Establishing new colleges for joint duty assignments. In 2017, the PLA NDU established a Joint Operations College and a Joint Support College to formally educate officers for joint duty assignments. A 10-month course at the NDU Joint Operations College will train officers at the battalion and deputy-regiment levels (these levels correspond roughly to the ranks of major and lieutenant colonel) as well as current theater command staff officers. The PLA intends to require all staff officers designated to serve in theater command organizations to successfully complete the course before assuming joint duty assignments. Despite the new emphasis on joint operations education, however, images and video of course participants reveal a student body made up predominantly of Army personnel.

Focusing Teaching Methods on Practical Combat Training

The PLA is also making an effort to update and modernize military academies' teaching methods and curricula. For example, in April 2016 the PLA Army Logistics Academy invited experts from a variety of other military academies to evaluate 69 undergraduate courses because the school "sensed that some instructors lacked up-to-date content, and teaching methods were behind the times."

In April 2016, the president and political commissar of the PLA NDU outlined several recommendations for this line of effort:

- The PLA should make greater efforts to build up PME faculty who "know about warfighting" and are also skilled teachers and researchers.
- The PLA NDU itself should explore a new model of combining teaching in the classroom and training in the field to improve both combat units' operational capability and the military academy's teaching capability.
- The PLA should bring military education closer to the combat forces and closer to actual operations, using methods such as laboratory work, wargames, testing of theory, and project-based teaching and research.

Adjustments to Civilian Education Channels and Military Academies

The PLA canceled its reserve officer program and is shifting toward directly recruiting graduates of civilian universities. The PLA began pilot work on a reserve officer system, the National Defense Student program, in the late 1990s. Under the program, participating civilian undergraduates received an annual scholarship, completed military training activities alongside their undergraduate coursework, and were sent to serve as officers in military units after graduation. By 2009, nearly 40,000 students had graduated from the program, and an additional 48,000 students were enrolled in 117 partner civilian Education institutions. However, Chinese sources suggest that the program was long plagued by administrative issues. For example, a paper written by PLA recruiters complained about a lack of support from "certain civilian university leaders," a lack of clear administrative policies, and insufficient benefits to attract high-quality talent. By 2012, the number of partner civilian institutions had shrunk to 86. By early 2017, the PLA's total number of commissioned officers originating from the National Defense Student program was less than 25 percent, down from about 30 percent in 2009. In May 2017, the PLA announced that the National Defense Student program would not be admitting new students and that the force would gradually shift toward directly recruiting university graduates.

NCO candidates cultivated at civilian vocational schools. Since 2012, the PLA has been carrying out pilot work on directly cultivating noncommissioned officer candidates at civilian vocational schools (as an alternative to having enlisted personnel get technical degrees from PLA NCO schools). Under the "2.5+0.5" program, high school graduates spend their first two and a half years completing studies in a technical subject at civilian vocational schools, where they take pre-approved courses that meet the requirements of specific military units. The last half-year is spent at military academies or training organizations, after which favorably reviewed candidates are assigned NCO billets. According to an article published in a Chinese military journal in early 2018, this NCO cultivation model is still in an "exploratory phase." As of 2017, the PLA had signed on slightly fewer than 50 partner vocational schools, and about 10,000 NCO candidates were enrolled at these schools annually.

Further consolidation of PLA academies. For decades, the PLA has been trying to achieve economies of scale through the consolidation of specialized military schools into multidisciplinary institutions. In 2017, Chinese authorities announced that 77 preexisting military academic institutions had been regrouped into 43. According to the PRC Ministry of National Defense, this reorganization was focused on developing a system in which the military's joint operations–focused institutions constitute the "core" of PME, while schools focused on service-branch specialties serve as the "foundation" and civilian education resources function as a "supplement." Notably, this process of consolidation did not extend to infrastructure, as many reorganized academic institutions now face the situation of being "one school with multiple locations," which could create short-term administrative difficulties.

Concluding Thought

The biggest near-term challenge that China's PME faces is the requirement for joint education. The PLA appears to be reforming its education system in parallel with its major reorganization in a dual effort to strengthen the PLA's joint operations capability. In the future, the PLA's new joint command structures—theater commands—will be staffed by officers who have received better training in joint operations. If these PME reforms are successful, the future PLA officer corps will be more capable of conducting joint operations within the PLA's newly created joint command structures and operating in the maritime and aerospace domains.

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Appendix B–3: Foreign Military PME Assessments

Professional Military Education in Australian Army

Introduction

The Australian Army currently faces a multitude of influences, constraints and uncertainty. In order to cope with the challenges at hand, the Army has determined that education is vital and created a definite goal for their Professional Military Education (PME) based on their tenets and value system, which are the guiding force for their educational modification and development. The Army has developed a thorough, multiple-step strategy to improve their PME, which this paper describes in detail.

The Need for Change

Constraints on the Australian Army

The Australian Defence Force (ADF) has developed a document titled "Future Operating Environment 2035," at the authority of the Vice Chief of the Defence Force Group. In that, they had determined that there are three critical constraints, which the Australian Army is currently facing. The Army has deemed that an updated PME is crucial to countering the effects of these challenging aspects. The three constraints listed below are three limitations on the Army's ability to succeed that call for change to be made.

The realization of these constraints gives reason for an update to PME. In knowing where a system is lacking, targeted changes can be made for lasting improvement. The Army will need to be better prepared and will need to train and educate themselves in order to compensate for these identified shortcomings. They act as a stepping-stone, which gives the Army greater sense of clarity about where their focus can be best directed.

"Demographic challenge"

One of the Australian Army's biggest challenges is its small defense force. Australia's population is small, especially compared to its neighbors' and enemies'. This is a problem which Australia will continue to face, because even as the population rises, the Army population is not projected to grow and it will not be able to generate the larger armed force necessary to stand up to their enemies.

"Spread of technological parity"

Another challenge the Army faces is Australia's "decline in their 'leading edge,'" which is their technological propensity. Australia has traditionally relied on this strength to give them the advantage over threats. However, recently concluded trends have indicated that as technology spreads across the world and becomes more readily available, Australia will have trouble using it as their own advantage over others.

"Potential impact of emerging technologies on the fighting of wars"

This third constraint challenges the ADF's ability to keep up with the vast technological advancements, which are bound to appear. As technology advances, it will seep into the war fighting space. It will, and is, changing the way wars are fought, and Australia will need to be exceedingly aware of the technologies which can be used against them, the technologies which they will need in order to counter their opponents, and the technologies which they will need in order to defend their own and their allies' countries. Technology is holistically changing the way wars will be fought, in the same way that it is changing day-to-day lives within all of society across the planet.

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Adaptability

The Australian Army has determined that a core value which they must integrate into their PME culture and aim to entrench, is adaptability. The environment surrounding the Army is constantly changing and in order for the Australian Army to be a force to reckon with, it must keep up with those changes. For the Australian Army, to be adaptable means to be intellectually prepared for any challenge that comes their way. In the effort of striving towards this quality across their organization, they have concluded that there are five factors which holistically capture the necessities for reaching the state of adaptability, which enable the Army to truly be adaptable from all angles. They are specific in that they represent areas which can be individually adapted, yet they work together to ensure that changes are properly integrated.

It is interesting to note that these factors mirror the six core functions defined by the J7 Joint Force Development (JFD) directorate as part of their mission in supporting the Chairman Joint Chiefs of Staff (CJCS). The six core functions of the J7 JFD are (1) Doctrine, (2) Education, (3) Concept Development & Experimentation, (4) Training, (5) Exercises and (6) Lessons Learned. Below listed are the Australian Army's five factors for achieving adaptability and each of their roles in that mission.

"Training and Education"

The first two factors are training and education. Although these two concepts may superficially appear to be one and the same, the Australian Army perceives a keen distinction between the two, treats them uniquely and applies them into their PME differently. This distinction lends itself to a theme which ultimately represents a facet of the Australian Army's approach to PME.

Training: Training provides military skills and forms behaviors and habits. Training is deeply immersed in the culture of the Australian Army and is even "one of the seven elements of culture described in Army's capstone philosophical doctrine."

Education: On the other hand training without education is incomplete. Military education serves as a foundation for training. The Army seeks to achieve a comprehensive study of war, as education, to provide a foundation for practical application of skills.

"Doctrine"

The third factor is doctrine which expresses the manner in which the force fights. This aspect represents the core beliefs of the force and unifies the organization's actions into alignment.

"Equipment"

The fourth factor is equipment. This is a vital aspect, because with ever-changing methods of war due to technological and scientific advancements, the physical equipment used by the army must correspond. A lack of the right equipment or a delay in procuring the equipment could hinder the success of the Army.

"Experience"

The final factor is experience which represents the optimization of learning. It is of great value as it allows education and training to be applied with robotic proficiency. With experience comes a self-assuredness and quick-action methodology that gives individuals and groups an upper-hand in the dynamic and fast-paced environment of war. It also allows those with less experience to learn from those wiser.

Strategy

The Australian Army has given much thought to the limitations they face and the changes that need to be carried out and why. In order for those changes to be made, they have created a thorough strategy in order to implement these

changes into the foundation of their PME and allow them to seep into every crevice of the organization to create a solid structural shift.

This has been done by (1) determining the top-level mission, vision, and objectives for the organization; (2) prioritizing those objectives; (3) creating specific plans of actions to achieve those objectives; (4) allocating resources and individuals responsible for carrying out specific parts of the mission; and (5) defining assessment methods for further adoption and refinement of the process. Each of these efforts is described in detail below.

1 | Organizational Vision

In order to make effective and long-term changes in their PME, the Australian Army has first started by defining at the high-level, what their organizational vision is. A review of the Australian Army's PME was conducted in 2016. As a result of that review, the Army had determined that their ultimate mission to achieve "mastery of the profession of arms in the land and joint environments." This is considered the "overall outcome" of the Army's Education, Training and Doctrine (ETD) system, under which PME is an established subset. In order to strive towards this goal, the army has deemed of vital importance to achieve an "intellectual edge." This is the driving force beneath all the Army undertakes in their PME endeavors and is representative of key aspects of their value system, such as to be "adaptive in the face of adversity" and to be a "force that is far more than the sum of its parts."

Based on the Army's ultimate mission, the Army has devised a set of organizational goals and objectives that will guide the strategy for improvement. With the objectives defined, they can more accurately develop an effective design for achieving those objectives and control how much investment is placed where. Specifically, the Army has determined what goals the educational system will need to meet as part of the ultimate mission and that education will need to play a large role in the undertaking of achieving the ultimate goals of the organization. The following are the 7 pillars which holistically represent the individual aspects that will ultimately lead the organization towards their mission. Although these are each individual facets of the mission, they are to be viewed in combination, as they will need to be achieved together in order to be effective. Education is valued as one of the main factors in reaching their ultimate goal and will be necessary to achieve each of the following pillars.

1. "Technical and Tactical Mastery"
2. "Physical Mastery"
3. "Psychological and Cognitive Mastery"
4. "Mastery of Military History and Organisational Theory"
5. "Mastery of Leadership and Ethics"
6. "Mastery of Operational Art"
7. "Mastery of Strategic Thinking"

2 | Prioritization

The following step is to develop the strategy for carrying out the mission. In order to create a streamlined and effective strategy, the Army has determined where priorities lie, how much effort and resources shall be directed towards various parts of the processes, and in what order the process shall ensue in order to be efficient and optimized. The Army's PME will need to be "deliberate in terms of an allocation of time and resources, and in the careful engineering of cultural change," ensuring minimal waste of resources and time and ultimately a more directed approach. They have also determined that the strategy will need to be "specific, measurable and achievable," allowing as minimal room as possible for error or uncertainty.

The Army's strategy of PME consists of a "balance between training, professional education and experience," three proven learning methods. These three factors are equally important and the Army needs to maintain a consistent and balanced

investment into these elements. In this day and age the changing character of a combat demands a sustained investment in PME across the entire army to evolve the "intellectual edge."

With adaptability being a key driving value, the Army has strategically left room for change where it is necessary. Understanding that not only could their PME structure change, but that it will change, the goal is to have a flexible model. They accept that the model will need to change in order to be most effective. This means they are completely ready and will build their structure in a way that it is changeable.

3 | Methods

As named by the Australian Army, the following are "the ways;" directed approaches with the intent of being "iterative and flexible." This notion is reminiscent of the Agile Methodology, a proven lifecycle method, being adopted all across IT spheres around the world as the new and improved approach for technological development. Each of the following methods has not only been defined but has also been allocated specific individuals and groups to lead and manage the implementation of.

"Evolving Organisational Culture"

One method for change the Army has determined is to aim at culture. In detail, the Army has defined how they want to be perceived "internally, regionally and globally," how they want the image of their soldier to be represented, the wide extent of cultural outreach they want to establish across the organization, and what stereotypes they want to limit.

"A Refocused Approach to the Study of the Australian Profession of Arms"

The profession of arms, as with any profession is influenced by a collection of theories that surround it. The Army will be reprioritizing their theories by how pertinent their impacts are on the conduction of their Army and will integrate them into their PME as deemed appropriate.

"A 'Whole of Enterprise' PME Approach"

With this approach, the Australian Army intends to garner a widespread sense of togetherness. The goal is to eliminate individual groups and replace with greater communication, sharing of knowledge, and combination of skills. The Army wants each individual and group to be as well rounded as possible. This method also further expresses the necessity of bridging the disparity between Science, Technology, Engineering, Mathematics (STEM) and "socio-cultural skills and emotional intelligence."

"Continue to Reinforce the Value Proposition of PME"

This method intends to fortify the culture of education by directing focus to individuals' career paths. This involves incentivizing as a means to create self-learners. The results are self-motivated individuals to make up the personnel system. This method not only helps the individuals who make up the organization, but in turn, helps the individuals to help in reaching the ultimate goals of the organization. This serves is an investment in the people who will carry out the mission.

"A Continuous Learning Approach"

This approach provides a means for making education more easily accessible across the organization and for instilling it into the surrounding culture. It allows the personnel system to get more value from education with less investment of resources from the organization. This method involves creating informal modes, in addition to formal modes, of education, which will inherently create a self-sustaining culture of education amongst the personnel. While the traditional classroom mode of education is an excellent method for knowledge transfer, informal methods allow education to be employed in settings where it normally would not be, tapping into the potential pathways for education which are currently unearthed.

"Comprehensive Accessibility"

This method intends to make education available and accessible all-around "regardless of role, rank or location." It removes barriers and allows each individual to have equal opportunity in furthering their education.

"An Army – Joint – Academia Relationship"

The approach intends to strengthen the relationships between the military and civilian academic institutions. This will allow PME to be more objective and gain external knowledge, lending itself to stay up-to-date on modern educational perspectives and enhance innovation.

4 | Resources

As defined by the Australian Army, the following are "the means" or "the physical entities, structures and policies created to achieve the [goals]." The Army has clearly defined roles and responsibilities for carrying out the strategy. This aids in ensuring that the means are executed. Individuals are held accountable for execution of their responsibilities. Groups are involved and collaborate with each other. The tasks have been divided and allocated, and each entity understands and are prepared and trained for their duties. Each of these parts adds irreplaceable value in the effort of achieving the ultimate goals.

"The Office of Director General Training and Doctrine (DG TRADOC)"

DG TRADOC is responsible for the integration of the PME strategy.

"The Chief of Army's Professional Development Priorities"

These are guiding priorities. They guide the curriculum and are an extension of the organizational goals, aiding in building a unified foundation. "In all, these priorities will guide Army towards an intellectual vision that matches the character of future war." This entity will help to manifest the organizational vision into reality.

"An Enhanced Professional Development Framework for Army"

This entity's focus is on career. It gives way to developing individual's careers, as the Army has determined that aiming at the careers of the individuals who make up the personnel system affects the culture surrounding the organization. This entity serves to enhance the value of education in the culture by proving education to be an effective means of strengthening careers and opening up opportunity.

"Improved Unit-Level Educational Capacity"

The execution of this capacity is the means of delivering the resources necessary for the PME to thrive and succeed.

"The All Corps Officer and Soldier Development Continuum (ACOSDC)"

The Australian Army has determined what currently works and will leverage those structures. The ACOSDC has been created to integrate the existing structures with new developments.

5 | Assessment

The following three metrics have been established for both success and failure. It is not enough to only assess success. The Army plans to quantify failure as well. This provides better understanding of failure, in terms of where failure has occurred and to what extent, allowing failure to exist on a spectrum rather than be binary. This allows greater control over failure and effective ability to rebound to success quicker.

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1. "That the Means Exist"
2. "That The Means Are Engaging the Ways"
3. "That Together They Will Achieve the End"

Each of the three metrics has been broken down into the categories of: "Who," "What," How," "Example Metrics and Methods," Potential Tools," and "Output." This allows a clear and objective method of applying the metrics. The metrics are a holistic approach, as each metric uses the output(s) of the previous metric(s). After assessing via the metrics, the Army will be able to adapt and further enhance their PME. The overall result is immense agility, flexibility and continuous enhancement.

Summary

In the Australian Army's effort to reform their education they have taken multiple steps to create a structured and holistic approach. Based on formal reviews conducted, they have identified constraints and values which shape the direction and form of their PME. They have developed a thorough strategy that leaves little room for uncertainty.

Resource

"'Evolving an Intellectual Edge' Professional Military Education for the Australian Army"

Appendix B–4: Foreign Military PME Assessments

Professional Military Education in the United Kingdom

Introduction

With fast-paced changes occurring within the political, societal, economic, and technological spheres of the country and the world, the United Kingdom (UK) is making an effort to update their Professional Military Education (PME), which takes place at their Defence Academy (DefAc) so that their Army will be able to correspond with these changes as they manifest into the warfront.

The DefAc has provided an update to the Military Education Coordination Council (MECC) which is an advisory body to the Director, Joint Force Development on joint education issues. This paper is a review of the DefAc's approach to evolving the PME, which was presented to the MECC.

Organizational Vision

Mission

The DefAc has developed their mission statement based on their core set of values which will guide the entire process of their PME enhancement. "The declared mission of the DefAc is to 'deliver the intellectual edge for success on operations, and leadership in government, with [their] allies and coalitions in an era of persistent engagement.'" The definition of their high-level objectives helps to align the products and organization of the educational system with the ultimate mission of their PME. These objectives include the following:

- "UK joint Defence education
- International Defence Engagement (DE) through education
- Defence education research"

Principles

The DefAc seeks to shape future PME by implementing a set of principles to guide the enhancement of their PME. They have identified the principles listed below, with the intention of using them to guide the future or their PME. These principles are holistic and well rounded, yet they represent distinct features of the PME. They allow the strategies and approaches to be streamlined and effective, as they all will be tethered to the same central tenets. With a defined set of principles, the entire organization marches to the same beat to more effectively carry out its mission.

The principles represent qualities which the DefAc has determined to be in alignment with their value system. These are qualities which stand at the foundation of their PME and which shape the quality and approach of their education and the culture surrounding it. By defining this list of principles, the DefAc is establishing a foundation for the educational enhancement approaches to carry out the organizational mission and objectives. This gives the educational system the ability to shift by means of a top-down approach. By institutionalizing these qualities into the bedrock of their system, the DefAc has determined in which direction the curriculum, faculty, culture, and career aspects their PME will advance. They represent the long-term vision that the DefAc has for their Army. The following principles have been defined by the DefAc:

- "Delivering high-quality education that is sharply focused on the strategic context and Defence need, rather than 'comfortable' and recognizable paradigms.

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- Delivering education using the technologies and techniques that deliver the best out-comes to the maximum number at the point of need.
- Delivering course content that is up-to-date and predictive of change.
- Streamlining education structures and supporting functions to achieve synergy while ensuring the student learning experience is optimised.
- Developing an educational research capability to underpin the DefAc's offer and sup-port the JFD Enterprise, including networking and collaborating with relevant external institutions beyond just the narrow purview of the defence and security community.
- Aggressively shaping our structure, supporting contracts and estate to our needs and resource base.
- Retaining and enhancing the DefAc reputation as the PME provider of choice for UK Defence, wider government and UK industry.
- Building a workforce that is diverse, inclusive in nature and thought, and empowered.
- Operating in an effective, efficient and economic manner, including seeking revenue generation from our IP, to deliver our business outputs at minimum net cost."

Methods for Change Implementation

The DefAc intends to put forth their values and objectives by implementing a set of changes into their PME system. The impact of these changes will be monitored and assessed by means of quantifiable goals. They plan to implement changes by means of a step-by-step approach, where the results of the changes will be assessed and will determine future changes. The central tenets to their approach are a focused curriculum, agility, and meeting stakeholder needs. The methods include the following, which have been defined by the DefAc:

- "Have a constantly enquiring and self-critiquing, learning-based, adaptive approach.
- Work as an inclusive, integrated, effective Whole Force, recognising people as our most important asset, promoting appropriate challenge across all activity.
- Optimise the student experience and outcomes through embracing those modern edu-cational practices that add value.
- Be outcome focused, responsive and proactive to emerging demands, and able to ad-just education through rapid assessment, testing and application.
- Be recognised for innovation and adaptation where the best want to work.
- Be efficient, effective and economic in delivering value for money.
- Underpin our educational offers by internal and external cutting-edge research.
- Consistently strive to develop and deliver best-practice joint education.
- Support national DE objectives to contribute to Global Britain by being international by design."

Top-Down Approach

The DefAc's approach to change follows a top-down methodology, whereby the institution is implementing changes at an organizational level, which will strategically impact various factors throughout the system. This section expands on these impacts.

Culture

The DefAc wants to institutionalize methods into their curriculum that will cause students to gain a sense of intellectual curiosity which will permeate into the environment to become a part of the organization's culture.

Organizational Budgeting of Resources

The DefAc aims to reduce costs and maximize the efficiency of the resources being spent. Unnecessary legacy costs will be eliminated and resources will be allocated as actual priorities demand. The academy aims to be more aware of where the costs are needed and to be more dynamic in their spending as it is deemed necessary.

Faculty

The DefAc is redesigning their faculty structure in order to enhance development opportunities, coordination of curriculum/course options, and exploitation of benefits.

Organizational Liaison

The DefAc intends to increase liaison between organizations and departments so that more resources can come together to assess and develop changes as necessary. This reduces a silo viewpoint of the organization.

Program Initiatives

As part of the DefAc's commitment towards improvement, new initiatives have been established, meeting their goal of updating the curriculum. The initiatives are instituted by way of two pathways/programs, each focused on preparing students for specific roles in the Army and consisting of various programs and courses. Each of these programs is a culmination and representation of the high-level vision, mission, goals, objectives and principles which the DefAc has defined for the progression of their PME. This allows the DefAc's educational content and curricula to be the means for transferring the skills and meeting the objectives, which have been put into place.

Strategic Leader Programme (SLP)

The Strategic Leader Programme (SLP) is aimed at future 2 to 4-star military and civilian leaders and will begin in January 2019. The intention of this program is to be flexible and career-oriented. It consists of short residential modules which students can easily fit around their work schedules regardless of location. The program also contains longer courses including the Higher Command and Staff Course (HCSC), which is described in a following section. Overall, this program intends to impart business acumen in order to develop leaders who are self-aware.

Advanced Career Development Pathway (ACDP)

The Advanced Career Development Pathway (ACDP) has been developed for OF-4 to OF-5/1-star. This pathway includes the three parts listed below, each aimed at providing individuals with a various set of skills and knowledge and preparing them for specific career options. The three parts of this pathway include (1) the Advanced Command and Staff Course (ACSC), (2) a Master's Programme, and (3) the Higher Command and Staff Course (HCSC), which was previously mentioned.

Advanced Command and Staff Course (ACSC)

The Advanced Command and Staff Course (ACSC) is an existing 9-month long course, which "help[s] build analytical/cognitive skills." It is currently being reviewed and analyzed in an effort to enhance it. Many factors are being reviewed, including delivery methods. The DefAc is striving to use the most optimal technologies and techniques to enhance the learning capacity of the students taking this course so that they can gain more in a shorter amount of time. Changes are also being made to reduce the amount of time spent on various parts of this course in order to add more units to the curriculum.

New Master's Programme

The DefAc has created a new Master's by Research (MRes) program, for which a small focus group of 12 individuals has been chosen to undertake. The purpose of creating this program is to increase the research capacity of the DefAc. This

program will allow the academy to create a team of "research-capable staff officers," will allow the academy to maximize on years of experience, and will enhance innovation.

Higher Command and Staff Course (HCSC)

The Higher Command and Staff Course (HCSC) is an existing 4-month long course aimed at developing and refining strategic leaders. Enhancements are being made, and quantifiable measures have been developed in order to track the changes, so that they can be objectively achieved. They include: "increasing reflection time by 36% and peer-to-peer learning by 125%; reducing time spent in lectures (down 39%), on 4 exercises (down 30%) and the duration of the Staff Ride (down 40%)." By quantifying expectations, there is less room for uncertainty and change is more likely to occur because it is easier to determine when the goal has not been met.

The curriculum is being revised to include proven learning methods, such as "increased opportunities … to innovate and to experiment in order to 'fail safely,'" introduction of a "disruptive mentor," and a less competitive environment. With a less competitive environment, there is less pressure, which enables creativity. The new curriculum also stresses the importance of the "art and science of warfighting at the operational level" rather than focusing on technology.

Summary

The DefAc's enhanced approach to education has many benefits for the Army. It will evoke a culture of self-directed learning, limiting the belief that individuals are only responsible for learning when required to for pursuing degrees. The new PME system will create a stronger personnel system, creating more effective leaders. The DefAc is investing in the people so that individuals are more capable to perform better and continually teach others to perform better. The DefAc has indicated in their review to the MECC that they will assess and continue to adapt their PME as necessary.

Currently the culture surrounding the UK's Army lacks value of education. So the DefAc intend to implement effective changes that will immerse deep into the core curriculum and culture from an organizational perspective via a top-down approach by creating programs that will be tested out and quantitatively assessed. This is the DefAc's approach to creating and implementing core objectives and a vision into their educational system.

Resource

"PROFESSIONAL MILITARY EDUCATION IN THE UNITED KINGDOM"

Appendix C: Study Methodology

In establishing the Education for Seapower (E4S) Study, the Undersecretary of the Navy directed to the research team to consult experts from a broad range of academic and professional fields, both within government and the private sector. The E4S research team collected data using a variety of techniques: semi-structured interviews, meta-analysis of previous reports and studies, organizational questionnaires, focus groups, content analysis, and online surveys. This project used three widely accepted approaches to research: quantitative, qualitative, and mixed-methods analysis to support findings and recommendations.

Quantitative analysis was conducted using the data submitted by the naval education institutions, service personnel systems, and outside agencies. These data showed trends in attendance rates, academic performance, and promotion rates. Qualitative research methods were used to analyze survey results of faculty and naval officers, the survey was conducted in accordance with the Department of the Navy's human subject research protocol, and included both open-ended and structured questions in order to draw from the research subjects the desired information into our current naval education system. Analytic data coding was used throughout this project in particular during semi-structured interviewing techniques for more than 55 subject matter experts (SMEs), drawing from public and military academia, military and governmental leaders, as well as experts in the cognitive sciences. A sample of articles in the premier naval trade publication was taken and articles were analyzed to draw inferences from the perspective of naval practitioners.

Mixed-methods research also was used where appropriate. Advanced analytical coding methods were used to quantify trends in survey data, open ended responses to interview questions, and content analysis of professional journal articles. Special thanks to the Center for Naval Analyses for their assistance in analyzing the survey data and to our outside experts who participated in numerous focus groups and fruitful discussions.

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Appendix C-1: Boards Pertaining to Naval Education

Provided by Naval History and Heritage Command

Knox-King-Pye Board (1919)

- Convened to assess the "instruction (training)" of the line officer.
- Authors: Dudley W. Knox; Ernest J. King; William S. Pye
- Overall point: continuous officer education aligned with career stages is required—reference made to "present advanced state of civilization."
- Recurring instruction periods indispensable to efficiency.
- Analyzed the line officer career path from midshipman to admiral and demands at a high level.
- Stated requirement for progressive instruction (education) of officers at recurring periods.
- Part I Recommended dividing a naval career into four general phases, each involving some formal education:
  - Inferior subordinate (division officer): Naval Academy—four years, preliminary and preparatory to commission of service by Naval Academy course.
  - Superior subordinate (Department Head): General Line Course between 5–10 years of commissioned service.
  - Commanding Officer (command of a single ship): Junior War College between 10th and 20th years in preparation commanding officer.
  - Flag Officer (command of a group of ships): Senior War College with 20+ years of service, as an O–6, prepares flag officer.
- All line officers would undertake the General Line Course; specialization would take place after at least 5 years of sea duty in one of five specialization fields.
- Part II Insure that full knowledge and use may be made of the constant progress in all of the arts, industries, and sciences-contribute to the advancement of efficiency in naval warfare.
- Specialization divides into 5 general classes:
  1. Design and production of material
  2. Manipulation (skill in use and operation) of material
  3. Requirements other than those which deal directly with material
  4. Special Duty only
  5. Staff corps and Marine Corps
     a. Combatant (graduates of the Naval Academy): naval constructors, supply officers, and civil engineers.
     b. Non-combatant (some instruction in leadership, military character, etc.: Medical, dental officers and chaplains
- The naval profession is the most varied in the. world; leadership, material, skill, judgment, operations—all are needed.
- The term "officer" is synonymous with "leader," which establishes the primary reason for existence of officers.

Taussig Board (1929)

- Formed to inquire into the curriculum of the General Line Course and Junior War College courses.
- Agreed with the timeline recommendations made in the Knox-King-Pye Board (1919) but noted that not enough officers were being assigned to take the various courses so as to effectively implement the Knox-King-Pye recommendations.

The Pye Board (1944)

- Stated that it is impossible to prepare an officer for an entire career over the course of one Education period. Found that education must be continuous, progressive, and administered at appropriate points in an officer's career.
- In addition to the four stages of formal education proposed in the Knox-King-Pye Board, the Pye Board proposed a fifth stage: postgraduate education.
- Proposed that approximately 15% of line officers should be involved in Education pursuits at any time.
- Advocated the establishment of a postgraduate school.

The Holloway Board (1945)

- For the initial education of officers, proposed the utilization of a combination of Naval Academy and NROTC sources, each with a four-year curriculum.

1948 BUPERS Board on Education of Line Officers

- Board was appointed by the Chief of Naval Personnel to study and recommend a program of education and training of line officers to best fit them for high command.
- After World War II, the Navy reviewed the need for education in line officers, with the following recommendations.
  1. Divide an officer's career into two parts:
     - First eighteen years of service.
       - After the eighteenth year of service:
         - Recommends establishment of a Career Planning Board to make recommendations concerning the education, training, and assignment of officers (rotating membership).
  2. First assignment of formal education at the end of five years' commissioned service.
     - General line course (11 months)
     - Education courses in various specialties (6 months to 1 year)
  3. Second assignment during the first three years in the grade of LCDR.
     - Command and Staff Course (NWC) (Pye Board 1944 recommendation)
       - To provide a basic education in the science and the Art of War, with special emphasis upon the operational functions of command and the organization, functions and procedures of operational staffs in planning and in the supervision of the planned action.
     - Followed by attending one of the below listed schools:
       - The Armed Forces Staff College, Norfolk, VA
       - The Command and General Staff College, Ft Leavenworth, KS
       - The Air University, Maxwell Field, AL

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- The Air War College, Maxwell Field, AL
- Air Command and Staff College, Maxwell Field, AL
- Amphibious Warfare School, Quantico, VA
- Anti-aircraft and Guided Missile Course, Ft. Bliss, TX

4. Third assignment—first three years as CDR and controlled by the Career Planning Board.
5. Fourth assignment as Captain or Flag officer and will be controlled by the Career Planning Board.

The Will Board (July 1948)

- Chaired by CAPT John M. Will, appointed to conduct a study about the technical postgraduate instruction of naval officers.
- Required graduates to take IQ and aptitude test to determine for which subspecialties they are best suited.
- Officers attending postgraduate schools will be required to remain in service post-graduation at a time 2X that of the education.
- One year applied courses in Ordnance, Aeronautical Engineering, and Aeronautical Operations were added requirements.

Weakley-Daniel Board (1956)

- Formed to study postgraduate Education program.
- Reduced postgraduate education from three years to two years.
- Proposed that all officers be available to attend postgraduate education, whether it is voluntary or involuntary.

Report by the AD HOC Committee to the Chief of Naval Personnel on Naval Officer Education (1959)

- Navy Officer Education Program was not in line with the advancement of current technologies or current events.
- Concern that Education background of the naval officer structure was "shockingly" deficient in light of advanced technology, world events and other demands of modern day conditions.
- Desire for officers to have advanced degrees that would aid the Navy's mission and requirements while at the same time offering officers professional development.
- Recommended that Navy involuntarily select the most promising officers to attend the Naval War College for graduate or postgraduate education. Technical versus non-technical were both needed and encouraged.
- The Committee also reviewed the Naval Postgraduate School curricula and proposed specific topic curricula in science, math, management and international affairs.

Annual Conference for the Review of Postgraduate Programs (1960)

- Formal technical education should occur at an early stage in an officer's career in order to maximize the number of years over which a return can be expected.
- Noted that despite the growing need for technical understanding, fewer well-qualified, motivated officers were showing interest in pursuing postgraduate education.

Naval Officer Professional Development Study (The Bayne Report) (1974)

- Comprehensive, multi-volume study headed by VADM M.G. Bayne to determine requirements for naval officer professional development.
- Includes replies from 30 flag officers (most retired) with a remarkable rank of perception, advice and clear indication of requirements for naval officer training and education.
- Study produced four major areas:
  1. An agreed set of requirements for naval officer training related directly to billets.
  2. Professional education of Naval officer in either graduate disciplines or professional military education should equate Navy professional education to other professions in U/S society rather than by billet requirements.
     - It can be shown the officer promotion and retention correlate highly with advanced education.
  3. Recognizes the importance of professional nontraditional education, use of new Education delivery systems and promotes the concept of continuing education throughout a career.
  4. Development of a professional development management system which is centralized and has education and training requirements, a method for establishing priorities, assessment of assets against requirements, efficient management of interrelated programs.
- The study group conducted an analysis of officer training and professional military and graduate education to determine their relative priorities.
  - Training for Fleet readiness had critical importance and highest priority.
- Addressed training, graduate education and professional military education, and noted that there is no framework that integrates all three areas.
- Defined 4 objectives of Navy's officer Education system, to include: develop technical and what we now call critical thinking skills commensurate with civilian executive level; social responsibilities awareness; Education incentives equal to civilian professional endeavors; to keep pace with "exploding body of knowledge."
- A summation point: Navy's total education needs cannot be quantified solely based on job needs but must also reflect the Education level/trends of society.

Documents Pertaining to Naval Education

- Report on the Education Program of the US Naval Postgraduate School. A study conducted by the Advisory Committee to the American Council on Education (June 27, 1947)
  - The Naval Postgraduate School's purpose is to serve the Navy by providing technically trained persons of the kinds needed by the Navy.
  - The objective of the Engineering Division of the Post-graduate school is to give a selected group of Naval Officers scientific and engineering training beyond that which they received as undergraduates.
- The First 50 Years of Grad Education in the US Navy 1909-1959 (Rilling, 1972)
  - Technical education should be implemented early in an officer's career in recognition of the need to stay ahead of technological innovations.
  - Publication mainly focused on the history of NPS and NWC.
- Trends in the Quantity and Quality of Unrestricted Line Officer Continuation (Moore-Ostlund, April 1996)
  - Study of how the quantity and quality of officers has changed over time and if drawdown losses consisted disproportionately of high-quality officers.
  - Focused on early career continuation because the continuation behavior of today's young officers will affect the Navy's ability to fulfill its requirements in the future.

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- Aviation and Surface Warfare traditionally retain officers of high overall quality, although some indicators suggest that SWO losses have historically been disproportionately high quality.
- Several reasons to examine retention after MSR.
  - First opportunity to leave the Navy after initial obligation and voluntary retention.
  - In both Surface and Submarine communities, the DH tour is pivotal and occurs roughly around the seventh year of service.
- Early in the career, an officer's education record is probably the richest source of information about his or her quality.
  - Potential indicators of quality—Willingness to work hard, scope of knowledge, speaking and writing ability, patience, or knowledge of specialized skills.

- Senior Officer Education, Today and Tomorrow (Admiral William J. Crowe, Jr., Oct 1985)
  - Focuses on importance of senior service school education to strengthen civil-military relationships.
  - Senior leaders must delineate between the warrior on one hand and the manager/diplomat on the other hand.
- A Review of Naval Education for the SECNAV: A Win-Win Story for the Navy, Marine Corps, and the Nation—A Way Ahead (December 1, 2004)
  - Aims, objectives and outcomes of Naval Education:
    - Education must be focused about achieving a continuous process of learning within the Department such that all naval personnel will have the incentive, direction and opportunity to prepare themselves better for carrying out their responsibilities and duties at whatever level in coping with increasingly complex, interconnected and constantly changing domestic and international environments.
    - Naval education institutions are priceless yet undervalued national assets in largest measure because there are insufficient overarching requirements, goals, policies and guidance in place and there is no single office or officer short of the Secretary of the Navy with the responsibility, authority and accountability for monitoring, support and oversight.
    - At the start of each budget cycle, or in this first case more immediately, you and the senior naval leadership (officer and civilian) should meet to lay out in clear terms the requirements, goals and policies for naval education and for the officer corps and what that means for each institution in terms of its duties and responsibilities.
    - To provide a means to ensure that guidance and policy direction are executed, we recommend either forming a "board of boards" that sits atop the educational institutions to perform these functions and coordinate education among the institutions or, as has been recommended before, establish a "Naval University." This option allows for either coordination and consultation or direct control, responsibility, authority accountability being placed in a single office or person
    - Recommend that Chief of Naval Education and Training be re-designated Chief of Naval Education and Learning (training can either devolve to a two star command or to the Bureau of Naval personnel).
    - Education should be defined and evaluated by what has actually been learned rather than degrees gained or courses attended and that the evaluation process for officers and enlisted.
- Career Progression of Line Officers and Graduate Education in the U.S. Navy (September 1996) (Dr. William R. Bowman, Department of Economics USNA)
  - The professional officer corps in the U.S Navy is comprised of one of the most highly trained and educated managerial staffs in the country.
  - Each year the Department of the Navy (DoN) spends billion of dollars for formal education and training of its officers, in addition to countless man-years of informal training aboard ships and planes
  - This study focuses on fully funded graduate education.

- The objective of this study is to determine quantitatively if investing in graduate education results in returns to both the Navy and to officers chosen for fully-funded graduate degrees that warrant the Education outlays made each year.
- Estimates of the returns to graduate education are statistically difficult to determine because many officers selected for graduate training were chosen because they had proven themselves to be better officers prior to entering graduate school.
- The study shows conclusively that emphasizing the average return misses the entire discussion of the wide range of returns observed for officers who pursue differing types of graduate degrees, who undertake graduate education at differing junctures in the Navy careers and who utilize their skills in subspecialties at different rates and different periods long after graduation.
- The study is divided into six parts:
  - **One** Four major Line communities (surface, submarine, pilot, and naval flight officer (NFO)) (Fiscal Years 1986–1994).
    - Many officers believe that the general skills learned while in graduate programs are utilized to varying degrees in all jobs—both operational warfare specialty and subspecialty billets alike.
  - **Two** Major characteristics of officers who are selected for fully-funded graduate education.
  - **Three** Available Professional Military Education (PME) programs are also important to the career progression of Line officers.
    - Address if PME and JMPE are complements or substitutes for graduate education for Line officers that must "squeeze" these requirements into a career path that is already filled with numerous milestones and "checkpoints" thought to be required for successful Navy careers.
  - **Four** Brief summary of prior research of fully-funded graduate education programs.
  - **Five** The initial return of graduate education to the Navy estimated by the ability of fully funded programs to attract and retain high quality line officers.
  - **Six** The returns to graduate education to the Navy and to Line officers are estimated by the increased promotion opportunities of P-Coded officers over others lacking this expertise.
- The experiences of P-coded Line officers vary dramatically with respect to the type, timing, and utilization of their fully funded graduate degrees.

➤ Developing an Education Strategy for URL Officers (CNA, March 2008)

- Purpose of study was to support the development of the Navy education strategy for unrestricted line (URL) officers, emphasizing the importance of critical thinking, leadership, cultural awareness, jointness, innovation, and adaptability.
  - Widely held belief that the Navy does a good job developing officers within their warfare communities but less effective job of preparing them for the later stages of careers, when assignments require a variety of expertise beyond primary warfare areas.
  - Numerous interviews from diverse stakeholders conducted.
- Reasons for grad ed: critical thinking; specific expertise (financial management); JPME; recruiting and retention incentive.
- Finding: Uneven job in providing education at right career time in an officer's career.
- Numerous barriers to implementation of an education strategy identified.
  - Board Recommendations
    - **Graduate education for every officer.** Every officer should have the opportunity for graduate education that is focused on the needs of the navy and the education establishment and community leadership should work together to attain executable programs that will enable this objective.

- **Education delivery.** The Navy should expand efforts to provide graduate education in a variety of ways, including resident, online, satellite campuses, and short certificate courses that fir into officer career paths.
- **Professional military education.** The Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.
- **Education utilization.** The Navy should rethink the P-code process, to attain a system that provides education when it is needed, increasing education utilization.
- **Implementation barriers.** The Navy should take steps to remove barriers to implementation of an education strategy:
  - » Commands have no incentives to support graduate education and operational pressures may cause command to oppose their officers taking graduate education. The Navy should develop a process that enables commands to support graduate education.
  - » Some education funding regulations are out of date and need to be reviewed and updated to meet current needs.
  - » Resident students receive unobserved FITREPs, which have a neutral effect on officer careers. This process should be changed and the Navy should reward officers for being good students.
  - » Officers do not routinely learn of all the education opportunities. The Navy should publicize all education opportunities on a BUPERS web page.
  - » The Navy lacks strong, effective management of generalist officer assignments-the 1000/1050 billets that are prevalent for more senior officers (O-5 and above). The Navy should review and strengthen the management of senior officer assignments.

➤ Data Analysis for a Navy Education Strategy (CNA, March 2008)

- ❖ The Navy is trying to produce an overall education strategy that will guide the training and education of officers in the future.
- ❖ As officers become more senior, there is a change in focus from operational tours requiring technical proficiency to staff tours requiring decision-making and complex problem-solving.
- ❖ Critical thinking skills, communication skills, and knowledge of both the Navy and the other services become important at senior levels.
- ❖ URL officers pose the most challenges to developing an education strategy (submariners, pilots, NFOs and SWOs).
- ❖ The idea that the Navy needs a specific percentage of accessions with technical degrees is hard to prove or disprove with data alone.
- ❖ Overall: very little evidence that the undergraduate major affects promotion and career advancement for all URL communities, although GPA was found to be significant in many cases.
- ❖ Navy operational commanders have indicated that, although the officers assigned to their staffs require critical thinking and communications skill (among other things) to perform well, they are coming in with insufficient skills to perform the duties of the job.
  - – Officers coming to these staff positions are the front-runners in the Navy, having successfully completed their operational tours.
  - – Graduate education is one means by which officers might be able to obtain the critical thinking and communication skills necessary to succeed as staff officers.
- ❖ In 2005, 70 percent of resident graduate degrees came from NPS or NWC.
- ❖ Officers with graduate degrees are significantly more likely to promote to all ranks from O–4 to O–6 but are not more likely to promote to flag officer.

- The Navy wants to provide in-resident graduate education to its most successful officers.
  - Timing of education is important as specific skills may atrophy if not used over time.
- URL Officer Career paths are already crammed with operational training, operational tours, joint education and experience, and shore tours as well as graduate education.
  - Different communities have different career paths and face different challenges in terms of providing graduate education to their best and brightest officers.
- Documents "rigid" aviation and sub career paths; SWO track has more flexibility.
- The navy is providing enough officers with graduate education and providing it in appropriate specialties, there are issues with the use of graduate education.
  - It is possible that the career paths of officers make it difficult to use their specific skills.
- Officers accessing with technical undergraduate degree have slightly better retention and pipeline success, but study is unable to show high proficiency in operations.
- Graduate education appears to aid in retention and promotion, though its effects on proficiency have been harder to measure.
- The question of when an officer gets a graduate education is tied to when the officer needs to utilize the education.
  - There is an overall need for enhanced critical thinking in all jobs, but some graduate education provides specific expertise the Navy requires for specific billets.

➤ Navy Education Strategy 2025: Educating the Military Force (authored by OPNAV N127) (CNO approved Nov 2013; posted on NWC and other websites; no hard copy publication).

- The Navy must be ready to fight and win today, while building the ability to prevail into the future.
- Education is our asymmetric advantage in developing leaders with the attributes necessary to innovate, adapt, and succeed in planning and delivering maritime joint warfighting and support capabilities; to meet strategic challenges and maintain dominance; and to exploit strategic opportunities in a dynamic and complex security environment.
- To ensure and maintain maritime dominance, the warfighting force has to balance operational skills with finely honed skills in leadership, technology, warfighting and regional culture and language.
- As a limited number of officer and enlisted billets that require specific Education requirements, all tours will benefit from well-developed skills in critical thinking, problem solving skills in complex environments and effective communications.
  - Increasing our technical experts in cyberspace, ballistic-missile defense, anti-submarine warfare, acquisition, financial management, energy management, operational analysis, logistics, and engineering.
    - Opportunities for high-level education will be given to top performers at early-to mid-career points.
  - Development of operational leaders and commanders who excel in the naval profession of arms and are able to integrate maritime capabilities effectively into joint and combined operations and plans.
    - Deep understanding of the geostrategic environment and be able to build an optimize global partnerships.
    - Complete Professional Military Education (PME) including Joint Professional Military Education (JPME).
  - In alignment with "The Navy Leader Development Strategy" develop leaders to lead the Navy in innovation and change.
    - Development of adaptable Navy operating concepts and prepared to produce optimal mix of capabilities in an uncertain environment and constrained resources.

- Develop and execute national military strategies in concert with other instruments of national power and international partners to achieve national security objectives.

❖ The Navy's investment in education must be fiscally disciplined focusing on the tenants of *Warfighting First, Operate Forward,* and *Be Ready*.

– Curricula must expand to include tomorrow's strategic and complex challenges; technical core of warfighting skills, interdependence of joint and combined operations, and complexity of decision making.

– The service academies and Senior Enlisted Academy will lead in the development of behaviors, skills, attributes, and expertise relevant to warfighting, warfighting support, and the development of innovative operating concepts and strategies.

– Promote broad understanding of maritime strategy and navy capabilities through participation in o the DoD education institutions and international military colleges.

– Professional Military Education, both officer and enlisted, will continue to be a vital component of our overall education strategy and execution.

– Career management and assignment strategies will emphasize developing leaders and the expertise to meet current and anticipated navy requirements and optimize education investments.

– Objective to deliver educated leaders of the future:

- Adapt in uncertainty, develop and incorporate new ideas and concepts, to manage large, complex organization, and to plan, operate and lead the Navy and joint force.
- Integrate education into career paths and focus on existing and future requirements capabilities and disparate threats.
- Development of leadership acumen at all levels.
- Development of language skills, regional expertise, and cultural awareness.
- Utilization of resources for maximum opportunities for all Sailors
- Expanse participation for enlisted members in critical technical warfighting curricula.
- Align education resources with highest priorities and return on investment.

Developing an Education Strategy for URL Officers (CNA, March 2008)

➤ Purpose of study was to support the development of the Navy education strategy for unrestricted line (URL) officers, emphasizing the importance of critical thinking, leadership, cultural awareness, jointness, innovation, and adaptability.

❖ Widely held belief that the Navy does a good job developing officers within their warfare communities but less effective job of preparing them for the later stages of careers, when assignments require a variety of expertise beyond primary warfare areas.

– To determine the requirements for staffs of operational commanders.

❖ Interviews with operational commanders

– Critical thinking

– Written and oral communication

– Knowledge of other services

– Knowledge of joint operations

– Broad knowledge of the Navy

– Expertise in operational planning

– Cultural awareness

– Expertise in fiscal issues.

- Community leaders
  - Importance of the command culture.
  - Technical degree is vital for some communities.
  - Make education and training efficiently meet the needs with extremely tight training schedule.
  - Address joint requirements.
  - Board precepts need to contain explicit guidance to accommodate talented staff officers.
- Leaders of the education establishment
  - Concern that the Navy does not value education.
  - Welcome an education strategy with enough specificity to design education programs and align resources.
  - Programs are oriented toward the needs of the Navy.
  - Expand and/or add programs focused on critical thinking.
- JO focus groups
  - Technical undergraduate education is not important because Navy gives sufficient community training to new officers.
  - All officers expect graduate education.
    - Belief it is a requirement for promotion to senior grades; preparation for a second career.
- Preferred in-resident education but not always an option.
- Little time or command support to take graduate education either during or after work hours.
  - Reasons for grad ed (critical thinking; specific expertise (financial management); JPME; recruiting and retention incentive).
  - Uneven job in providing education at right career time in an officer's career.
- Enhanced critical thinking skills are increasingly needed as a career progresses and this expertise is provided whenever graduate education occurs.
- Navy and Joint PME is occurring at the right time (following a department head tour).
- Education in a specific expertise (e.g., financial management frequently occurs early in a career, but is not needed until much later).
- Barriers to implementation of an education strategy
  - Commands have no incentive to support graded
  - Education funding regulations may be out-of-date
  - FITREP system "indifferent" to grad ed
  - Opportunities poorly advertised
  - Lack of strong, effective management of generalist officer assignments.

➤ **Recommendations:**

1. Every officer should have an opportunity for graduate education that focuses on the needs of the Navy, and the education establishment and community leadership should work together to attain executable programs that will enable this objective.
2. Navy should expand efforts to deliver graduate education in a variety of ways, including resident, online, satellite campuses and short certificate courses that fit into officer career paths
3. Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.
4. To increase education utilization, the Navy should rethink the p-code process to attain a system that provides education when needed.

5. Navy should take steps to remove barriers to implementation of an education strategy: (a) develop a process that enables commands to support graduate education (b) review graduate education funding regulations (c) change the process of unobserved FITREPs for resident students to reward officers for being good students (D) publicize all education opportunities on a Bureau of Naval Personnel web page and (e) review/strengthen the management of senior officer assignments.

➤ **Discussions:**

- ❖ Operational commanders (Pacific Fleet, Seventh Fleet, Fifth Fleet, Sixth Fleet, and Third Fleet—What are the skills required for URL officers to fully perform their work at both Navy and joint commands?
  - – The commands had a wide variety of sizes, assignment lengths and roles responded that the following areas of expertise were both requirements for their staff and areas where they were deficient.
    - Importance of written & oral communication—noted the poor ability of staff to write a concise description of an issue; the ability to listen and understand body language is also important especially in multinational environment of the Sixth Fleet.
    - Understand other Services—especially for successful functioning in a joint environment; broad knowledge of Navy capabilities to describe to other services and foreign military staff.
    - Joint operations knowledge
    - Understanding operational planning— Naval War College's Navy Operational Planner Course (NOPC) and the Army's School of Advanced Military Studies (SAMS).
    - Noted that the "go to" guys on their staffs may not necessarily be the Navy's front-runners. Front runners typically have lots of operational experience but not much understanding of staff operations.
    - Fiscal Issues—knowledge of the Program Objective memorandum (POM) process and experience in OPNAV N8 is valuable.
    - Critical thinking—Tackle complex problems is essential capability that is not readily obtained in a short training course. Critical thinking is a mental trait that is nurtured and developed through long-term education.
    - Importance of cultural awareness with a distinction between cultural awareness and language expertise (do not want foreign language to be utilized in official communications due to complex, nuanced languages
- ❖ Community leaders—"What are the implications of these requirements to careers, assignments, and promotion criteria?"
  - – Importance of an education strategy.
  - – Career paths are extremely tight—with the addition of joint requirements puts great stress on officer careers and difficult to find time for education.
  - – Changes have been made recently to address joint requirements.
  - – The officer management process can accommodate talented staff officers—the Navy cherishes its culture of command and believes that it breeds the leaders the Navy and the Nation need. Navy leadership is very clear that it does not want to move toward a staff culture.
  - – Operational commanders are satisfied with the technical proficiency of Navy officers because of the community leaders' processes. General belief that the Navy is a technical institution and that a certain amount of technical proficiency is required by all Navy officers. The community leaders are content with their officers' technical proficiency and believe that officers have the required technical education, training, and operational exposure.
    - Key observation by the Commander, Naval Reactors:
    - U.S. is leveraging technology to overcome a larger force.

    - » The Navy is building ships with smaller crews, with more demand for technology.
    - » Modern warfighting systems are highly complex, and to use them you need to understand the technologies.
- Education establishment (USNA, NWC, NPS, NROTC)
- Different missions and focus on different topics.
- Concern that the Navy does not value education—frustrated with the lack of Navy support for its initiatives and endeavors. Many Navy education initiatives during the past 50+ years, but process is painfully slow. Navy "says" that it values education, but when it comes to assignments, operational concerns always outweigh education requirements. Major impediment—not enough time in the officer career to meet all operational needs and also obtain in-residence education.
  - Welcome an education strategy that specifies requirements to design education programs and align resources. Education establishments feels like it is making many decisions policy guidance or sometimes with conflicting policy guidance. Overall it's hard to ensure that all programs are appropriate and resources are in the right places.
  - Their programs are oriented toward the needs of the Navy. Some concern the education establishment (NPS in particular) is removed from Navy life and not responsive to the Navy needs.
  - They have ideas to expand and/or add programs focused on critical thinking. Critical thinking is a concept that is commonly used but hard to accurately define. All educators understand the importance of critical thinking and appreciated that it is a skill developed and enhanced by education. They also explicitly address the need to develop critical thinking in their education programs and have numerous ideas regarding how to accomplish this.
- Junior officer focus groups (surface warfare officers, submarine officers, TACAIR pilots, and NFOs)
  - What knowledge and expertise have you required for your assignments?
    - » How important is technical expertise?
    - » Can technical expertise be provided in a core curriculum or do you need a technical major?
  - How well prepared have you been for your assignments?
  - USNA has a strong technical core curriculum (calculus, engineering, chemistry, and physics courses).
  - Uniform response from all groups—technical education is not important because the Navy provides sufficient community training to new officers that allows them to function well within their communities.
    - » Their work requires rote knowledge and that critical thinking and innovation are not required and in some cases even discouraged.
- Following comments should be considered in the context that officers have a lack of experience and perspective.
  - Emphasis is on performance and proficiency, as the officer gains experience in his/her warfare area.
  - How important is graduate to you?
  - Have you taken graduate education?
    - » Will you?
    - » What disciplines?
  - What form of graduate education will you take (in-resident, distance learning, etc.)?
  - How do you feel about pursuing education on your own time?
  - All officers expected to get a graduate education and believe a graduate degree is a requirement for promotion to more senior grades (not written in board precepts, but could be a tie-breaker between otherwise similar officers).

- Major motivation was personal development, such as preparing for a second career.
- Disciplines varied with preference for in-residence education but not always an option due to career path demands (reconciled to obtaining a degree by some form of nonresident education e.g. night school, distance learning, etc).
- Feel Navy doesn't care where they get a master's degree, but see a great difference in quality of education and want to pursue "good" programs.
- JO Concerns
  - » What "own time"? work 12+ hours and want time with families
  - » CO's less than supportive of taking graduate education, even prohibiting it, as a detractor from their duties.
  - » Concern about perception as slackers if they took time off to study.

– Education Framework—consider the variety of education officers receive (purpose and content).
- Enables officer development to meet the requirements of officer careers.
- Two broad stages of an office's career:
  - » First Stage: emphasis on performance and proficiency in warfare community, requiring technical expertise.
  - » Second Stage: emphasis on broad operational issues, requiring critical thinking.
- Undergraduate education with both technical background that is necessary for proficiency in a warfare area and the basis for critical thinking, followed by assignments for community proficiency.
- Two kinds of graduate education: Technical (e.g. financial management) and Joint PME; education is interwoven between further community assignments.
- Graduate education revitalizes and enhances critical thinking skills, and develops expertise that supports Navy needs.
- Train for the short-term, educate for the long-term
  - » Education encompasses teaching and learning specific skills; the imparting of knowledge, positive judgment and well-developed wisdom; facilitating realization of self-potential and latent talents of an individual.
  - » Training "to make proficient with specialized instruction and practice.
  - » May not be a clear boundary between where education ends and training begins.

– Undergraduate education—"What percentage of officers require a technical education?"— emphasize is on performance and proficiency.

– Technical degree—USNA—all students receive a significant technical education based on the core curriculum.
- **Tier I** = Engineering
- **Tier II** = Mathematics & Science
- **Tier III** = Humanities & Social Sciences

– Most analyses address the value of education in terms of personal success, by considering technical vs. nontechnical educations that pass training courses and get promoted at higher rates.
- Officers with technical degrees pass initial community training at higher rates than offers with nontechnical degrees (roughly 10% points difference).
- After initial training, no observable effect on an officer's career success.

- Many factors (degree, GPA, college, etc.) affect officer success in initial training. These factors tend to be correlated with each other, making it very difficult to identify cause and effect.
- USNA graduates succeed at higher rates than other officers.

– There was no discernible relationship between education major and tactical proficiency

❖ Graduate Education—uniform agreement that many officers need graduate degrees.

– Four distinct reasons why the Navy needs to provide graduate education to its officers.
  - Enhance critical thinking skills, needed in all senior positions; enhancement of mental capabilities; hard to accurately define which causes some difficulty when trying to determine whether officers have sufficient expertise .
  - Provide specific expertise; subspecialty codes (e.g. financial management).
  - Provide Navy PME and JPME (JPME is required for many Joint assignments).
    - » Department of Defense is a joint organization;
    - » Officer careers are planned and organized to develop joint warfighters.
    - » PME—conveys a broad body of knowledge and develops the habits of mind essential to the military professional's expertise in the art and science of war.
      - - Critical thinking and building/enhancing these intellectual skills.
      - - Effective maritime spokesperson with a broad understanding of the navy able to speak for the Navy to other organizations.
      - - Expertise in joint warfare and how to operate in a joint environment.
      - - Knowledge of operational planning
  - A graduate degree is a recruiting and retention incentive.
  - Lessons from the civilian sector
    - » Staff is well educated = industry values education

❖ Issues and challenges to the development of a framework for education.

– Navy career paths are crammed
  - Warfare community tours
  - Operational training for a warfare community
  - Joint education and experience
  - Some shore tour experience (OPNAV, PERS-4, Staff, etc.)

– Taking time (18+ months) for resident graduate education takes time from the officer being in an operational environment and need to get back to speed on returning to the fleet.

– Short courses could provide knowledge applicable to the officer's next tour, significantly increasing utilization.

❖ Alternate career paths to provide expertise that the Navy needs.

– E. G. SWO community is developing specialist career paths in missile defense, strategic sealift, shore installation management, undersea warfare, antiterrorism/force protection, and mine warfare.

❖ Timing of graduate education

– PME is occurring at the right time in an officer's career.

– Other types of graduate education frequently occur well in advance of the Navy's need for the education, resulting in many inefficiencies.

- Education delivery
  - Naval War College—military education, both Navy and joint
    - Goldwater Nichols Act—made JPME requirement for promotion in the URL (Navy ensures frontrunners attend NWC.
    - Navy PME is essential for every Navy officer; core of NWC education.
    - NWC provides staff to NPS to include JPME-I in degree courses.
    - Senior PME at the War College accredited since the early 1990s with NWC students routinely obtaining Master's Degrees in National Security Studies.
    - NWC also provides the Navy operational planner course (NOPC).
  - Naval Postgraduate School—predominantly technical in nature
    - Delivery methods include: resident graduate education, distance learning, satellite campuses at fleet concentration areas, certificate courses, CD-ROM instruction, collaboration with other universities.
- Utilization of graduate degrees
  - Requirements for graduate education is specified by billets with subspecialty codes that are P-coded or Q-coded; with officers educated to meet these requirements and NPS student quotas established based on the requirements.
  - Officers need to be assigned to billets that require this expertise.
  - Cause of poor utilization of graduate education is that the first officer career priority is to develop expertise in a warfare community (this takes time). Second priority of an URL career path is to acquire joint expertise.
  - The Navy needs to rethink the process for providing and using graduate education: the current process is evidently grossly inefficient and ineffective
- Training accreditation—the Navy provides rigorous training to its officers.
  - This is accredited toward degree programs and/or professional qualification.
  - Good recruiting incentive and may benefit retention.
  - Flight training may lead to accreditation with colleges.
  - SWOs may receive credit toward merchant mariner license (deck and/or engineering).
  - NUCs receive credits from PG school and a P-code.
- Why has progress been so slow?
  - Frustration over a lack of progress—constraints and pressures caused by officer careers.
  - Officer community leadership stresses the primacy of operational requirements and warfare proficiency in making assignments.
  - The Navy has found it difficult to implement education recommendations in a manner that is executable within the constraints of a Navy career.
  - We need a mix of education programs and career management initiatives that fit together to provide an executable education strategy.
- Implementation barriers
  - Command support—no incentives to send their officers to graduate school and pressure to decrease time spent on graduate education

- Operational pressures tend to lead to command leadership not looking kindly on officers setting aside time to study, at any time of the day or night.

– Graduate education funding
  - Some education funding rules are out of date, may conflict with education priorities, and need to be reviewed.
  - Funding regulations re tightly written and lead to strong control of funds (may not be current with changes in education).
  - Education delivery methods are evolving and funding mechanisms need to evolve in response to these changes.

❖ FITREPs—officers receive written reviews from their superiors who have directly observed their performance
  – This process does not work well for officers taking in-resident graduate education.
  – Navy officers have adapted to this situation: many avoid resident graduate education for fear of missing career-enhancing opportunities.
  – Reward for being good students: education excellence.
  – If the navy sends a clear message that it values education, officers will react accordingly, by striving to attend good schools and excel at their studies.
    - Publicizing education opportunities
      » The Navy relies on commands providing information to the officers, and some commands are better than others in doing this
      » BUPERS should provide a comprehensive education opportunities page on the BUPERS web site.
    - Officer community development
      » Tension between development of officers in their communities and development of all-round navy officers.
        - The Navy develops great SWOs, aviators, and submarine officers, but not necessarily prepares all-round officers.
      » Recommendations from the 1946 BUPERS Board are still applicable with not much changed since then.
        - Expand PME
        - Establish panel to manage the careers of senior officers.
    - Officer career lengths
      » Constrained by law

❖ Board Recommendations
  – Graduate education for every officer—Every officer should have the opportunity for graduate education that is focused on the needs of the navy and the education establishment and community leadership should work together to attain executable programs that will enable this objective.
  – Education delivery—The Navy should expand efforts to provide graduate education in a variety of ways, including resident, online, satellite campuses, and short certificate courses that fir into officer career paths.
  – Professional military education—The Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.
  – Education utilization—The Navy should rethink the P-code process, to attain a system that provides education when it is needed, increasing education utilization.

– Implementation barriers—The navy should take steps to remove barriers to implementation of an education strategy:
  - Commands have no incentives to support graduate education and operational pressures may cause command to oppose their officers taking graduate education. The Navy should develop a process that enables commands to support graduate education.
  - Some education funding regulations are out of date and need to be reviewed and updated to meet current needs.
  - Resident students receive unobserved FITREPs, which have a neutral effect on officer careers. This process should be changed and the Navy should reward officers for being good students.
  - Officers do not routinely learn of all the education opportunities. The Navy should publicize all education opportunities on a BUPERS web page.

Appendix C-2: Coding Schema

This typology describes the codes and their definitions used to extract and classify the information gathered in the interviews and surveys administered for the E4S Study for further qualitative analysis. A code in qualitative analysis is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for language based or visual data These codes provide a means to organize the data into quantifiable measures in order to be able to conduct a statistical and objective analysis. Codifying data involves arranging the ideas present in the data into a systemic format to create a classification or "hierarchy." This allows themes and trends to be elicited in the form of relationships amongst the various distinct parts of the classification. This process requires an effective balance of the appropriate levels of specificity. If the focus of the coding schema is too broad, the result will show little meaning behind the data, while too narrow a focus results in codes which are too specific and isolated that they do not allow effective analysis of the data.

A careful analysis in this study has revealed the following coding schema which consists of a list of Codes, some of which contain Sub-Codes, classified into higher level Categories. The Codes and Sub-Codes used in this hierarchy represent the essential elements of the recurring themes discovered within the interviews and surveys. This set of Codes is represented under another set of Categories (Problems, Recommendations, Observations) which give direction to the data in terms of how that data is to be acknowledged. These codes wholly and concisely capture the information gathered and provide discerning insight into the current state and future needs of the DON's Educational Enterprise. A visual representation of the hierarchy is presented in Figure 18.

CATEGORIES

Problem

These are areas identified by participants of the interviews and surveys, which are shortcomings in the DON's educational enterprise. Theses are areas where participants have noted that they believe action for improvement is required and which are preventing successful administration and usefulness of education.

Recommendation

These are statements identified as suggestions and possible means of improvement for the educational enterprise.

Observation

These statements are neither explicitly positive nor negative; they are general statements regarding the educational enterprise. While all survey responses are inherently observations, this category captures those statements which fall into neither category, but rather provide a neutral thought on the subject of education within the DON. An analysis of the data in this category could identify additional problem areas or means for improvement from statements which were not originally intended in positive or negative light.

E4S Study

These are statements aimed toward the E4S study. These are statements made by participants that offer suggestions and questions for the E4S team to consider.

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CODES

Organization

The structured and managed composition of people within the Educational System and the relationships between the designated groups of people within the System. The organization is established in order to meet a need or to pursue collective goals, which in the case of the DON's Educational Enterprise, is providing a platform to allow the creation and dissemination of knowledge deemed necessary to carry out the duties of Navy personnel. The organization includes a management structure and is divided into groups with assigned roles, responsibilities, and authority to perform various activities. The organization determines requirements and allocates funding across the enterprise. It also determines the vision, mission statement, and objectives of the organization.

Sub-code(s)

Administration:

The collection of individuals who manage/lead the organization and conduct the day-to-day activities to administer and monitor resources across the organization.

Curriculum & Faculty

The subjects, lessons, and academic content that comprise the course of study. This includes the programs that are administered, the list of courses that are offered, the departments wherein they are organized, and the content/teaching material that is provided in the courses and how that knowledge is organized and delivered by means of units, lessons, assignments, and evaluation methods. The curriculum determines the knowledge and skills students are expected to learn, by defining the objectives and standards they are expected to meet.

Sub-code(s)

JPME:

Joint Professional Military Education (JPME) is a form of Professional Military Education (PME) that emphasizes a multiservice approach. JPME was established to address the need for effective cooperation between the branches of the United States armed forces and is available at a number of colleges and JPME Institutions.

Emerging STEM Education:

Science, Technology, Engineering, and Mathematics are constantly being researched and advanced. STEM studies are included in the DON's Educational Curriculum, but with the ever-changing world of STEM, the DON must keep pace with emerging intelligence and additionally, be a part of aiding in the advancement and progression of this field of study. Emerging technology may also be used as tools to enhance the teaching and learning of knowledge in other fields of studies in the curriculum.

Culture

The customary and shared set of values, beliefs, and attitudes prevalent in the DON's Educational Enterprise. These ideals determine the goals and social practices of the people comprising the Organization and characterize the Organization.

Personnel System & Incentives

The individuals who form the DON and their incentives for pursuing education. These are the individuals who reflect the effectiveness of the educational system and who implement the knowledge and skills gained into practice through their careers.

Student Selection

Aside from the overarching Organization, Curriculum, and Culture that is placed upon the students and in which the students exist, the students hold individual beliefs, values, and interests that guide them through the Educational System.

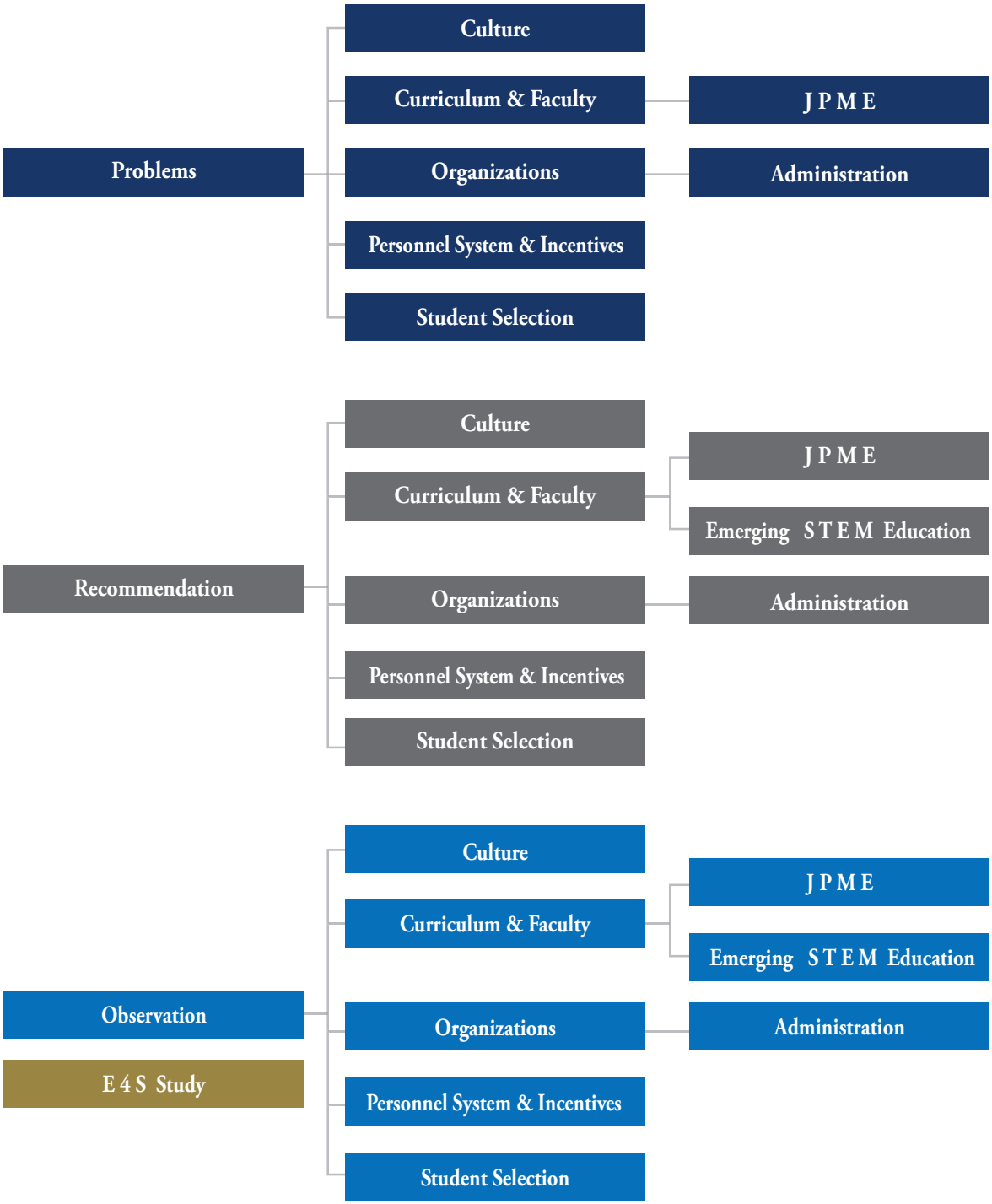

Figure 18. Code Hierarchy

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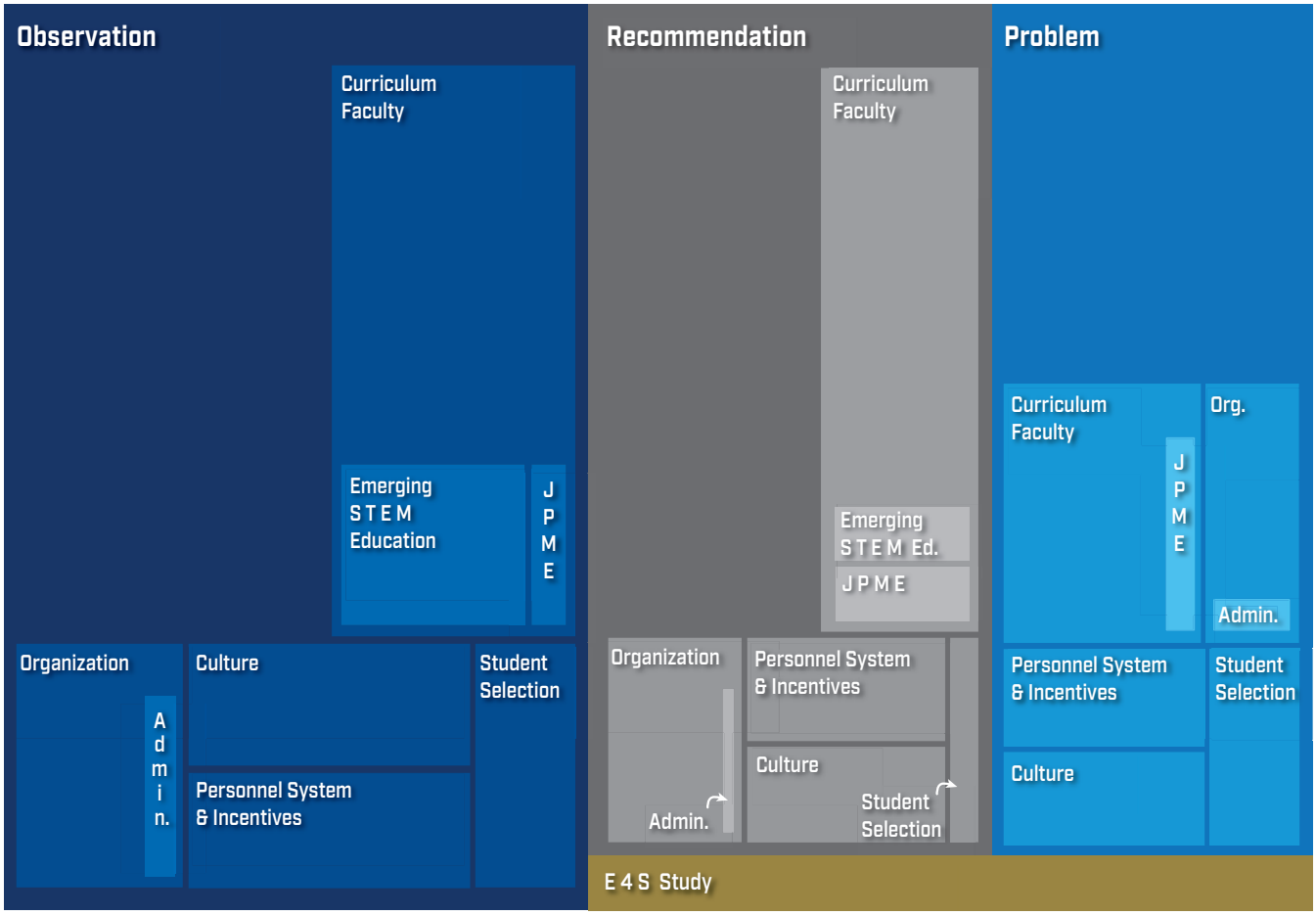
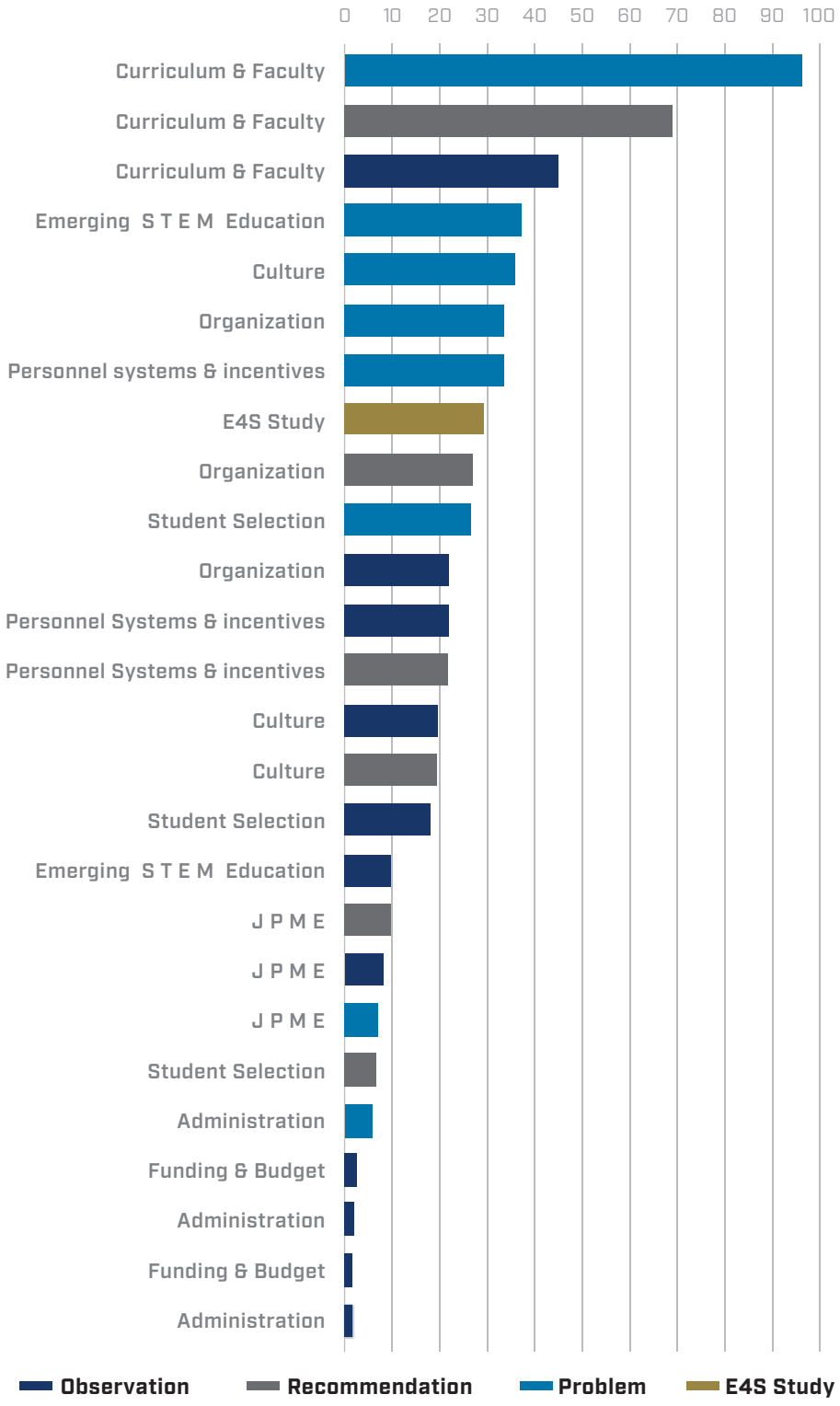
Appendix C-3: Coding Hierarchy

The Figure below shows a Hierarchy Chart: visual representation of the Code Hierarchy presented in Appendix C-2, based on how often each Code, Sub-Code, and Category was discovered throughout the interviews. Larger portions represent more prominent themes discussed by the interviewees.



The figure below shows a detailed quantitative breakdown of the Codes and Sub-Codes as they were identified throughout the interviews.



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Appendix C-4: Word Frequency Analysis

Problems

1 | Curriculum & Faculty

A word count of the interview content labeled under "Problem/ Curriculum & Faculty" has shown that there is a problem with the treatment of faculty, which is resulting in a poor curriculum. Faculty members are not receiving benefits competitive enough as those offered by external parties and are opting for work outside of the military. With a lower standard of faculty members, the curriculum is facing problems such as not being relevant to the organization's goals and being too diluted. The current curriculum does not allow enough value to be placed on education for preparing students for leadership and for war. This deduction is based on the following ideas prevalent throughout the interviews.

Faculty

1. The hired faculty are of great importance because they determine the curriculum. Good faculty are required in order to create and maintain a strong curriculum.

   "Afterwards, we hired the wrong faculty and therefore the wrong curriculum for peer competition."

2. The faculty members are not given enough authority or freedom. Thus, they are not inspired to take more action and accountability for their work.

   "How do you treat an adult PhD like that? It creates a frame of mind, that the faculty are just hired help."

   "Current trends in faculty hiring: people aren't as mobile as they used to be for jobs like this. Federal rules requiring eight hour days and being physically in the workspace don't work well for high-level academics."

   "Toughest in Joint Operations—faculty is generally good but they have never had much control over the curriculum, mostly JPME-driven—little left over for the staff."

3. Military faculty members are not given tenure.

   "Tenure does figure in, but is not an unalloyed good. In Federal hiring, if you do a good job, you don't have to worry. But tenure is also a matter of professional prestige—a subtle message of how much the institution values the faculty. For example, look at the recent Current Strategy Forum, where a big deal is made of inviting tenured faculty from other institutions—it "disses" internal talent without tenure and sends a bad message."

4. Military leaders are not placed in leadership positions within civilian academia. This causes a rift between the military and civilians.

   "Permanent Military Professors (PMP): They are all proven leaders, but not placed in leadership positions amongst the civilian faculty."

5. Qualified individuals are opting for positions outside of military education.

   "We've played the service to country too many times with the faculty. We are losing some of our best."

   "…but it's the high-end, more senior faculty you will lose without higher numbers."

Curriculum

1. The curriculum is being diluted and doesn't allow students to master the covered topics.

"There is a long trend in Strategy and Policy, where the faculty committee keeps finding good articles and other things for the students to read, but it detracts from the two or three core books the students should read in depth, from cover to cover. After 46 years of adding all these outside readings, we end up cutting up the core books and assigning only ever-smaller portions of them."

2. The curriculum is not adequately preparing students for roles that require critical thinking such as leadership and war-centric roles. Readiness for war is determined more by experience rather than education, thus placing education at lower value.

   "There is a huge deficiency in basic knowledge required because our Education system, both civilian and military, does not adequately prepare mid-grade officers."

   "From in-resident PME to Major Command, we are not teaching the skills needed to navigate political, military, economic challenges. Nuclear power (8 yrs to be CVN CO) doesn't teach strategic thinking."

   "What is the main problem? We aren't that good at providing education for war."

   "To the extent the Fleet is starting to gear up now with regard to greater lethality and peer-on-peer warfare, we are not complementing the same on the education side."

   "A Chinese military graduate from the top war colleges in Beijing is conversant in Clausewitz, Mahan, Jomini, with a mastery of the themes of warfare and political influence. His American counterpart has no idea of Chinese warfighting doctrine."

3. The curriculum does not provide enough practical education.

   "So there is a tension. We force high-level, Ivy-league level technical education on our undergraduates, and then they transition to learn skills needed in their warfare communities. We force rote memorization, instinctive responses."

2 | Organization

A word count of the interview content labeled under "Problem/ Organization" has shown that there is a problem with funding and administration within the organization. The current distribution of funding hinders the progression of Education advancement. The administration governing the organization does not enable the Education system to succeed, including decisions regarding research and the preparation/allocation of officers. This deduction is based on the following ideas prevalent throughout the interviews.

Funding

1. The current cost of the DON's education is too high.

   "I found out all the ways we spend money on schoolhouses: salaries, instructors, PCS money, etc; and divided by the number of Sailors we had —and the number per person exceeded that of a Harvard education!"

2. There is not enough funding being allocated to technology and research. The available money is not being invested appropriately.

   "The largest gaps I see in management education today are in technology and global strategy. As you well know, technology is restructuring one business after another. But we are not training people in implementing technology (or increasing funding for technical training), and we aren't considering a change in Education structures. What should investment in education look like for the military after next?"

   "Naval Research Laboratory and Office of Naval Research aren't allowed to touch education dollars—current policy keeps R&D separate from education. But in real life, it's not separate but closely associated."

   "So when ONR appropriates funds for research in the Navy budget, we get none of it because we fall under education. The Navy has no research obligation to NPS. If we ant to be agile, we have to build flexibility into the way we fund RDT&E."

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"For example, Kansas State can build a program and then get sponsors. We can't. The way money flows creates stovepipes. Robotics have to be "learned" through a single department. Can't share money with other associated departments."

3. The misdistribution of funding is causing initiatives to not be completely accomplished.

   "Our budget is down—we are between $10-13M under-budgeted to do basic things. For our new Cyber Center, we won't make our goals for completion of construction at current funding rates. It was a great move, but we will need more money than Congress has allowed… But we have to pay attention to this, if not addressed we will have to stop doing some things in the next five years."

Administration

4. The programs that are currently in place are not favorable to the advancement of the DON's Education system and the achievement of its goals. The organization is governed by bodies that do not consider the specific needs of the DON's Education system, especially those regarding research.

   "The Continuing Resolutions (CR) have wreaked havoc on education."

   "Our curriculum is driven by the OPMEP—J7 document—so as we try to fix Naval education remember we are a naval school by resources but a Joint school by directive."

   "What hurts research the most are the bureaucratic requirement that have piled up over the years, especially the aspects of program management our scholars and professors must go through as a result of the 2012 IG."

   "Right after the 2012 IG, the NPS President could not approve research projects. N1 had to do it. And they still do, only a little less intrusively now, in the "work acceptance process."

5. There is a problem with management. The organization is oversaturated with responsibility, and officers are not adequately prepared.

   "The main issue in Education acculturation is officer acquisition and management policy."

   "We keep creating new requirements for our forces without increasing the people to do them. Look at the Army—Foreign Advisory Brigades. The Air Force has four-star officers reporting to other four-stars. We are eating up our force structure. No one wants to say we can't do something anymore."

   "There is a huge deficiency in basic knowledge required because our Education system, both civilian and military, does not adequately prepare mid-grade officers."

3 | Personnel System & Incentive

A word count of the interview content labeled under "Problem/Personnel System & Incentive" has shown that the DON is not producing qualified individuals. This shows that the DON is not placing enough value on education and neglecting the impacts education has on creating qualified personnel. This deduction is based on the following ideas prevalent throughout the interviews.

1. The DON is not fulfilling their quotas in sending qualified individuals to other institutions.

   "Navy is filling less than half their slots, and over half of those are not promotable to O-4."

   "The Navy expects the Army to send comparable numbers of students to Newport, but they are not doing the same for Command and General Staff College (Leavenworth). Navy is sending non-promotable O-3s to CGSC."

   "Navy does not send their best officers to any of the War Colleges. Other Service officers come to Newport and compete very well. The Navy ends up near the bottom academically without fail. Thus the Air Force, the Army, and increasingly international students take all the prizes. We certainly want to help the Navy officers, we are Navy, after all. But it's difficult to do when the Navy doesn't send the right people."

2. The DON is not producing high quality officers and leaders.

   "DoD is not producing enough strategic thinkers at the four-star level or action officer level at major staffs."

   "Our talks with Navy leadership showed that although operational skills were good, critical thinking, writing and speaking skills were not."

   ". . . would receive "black books" of hand-selected officers for critical positions on the Joint Staff, and then have to ask, "but do you have anyone qualified for the job?" He would receive officers at O-9/10 level who could not articulate simple Joint policy or the description of a COCOM."

4 | Culture

A word count of the interview content labeled under "Problem/Culture" has shown that the DON's Education system has a deeply ingrained culture that does not view education in high regard. The system places more importance on experience/career and does not justify the value education can bring to one's career. The system discourages personnel from furthering their education. This deduction is based on the following ideas prevalent throughout the interviews.

1. The DON places more value on operational experience rather than education, which is evident throughout the culture of the Education system. The current system does not affirm that there is a return on investment in education.

   "The operationalizing self-narrative of the Navy devalues the importance of education. The rise of the communities as the be all/end all of professionalism changed our attitudes and actions on education—95% of the future value of each officer is determined by how they performed in their community. Education has very little to do with how we value them. Community status dominates your profession, and edges out education opportunities because there is no return on investment for it, at least for the community."

   "The Navy mistakes education for training 99 times out of 100. Communities do not value education in career paths. Training equals readiness in the Navy's calculus, not education."

   "Government shutdowns—tell Faculty to go home. Demonstrates again our low value for education."

   "The bottom line is that the Navy does not value education. Manning drives education."

   "Must change the tribal mentality of the Navy that education is somehow damaging to careers and our future."

   "In the Navy much more than the other Services, there is a culture that disdains in-residence schooling. But it is needed. I am now writing a more recent history of the Navy and examining the way Naval officers are not able to compete in the Joint environment. We just don't understand or care to understand how we would fight Jointly, or to learn Joint war planning, nomenclature, and procedures."

2. Education is not prioritized. It is not evident how education fits into the career of the individual and their advancement.

   "Right now education is an afterthought."

   "Formal education does not seem to be a priority along a career path."

3. The culture is rigid and not willing to be change.

   "You are studying a system that is designed not to change: Alumni Associations, Professional Societies, Platform Communities"

   "Navy culture is deeply ingrained"

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Appendix C-5: Word Frequency Analysis

1 | Curriculum & Faculty

A word count of the interview content labeled under "Recommendation/ Curriculum & Faculty" has shown that timing and goal-orientation of the curriculum are essential for the greatest success of the student. The curriculum should be more thought out, as it needs more specificity, focus, and reasoning in its intention. The curriculum should also be more hands-on, integrating methods such as research, practice of theory, and oral examinations. This deduction is based on the following ideas prevalent throughout the interviews.

1. A ladder structure or compartmentalization should be created within the curriculum so that the students' education is more specifically applicable toward their goals and intended career path.

   "We need to figure out what percentage of our force/curriculum needs to be fully technical, and then build from there the strategy and policy (usually through study of history) curriculum necessary to educate critical thinkers we will need in the future."

   "With regards to technical education she proposed a hierarchical structure: the bottom layer is general technical proficiency of the naval officer corps. This can be done through online degrees, certificate programs, etc. The next layer up is for technical depth—AEDO/EDOs. This can be done through partnerships with top schools and naval officers would participate with actual research projects and formal course work. The top-tier are true masters in a technical field and these are the people we need to send to top schools and use in leadership positions within the organization."

   "Why is in-residence education all or nothing? Why can't we send you to NPS for a while, then next to Stanford, or MIT? Couldn't you imagine a place in the future where NPS provides the defense-related (and if need be, classified space to learn) for students, and then some go to Stanford, say, for graduate level physics? Perhaps ROTC grads with their civilian experience spend more time at NPS, finding better defense applications for their studies, and USNA graduates might benefit more at a civilian school?"

   "The better idea is that for each unique career path, there is a natural point to put graduate education. It would be ideal to place graduate education before the officers reach the point of serving in those staff positions where the skills are needed most. Even if the education is achieved long before its needed, you can pull it back up with a short course, a certificate, or other short augment."

2. The curriculum should introduce critical thinking objectives earlier in the student's education.

   "We need to plant the seeds of strategic thinking early. At USNA and ROTC, make it clear—not all will stay, or aspire to be one of our senior leaders in the service; but don't rule it out."

3. There should be a bigger focus on modern war-fighting philosophies.

   "Need to make tradeoff—less Peloponnesian War and more Modern War."

   "The way we wage way is changing and moral/ethical education and character development needs to change as well."

4. The curriculum should be more hands on. Students should receive more involvement with research and/or there should be more practical teaching.

   "I also think we need to build into our curricula more experience with non-profits and experiential internships with industry, where they are actually doing research."

   "We need to change our mindset: more war gaming, experimentation, less papers."

   "the students need much more hand-on experience in the laboratory"

5. Oral exams could aid in sharpening critical thinking skills within students.

   "I think part of the answer lies in oral exams. Talk to us how you are thinking, strategically…We should expose the ability to go far beyond the tactical – do they really know how to think? How do we pick people who rise above operational excellence? I think we need to be more direct in this. Give them a direct test—show us your stuff—what else did you learn?"

2 | Organization

A word count of the interview content labeled under "Recommendation/ Organization" has shown that changes could be made with respect to administration and funding within the organization. In order for the administration to better govern the organization, the organization should define their goals and needs more clearly. With precisely defined requirements, the governing administrations can better aid the DON's Education system. A defined model will help to lead and guide the system at every level so that the results are not led astray of intentions. Regarding funding, the system could benefit from a Working Capital Fund (WCF), which could help advance research initiatives. This deduction is based on the following ideas prevalent throughout the interviews.

Administration

1. The DON's Education system needs to become more clear on their needs for greater success of the organization.

   "The naval services need to define what the organization needs with respect to education."

2. Leadership should have a presence at every level to enforce the clearly defined Education model while keeping their ultimate goals in mind.

   "On top of whatever Education model is implemented a strong leadership structure must be in place to guide the process."

   "However, more integration needs to occur across all learning endeavors. There is no integration across the Navy. At every level leadership must be modeled—we can improve here at every level."

   "You need leadership to enforce it and care deeply about it."

3. A department or board created specifically for the purpose of overseeing the Education system would be a valuable asset as it could focus its attention on clarifying the necessities, essentials, and goals of the system.

   "So what do we need to reform education? An organizing structure for doing it."

   "The concept of an Office of Naval Education should be considered to define institutional Education requirements, develop a strategy, assess performance, and build a network with civilian institutions."

   "Advanced Education Review Board: This is our (Education institutions) only chance to give voice to what we need."

   "How should we show our value for education? Have a real Selection Board—10 Flag officers in the tank voting on O-5s and O-6s to come to NWC."

4. The defined requirements of the system should include what the ultimate goals of education are for the DON. This may include the types of individuals the DON wants to create by means of the Education system and how selective the system needs to be in order to reach that goal.

   "We need to develop criteria to identify future strategists and accept the fact that the process and education will be 'elitist'."

5. There should be more collaboration between the military and civilians.

   "A new consortium or structured collaboration between civilian and military schools dedicated to the art of war should be constructed."

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"But we could be a place where industries who work for (or want to work for) DoD pool their resources to work on active offense in cyber—a model that is industry-funded, but NPS operated. We would engage with industry, and they would send people here to work with us, go to school here. There would be challenges with intellectual property ownership, but in the unclassified domain, all could share equally; or an entity could hold the licensing rights and issue equal ownership. Much like labs for utilities do today. Results are published to and use by all its members."

Funding

1. The Education system could benefit from a Working Capital Fund (WCF) as one solution to the problems with funding.

   "Why can't we have a Working Capital Fund—so we can address the gaps between education and research ourselves? The faculty sees them as intertwined."

   "We need some sense of stability, and a WCF setup might help. In fact right now I'm reading a thesis written by two of our business students on why NPS should be under a WCF."

   "I think some portion of NPS could be a Working Capital Fund (WCF)."

3 | Personnel System & Incentive

A word count of the interview content labeled under "Recommendation/Personnel System & Incentive" has shown that higher quality personnel must be produced. Two methods include (1) placing more attention on the Education requirements for officers so that it is targeted toward creating leaders and (2) employing incentives. Incentivizing personnel will make them feel more valued and encourage them to perform better and feel the desire to educate their selves. This deduction is based on the following ideas prevalent throughout the interviews.

1. Officers and leaders within the DON need to be better trained, which includes a more focused and updated education.

   "We need to improve how we develop enlisted sailors which accounts for generational changes."

   "We have to start at mid-level, successful division officer or company commander for the right stuff, 8-10 year point, then identify and groom them to be strategists."

   "I think we worry too much about precise measures of reutilization for graduate education, especially for the Unrestricted Line Officers (URLs). We need as a general rule a broader ranger of officers to be better educated."

   "We need to teach officers about how to create strategic partnerships, about the need to listen. We can have our own messages, clearly, but if we have no empathy, there is no two-way conversation and therefor no learning."

   "We should do this for civilian schools as well. Then when that officer comes in front of a selection board, they have completed the same career milestone tours, but have the additional advantage of a full-time master's degree. Now education would come to the fore as a tie-breaker, a real advantage."

2. Employing incentives will create higher quality officers. Incentives, such as more freedom, will place more value on personnel and can be used to encourage them to become more educated. Individuals will feel the desire for education if they believe it will prove useful in helping them reach their career goals. Incentives can also create self-learners.

   "Readiness is not about officers, it's about the Sailors. Somehow we have to make their lives better."

   "This could be addressed by increasing options, reducing the need to move so much during a career. This is especially true for Junior Officers and our fast-moving Non-Commissioned Officers (Enlisted)."

   "In the end, however, the Navy needs to value people they send to PG school, instead of not, which has long been the practice and still is today."

   "We need to set conditions such that people are hungry for education, that they believe what they learn will be useful and get them where they and the Navy want them to go."

"Key is career paths—matching opportunity in a career for appropriate education. This incentivizes education on both supply and demand side."

"Maybe we could scale our development of them (self-learners), but what's the incentive? I think if we can provide incentives, the Millennials especially will go out and get that education on their own."

4 | Culture

A word count of the interview content labeled under "Recommendation/Culture" has highlighted the importance of the culture surrounding the DON's Education system and the impact it has. The culture needs to change to encourage Navy personnel to view education as a lifelong pursuit and should emphasize the benefits that education can have throughout each individual's career. The culture will reflect the curriculum, so changing the curriculum is one way to change the culture. This deduction is based on the following ideas prevalent throughout the interviews.

1. The culture should be instilled with higher value of education. Education should be viewed as a lifelong pursuit.

   "Before any changes take place the culture must become more accepting of education."

   "Today's complexity demands something else—an appreciation for education and the culture of learning."

   "How do we unlock them from such an operationalized mindset? Perhaps if we had a culture of learning, these students might have arrived with a different mindset."

   "Our goal for the Naval Learning Continuum should be that an officer or enlisted person is never 'not' in education."

   "Should plow ground CNO is creating, trying to make the Navy a Learning Organization: "guided learning" throughout a career."

   "So the real question is not how education can be more relevant to the Navy, but how the Navy can better value education."

2. Greater value of education will increase the quality of Navy personnel and can be equated to improvement.

   "It should be part of our culture to educate and learn at the very top—are we sending our best to NPS and NWC? Need a cultural shift at NPS, make it more relevant to DON …NWC is different (more relevant), but if we aren't sending our best and brightest to learn and to teach there, we are limiting the potential of education for our institution."

   "A Culture of Improvement must be the first priority—to imbue in successive generations the ability to receive and capture different ideas, a cultural transmission of learning."

3. Part of changing the culture to value education more, requires changing how students learn, which ties back to "Recommendation 1: Curriculum & Faculty." Changing the curriculum will change the culture.

   "They should be set up so they can fail—to break through the psychological barrier of failure as a mode of learning."

   "Humility is about realizing that education is just as hard as anything else we do professionally, and if not then we are wrong."

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Appendix C-6: Sample USNI *Proceedings* Articles

Abdullah, Joseph, LT, USN. "Professional Notes." Proceedings Magazine. October 2013: 328. Print.

Armstrong, Benjamin, LT. "Nobody Asked Me, But…Fix Navy PME!" Proceedings Magazine. July 2012: 313. Print.

Armstrong, Benjamin, LT. "Nobody Asked Me, But…Who Needs Warfighting Secrets from the Boardroom?" Proceedings Magazine. September 2007: 255. Print.

Bray, William, Capt. USN. "The Well-Educated Officer." Proceedings Magazine. January 2016: 355. Print.

Butler, Mark, Command Master Chief Petty Officer, USN (Ret.). "Use the Naval Academy to Educate Sailors, Too." Proceedings Magazine. February 2007: 248. Print.

Calvert, James, VADM (Ret.). "U.S. Naval Academy Is Balanced." Proceedings Magazine. October 2003: 208. Print.

Chiacchia, Benjamin, Midshipman Second Class, USN. "Rethink NROTC for a Changing World." Proceedings Magazine. September 2018: 387. Print.

Cohen, Steve. "The Academy Could Learn a Thing or Two from the Ivies." Proceedings Magazine. July 1999: 157. Print.

Cowen, J., Lingenfelter, M. "Educating Kids Is a Readiness Issue." Proceedings Magazine. October 2017: 376. Print.

DeBuse, Mark, LT. "U.S. Naval Academy Is Not Just for Midshipmen." Proceedings Magazine. September 2003: 207. Print.

Drew, Anne-Marie. "The Midshipmen Weigh In: Does The Naval Academy still have value?" Proceedings Magazine. May 2018: 383. Print.

Edson, Douglas, LCDR. "Navy Shortchanges Professional Education." Proceedings Magazine. May 2002: 191. Print.

Ellison, David, RADM. "Naval Postgraduate School Is in Sync with Fleet." Proceedings Magazine. January 2001: 175. Print.

Ellison, David, RADM. "The Navy Has Its Own Corporate University." Proceedings Magazine. September 2001: 183. Print.

Evans, Michael. "History of Arms Is the Difference." Proceedings Magazine. May 1998: 143. Print.

Fleming, Bruce. "Nobody Asked Me, But…The Academy Can Do Better." Proceedings Magazine. February 2005: 224. Print.

Fowler, Jeffery. "Naval Academy…A Crucible for Warrior." Proceedings Magazine. October 2007: 256. Print.

Flynn, Karl, 2ndLt. "Professional Reading Builds Better Leaders." Proceedings Magazine. June 2018: 384. Print.

Graham, Janice, LCDR, USN (Ret.). "Rethinking the Naval Postgraduate School." Proceedings Magazine. July 2000: 169. Print.

Hanley, Brian, Lt Col, USAF. "Time for a First-Rate Joint Staff College." Proceedings Magazine. December 2006: 246. Print.

Hilger, Ryan, LT, USN. "Better Education Makes Better Officers." Proceedings Magazine. February 2013: 320. Print.

Holwitt, Joel, Lieutenant Commander, USN. "Nobody Asked Me, But. . . - Humanities or STEM? It's a False Choice." Proceedings Magazine. July 2014: 337. Print.

Kime, Steve. "Education Is for Enlisted People, Too." Proceedings Magazine. August 2004: 218. Print.

Kuehn, John, CDR. "Nobody Asked Me, But…Does the Navy Value Joint Education?" Proceedings Magazine. October 2012: 316. Print.

Long, Peter. "Educating the Navy for the Long Haul." Proceedings Magazine. January 1999: 151. Print.

Mahnken, Thomas. "Sailing Through the 'Fog of Peace'." Proceedings Magazine. February 2012: 308. Print.

Mauz Jr, H., Admiral, USN (Ret.), Gates, W. "The Naval Postgraduate School-It's About Value." Proceedings Magazine. August 2000: 170. Print.

McCord, Brendon, ENS. "Professional Notes." Proceedings Magazine. May 2010: 287. Print.

Michel, Christopher. "Charting Your Course: The Education Gap: Benchmarking Education Levels in the Army and Navy." Proceedings Magazine. June 2005: 228. Print.

Miller, John, Col, USMC (Ret.). "Nobody Asked Me, But Don't Cut Military Education." Proceedings Magazine. April 2005: 126. Print.

Mortimer, Anthony, LT. "Reading for Readiness." Proceedings Magazine. January 2006: 235. Print.

Murphy, Jim, Senior Chief, USN (Ret.). "Expand Education for Sailors." Proceedings Magazine. February 2003: 200. Print.

Murphy, Jim, Senior Chief, USN (Ret.). "From the Deckplates - Enlisted Training Should Also Be Education." Proceedings Magazine. December 2014: 342. Print.

Murphy, Jim, Senior Chief, USN (Ret.). "We Don't Need Another Academy." Proceedings Magazine. February 2007: 248. Print.

Murphy, Jim, Senior Chief, USN (Ret.). "Nobody Asked Me, But... Let's Create a Navy and Marine Corps College." Proceedings Magazine. April 2009: 274. Print.

Nelson, Christopher, LCDR. "Nobody Asked Me, But…We Need More Than a Reading List." Proceedings Magazine. March 2013: 321. Print.

Orozco, Valerie, PO2. "Deckplates: The Educated Sailor Is an Investment." Proceedings Magazine. May 2018: 383. Print.

Pallotta, Maria, Col., USMCR. "Professional Notes-Cross Cultural Competency Education at the U.S. Naval Academy." Proceedings Magazine. July 2017: 373. Print.

Park, William, Capt. "Nobody Asked Me But…Military Education is a Real Deal." Proceedings Magazine. February 2010: 284. Print.

Phillips, Kyle, LtCol. "Enlisted Education Must Be More Than Training." Proceedings Magazine. January 2018: 379. Print.

Rielage, Dale, Capt. USN. "War Gaming Must Get Red Right." Proceedings Magazine. January 2017: 367. Print.

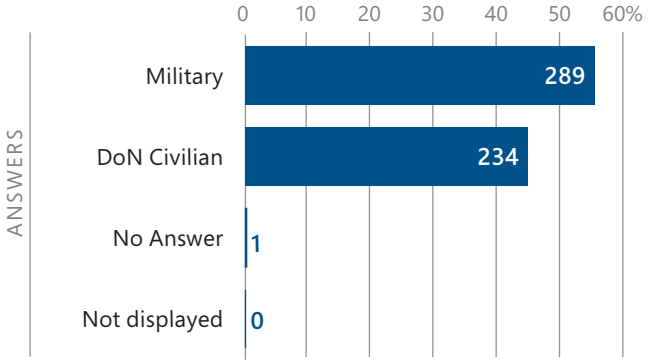
Rutledge, Joseph, Col, USMC. "Professional Notes." Proceedings Magazine. January 2012: 307. Print.

Appendix C-7: E4S Survey 1

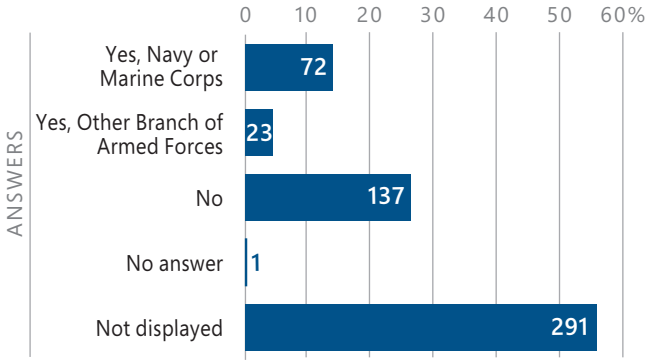
Results | Faculty Survey 682471

Number of records in this query: 524.
Total records in survey: 524.
Percentage of total: 100%.

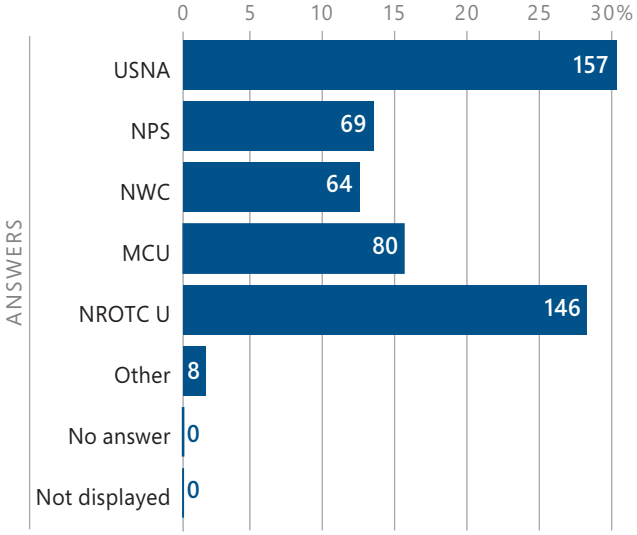
Question 1 | Which of the following best describes you?



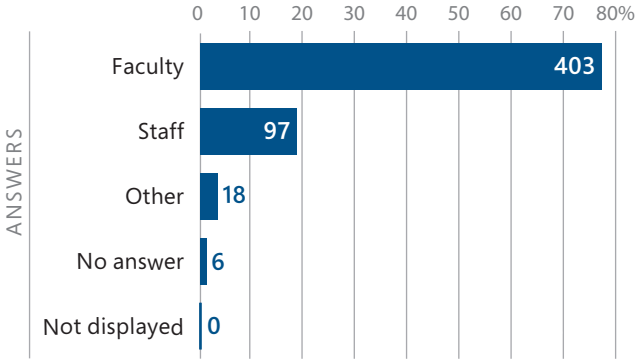
Question 2 | Have you ever served in the U.S. military?



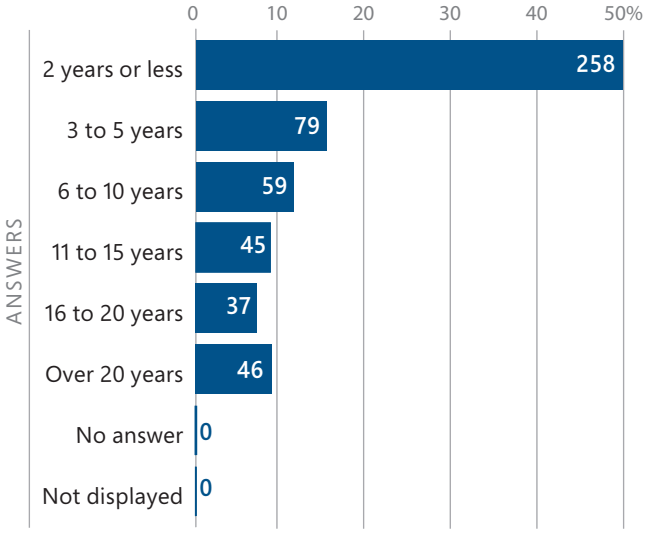
Question 3 | Where do you work?



Question 4 | Which of the following best describes your current position?



Question 5 | How long have you been in your current position?



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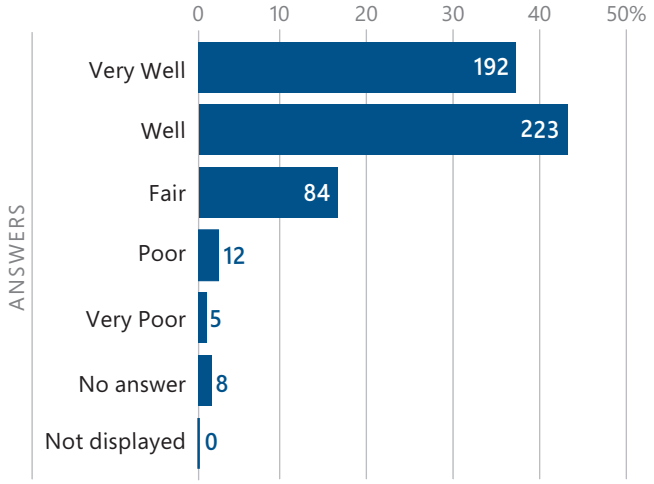
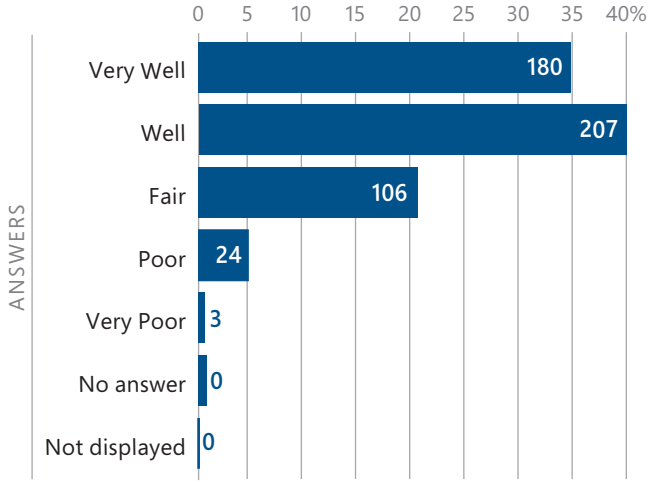
Question 6-1

How well does your institution prepare Naval Officers to ... [Be an effective Navy leader?]



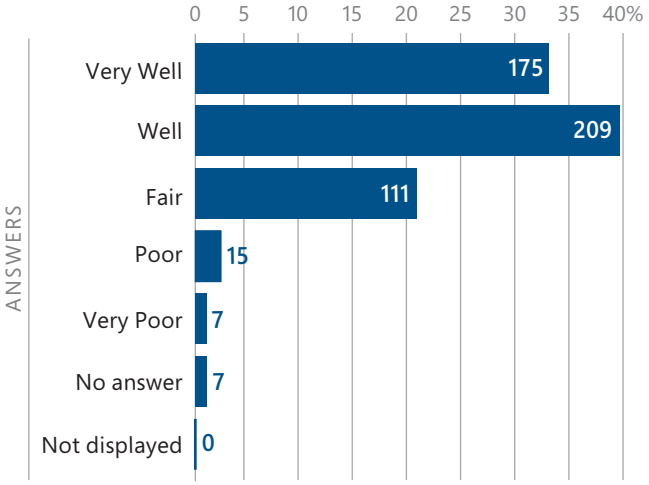
Question 6-3

How well does your institution prepare Naval Officers to ... [Apply their education to real world situations?]



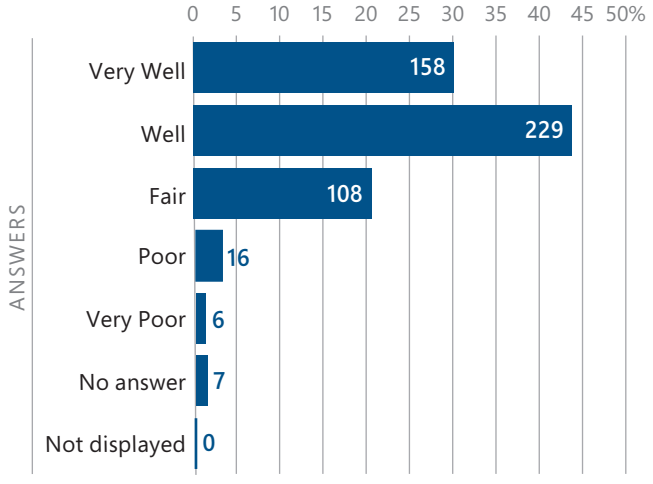
Question 6-2

How well does your institution prepare Naval Officers to ... [Excel in their fields of study?]



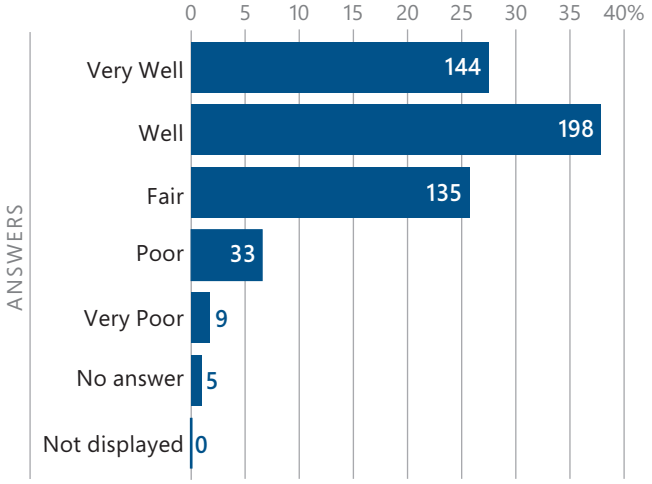
Question 6-4

How well does your institution prepare Naval Officers to ... [Establish and manage effective teams?]



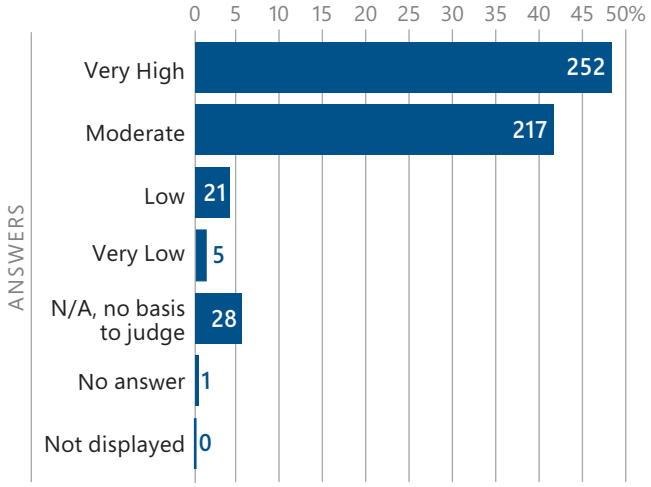
Question 6-5

How well does your institution prepare Naval Officers to ... [Understand critical strategic issues?]



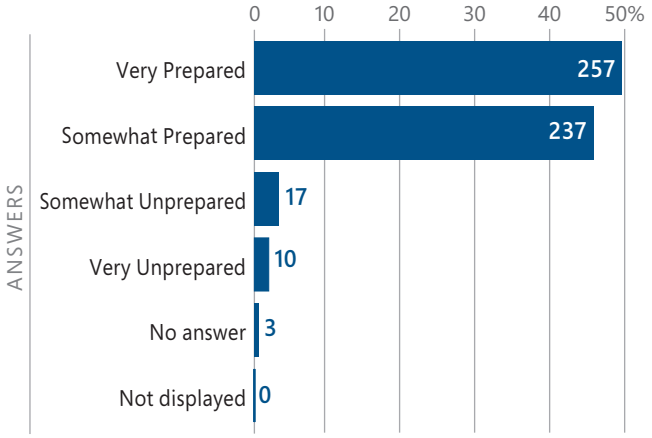
Question 8

How would you evaluatye the overall level of interest of students in your program over the past 12 months?



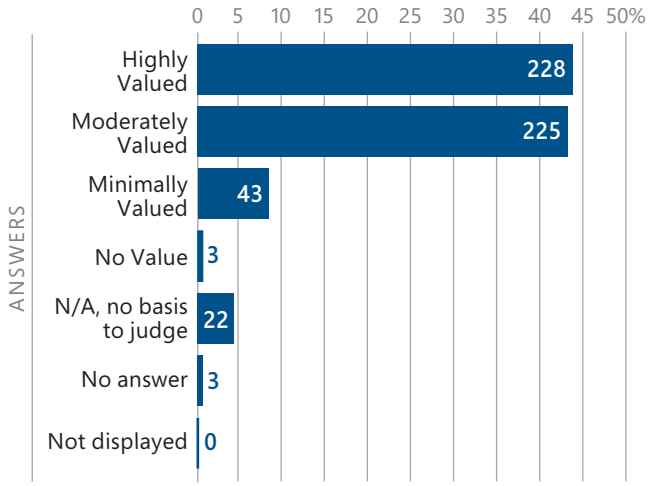
Question 7

In general, how prepared are officers in their field of study when they leave your program?



Question 9

What value do naval students place on the education they are recieving at your institution?



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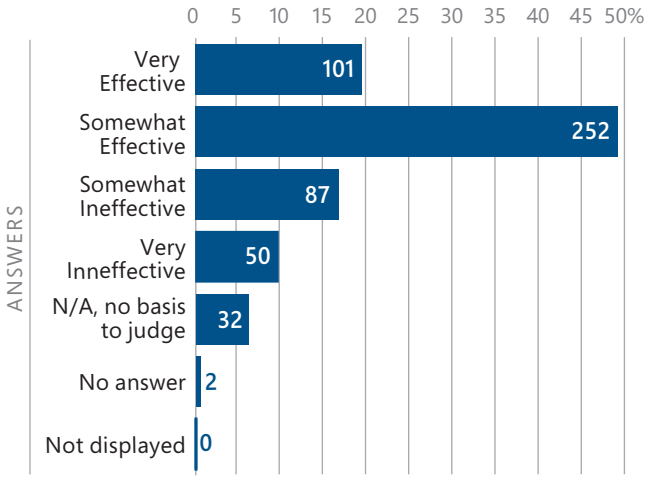
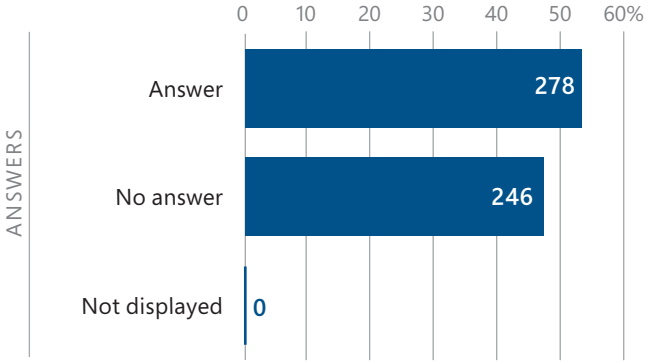
Question 10

How effective or ineffective is the naval education enterprise at adapting to changes in the external environment?



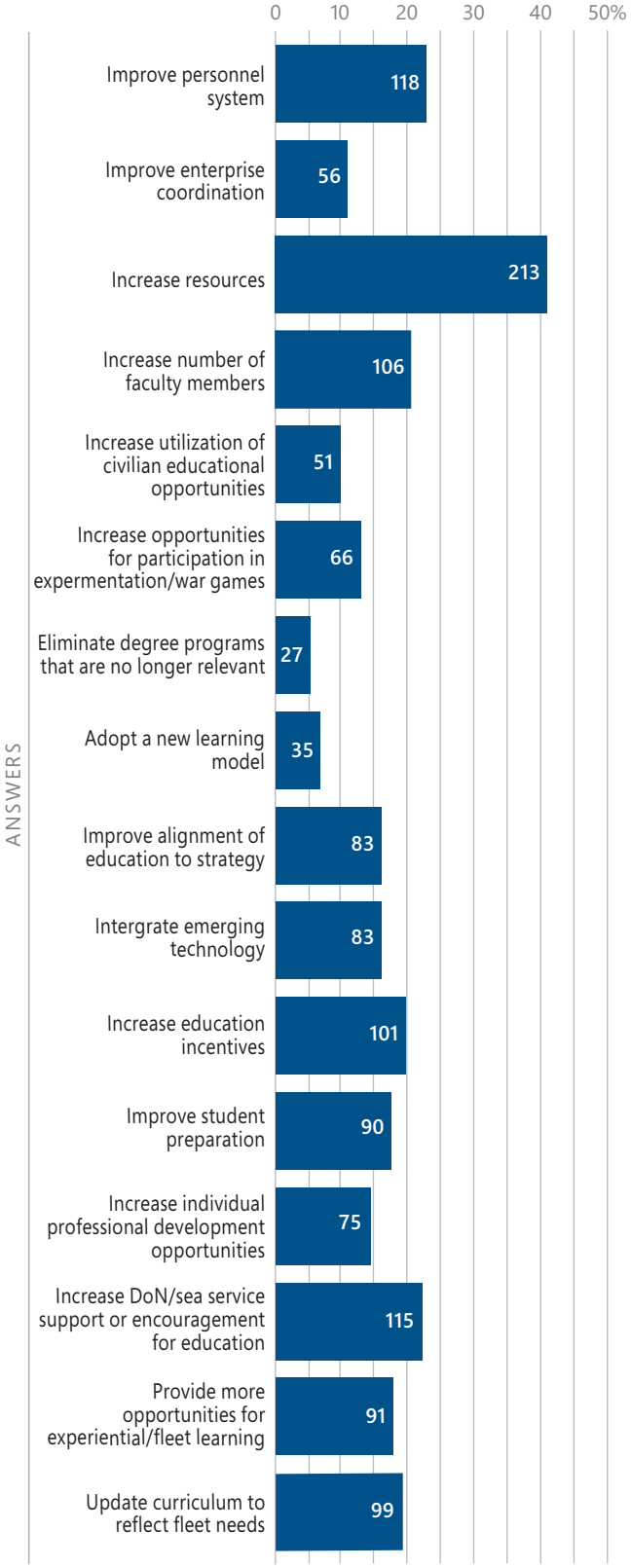
Question 12

Please use the space provided below to expand on how to improve naval education.



Question 11

How do educational factors need to change most critically to improve the naval education enterprise?

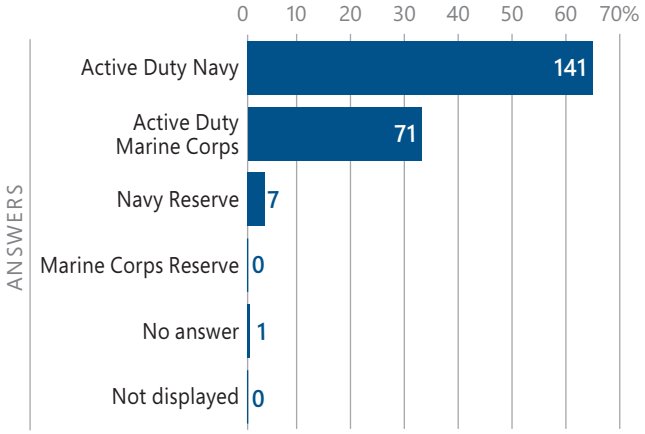


Appendix C-7: E4S Survey 2

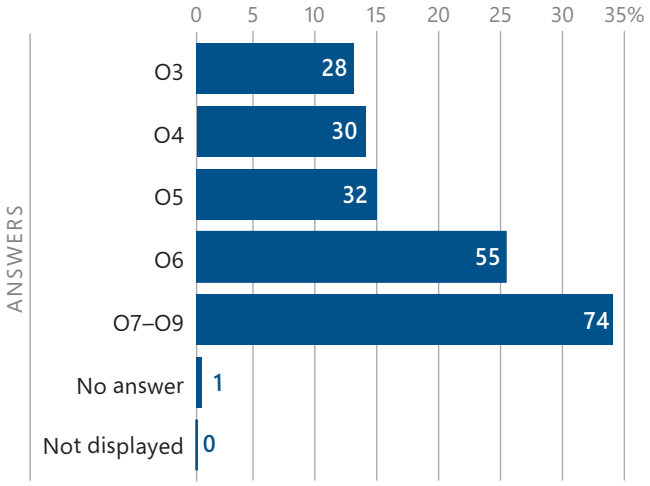
Results | Navy and Marine Corps Survey 737112

Number of records in this query: 220.
Total records in survey: 220.
Percentage of total: 100%.

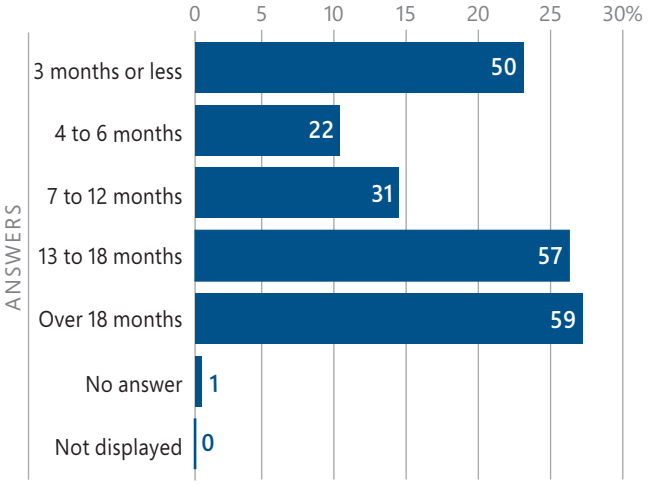
Question 1 | Which of the following describes you?



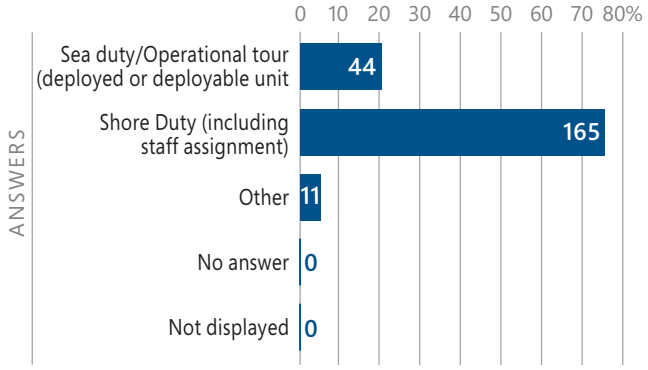
Question 2 | What is your current grade?



Question 3 | How long have you been in your current position?



Question 4 | Which of the following best reflects your current duty assignment?



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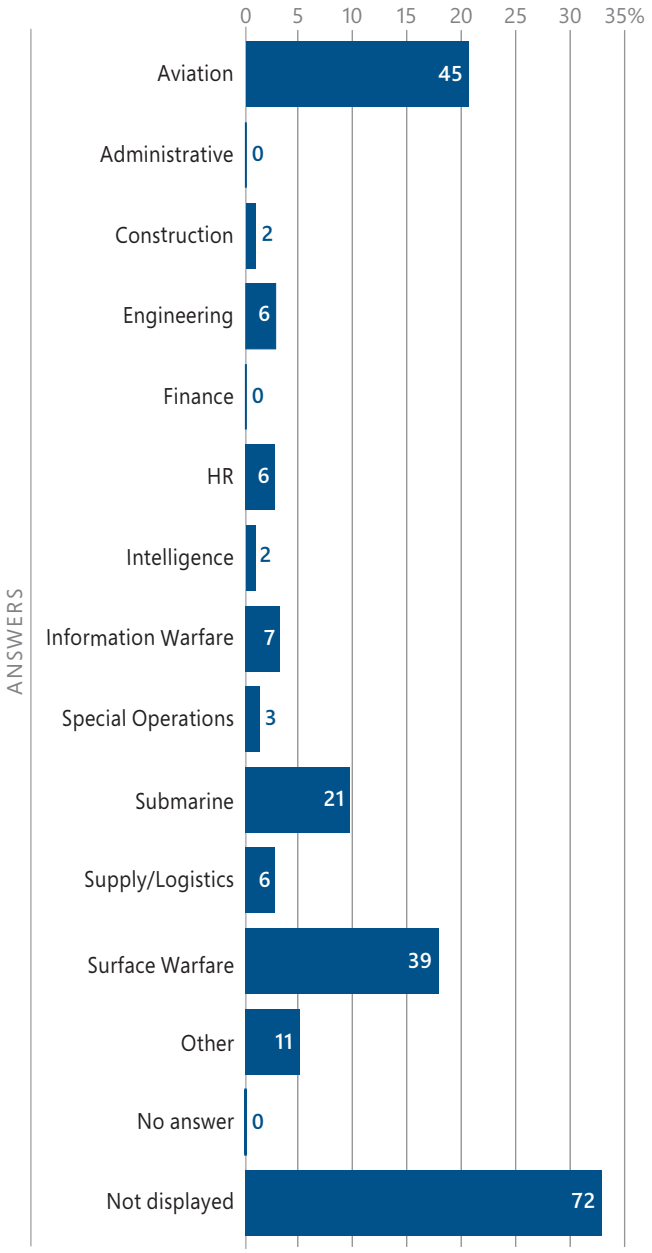
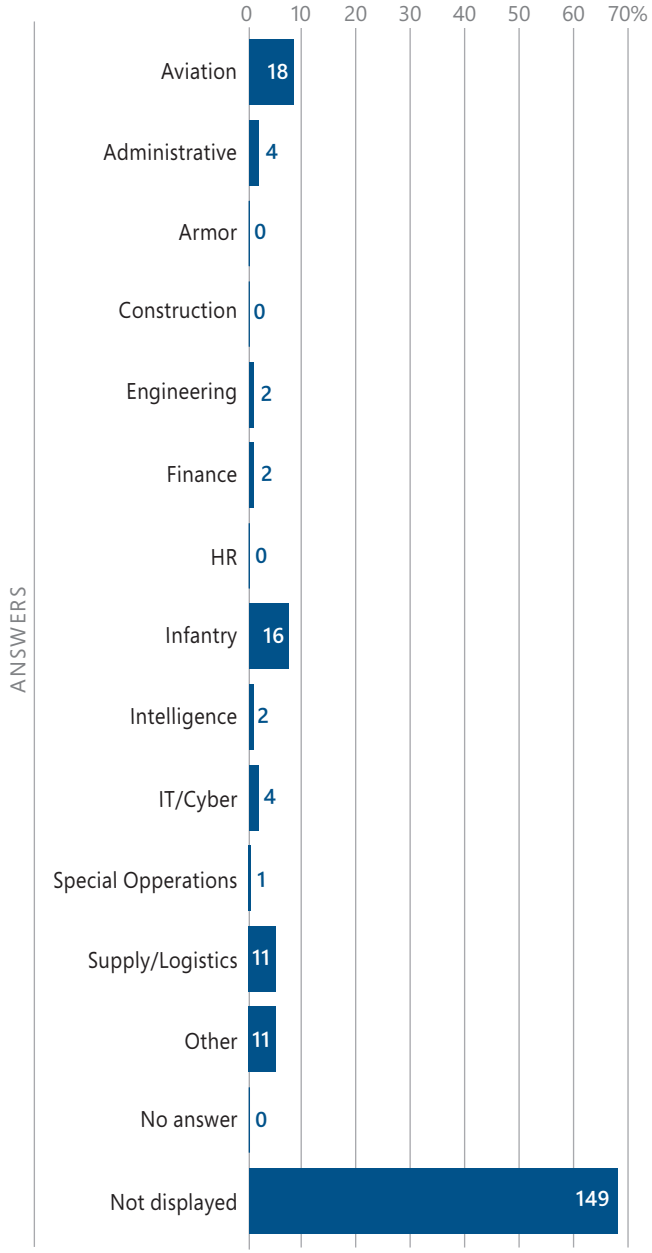
Question 5

Please select your current community from the following list.



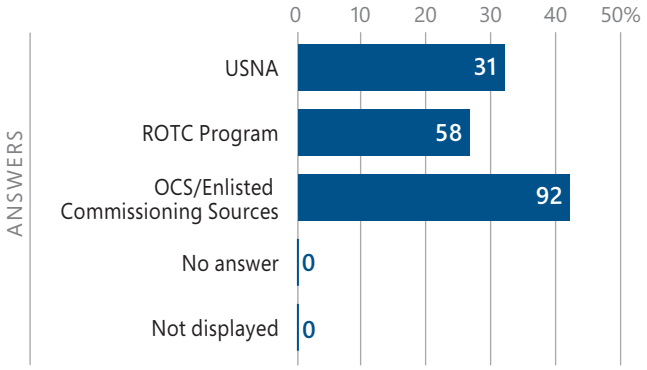
Question 6

Please select your current community from the following list.



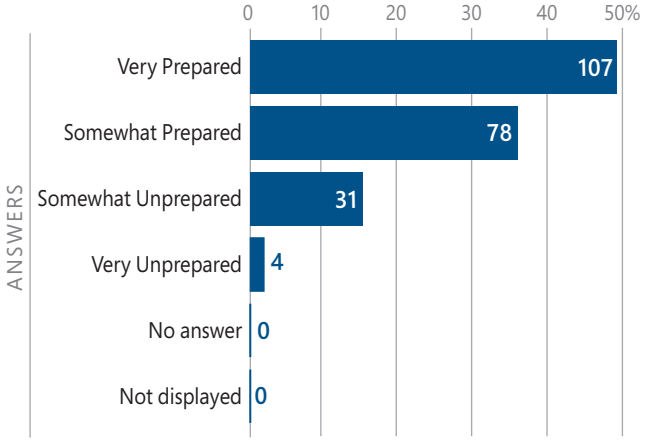
Question 7

Which of the following best reflects your commissioning source?



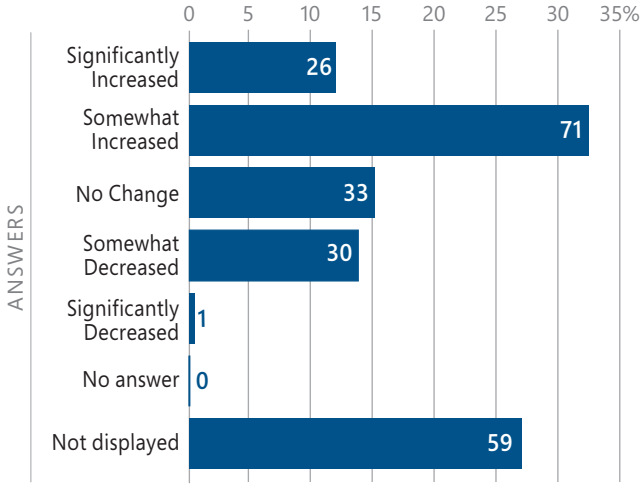
Question 8

In general, how prepared were you for success in the fleet after completing your initial officer accession training and education?



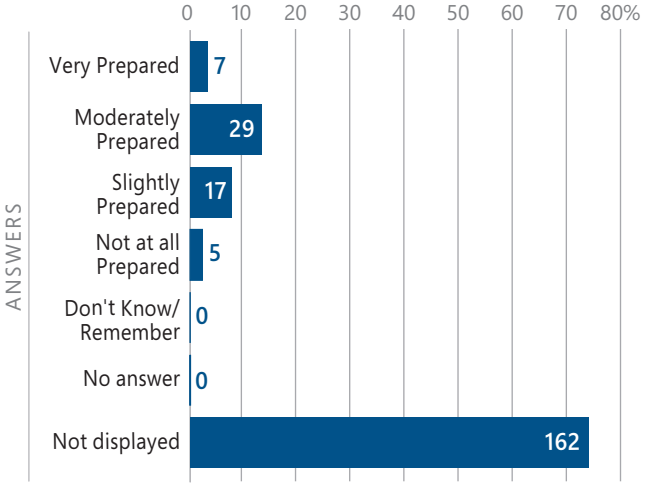
Question 9

Based on your observations, how have the critical thinking skills of junior/company grade officers changed over time?



Question 10–1

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Be and effective Navy leader?]



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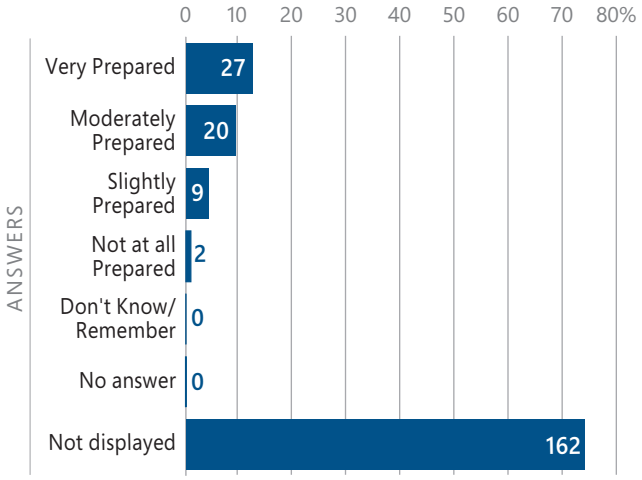
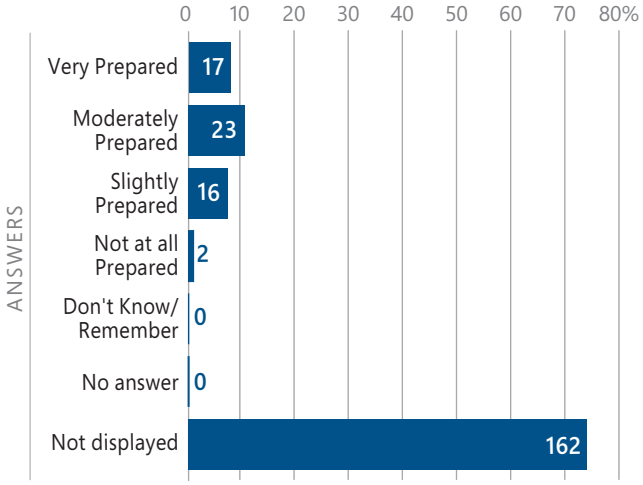
Question 10–2

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Work with personnel from diverse backgrounds?]



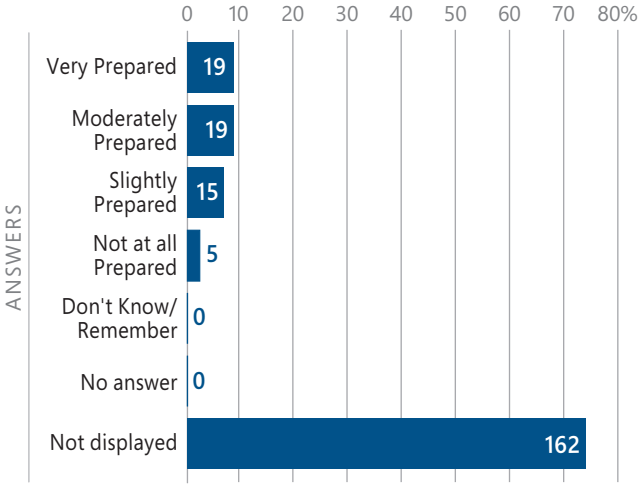
Question 10–3

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Think critically in demanding situations?]



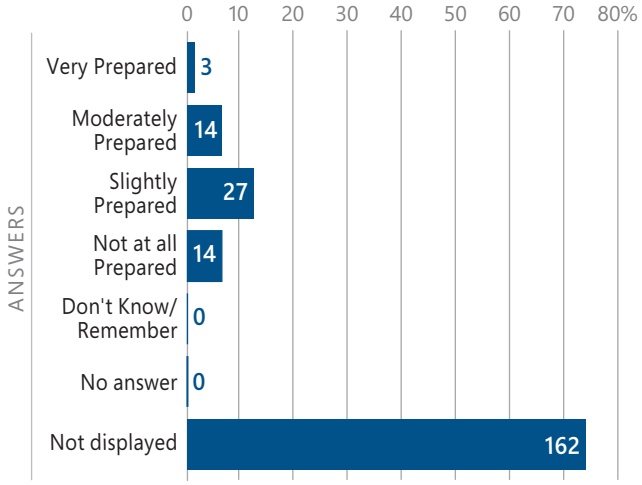
Question 10–4

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Deal effectively with operational stress?]



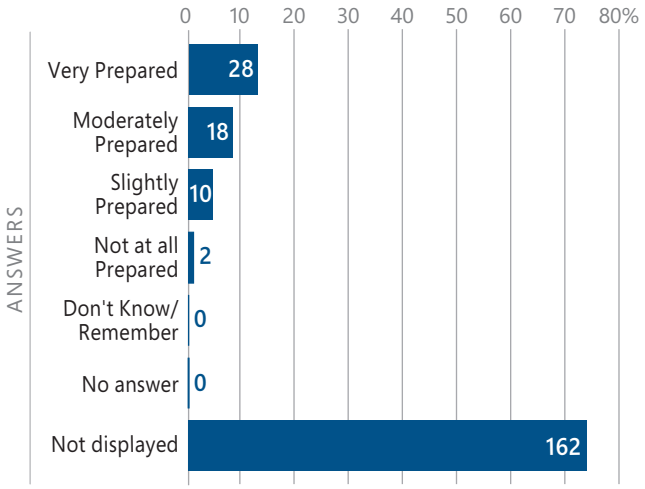
Question 10–5

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Understand critical strategic issues?]



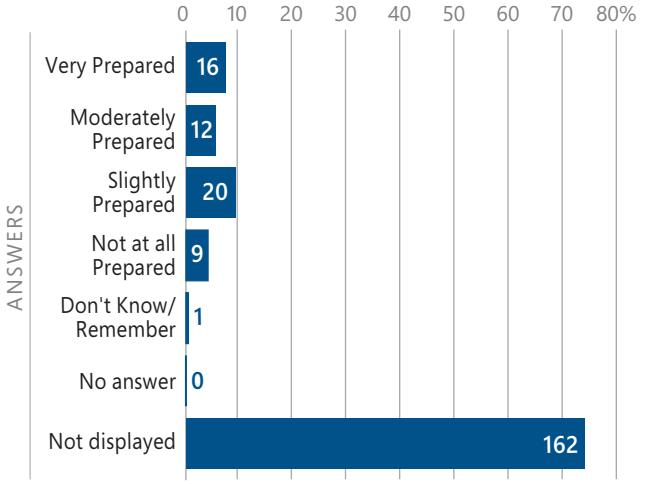
Question 10–6

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Apply ethical principles to everyday activities?]



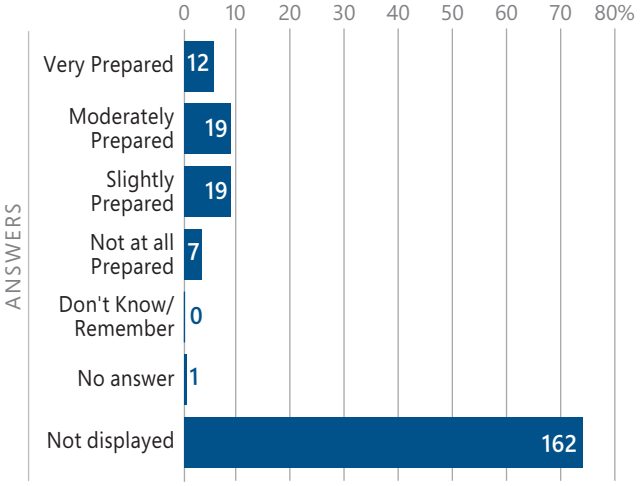
Question 10–7

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Think creatively/ innovatively?]



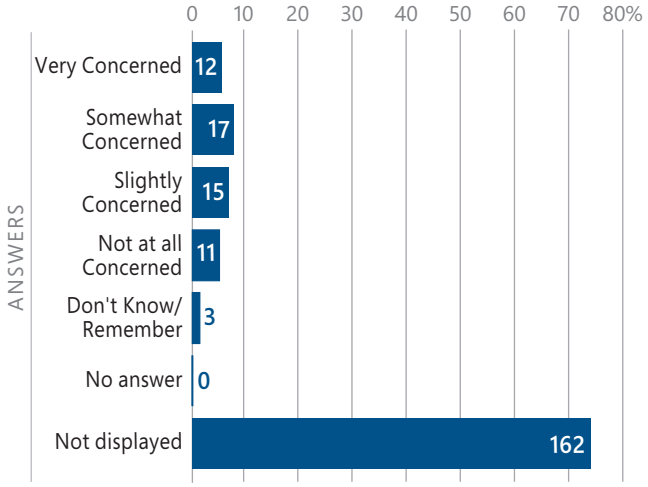
Question 10–8

After completing your initial entry education/training (OCS, ROTC Program, USNA), how prepared were you to: [Understand technical material?]



Question 11

At you first operational command, how concernned was your leadership with your professional development?



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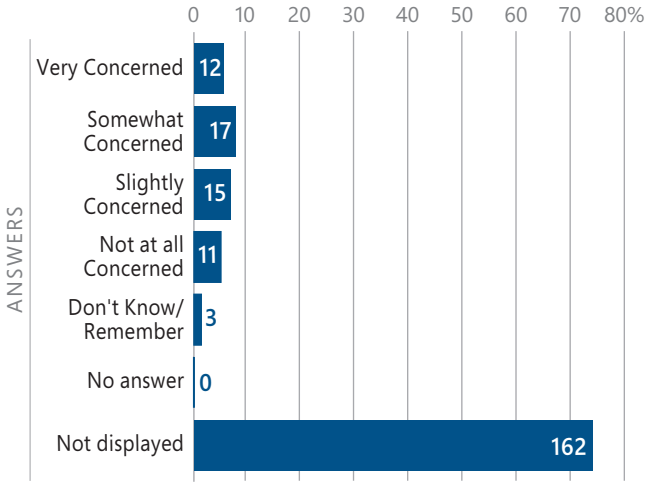
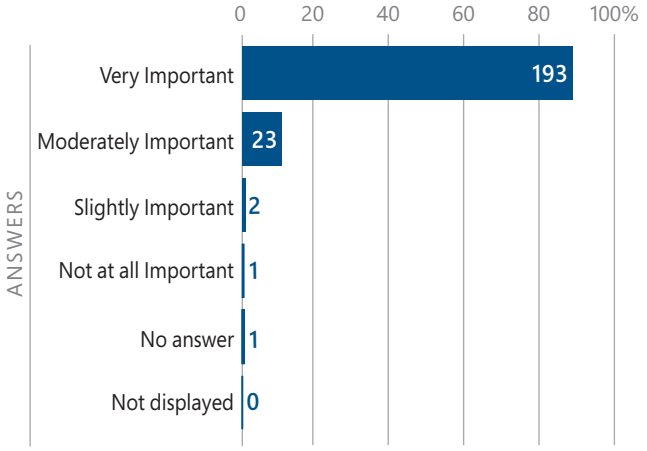
Question 12

How effectively does your current command utilize your training, knowledge, and expertise?



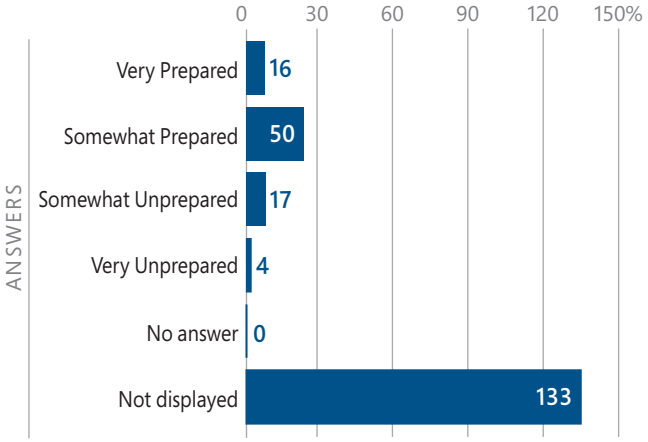
Question 13

Based on your experience, how important is continous learning to a successful career in the Navy/Marine Corps?



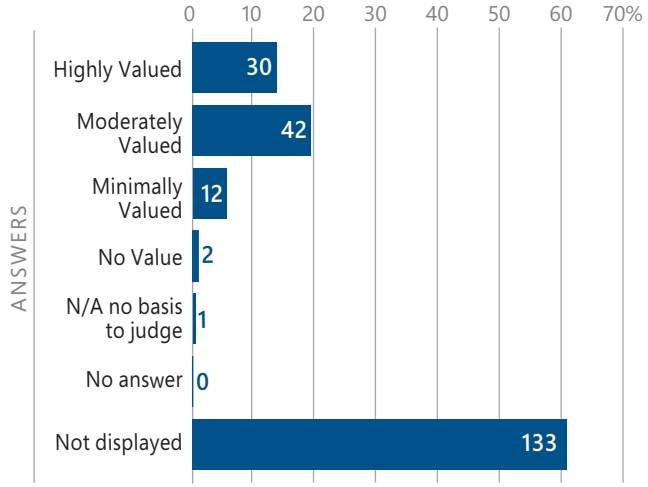
Question 14

In general, how prepared are junior/ company grade officers to perform successfuly when they arrive at their first operational command?



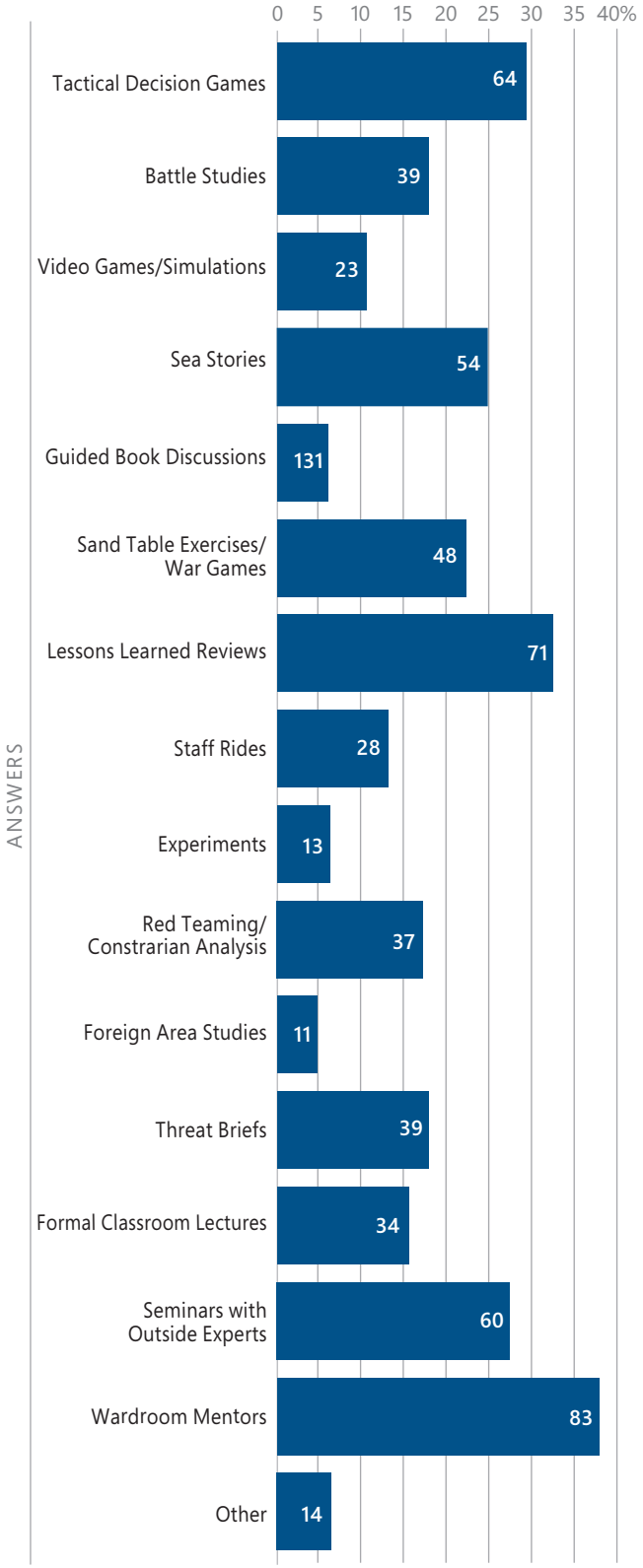
Question 15

In your opinion, how much do junior/ company grade officers value opportunities for continuing education?



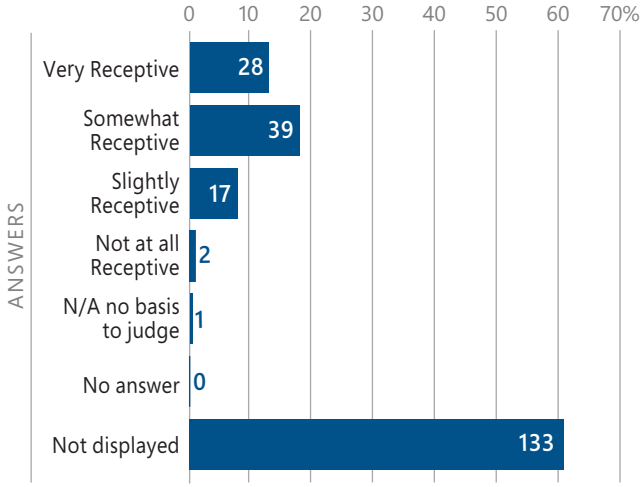
Question 16

What methods have worked best to facilitate learning within the commands to which you have been assigned?



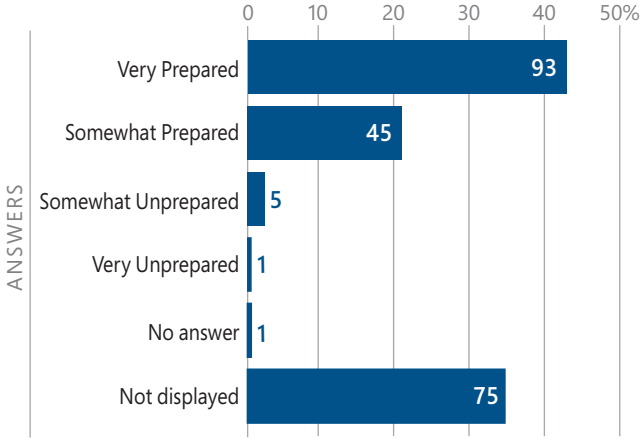
Question 17

In general, how receptive are junior/company grade officers to participating in learning opportunities while assigned to operational units/commands?



Question 18

How prepared are you to train, mentor, and educate new junior/company grade officers reporting to your command?



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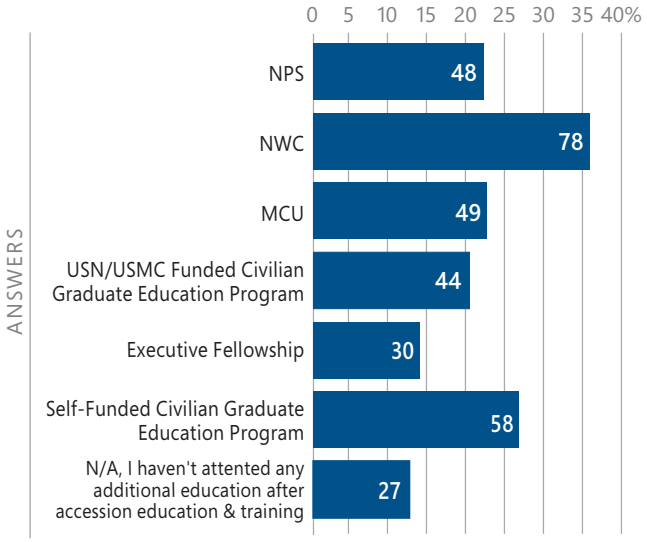
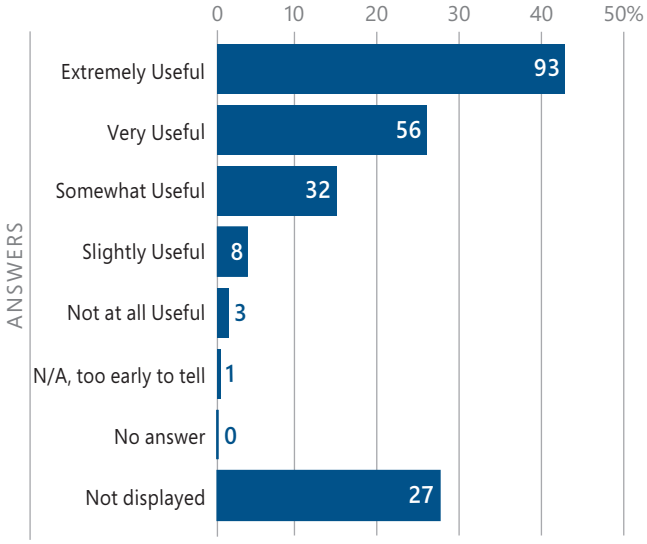
Question 19

Have you attended any of the following?



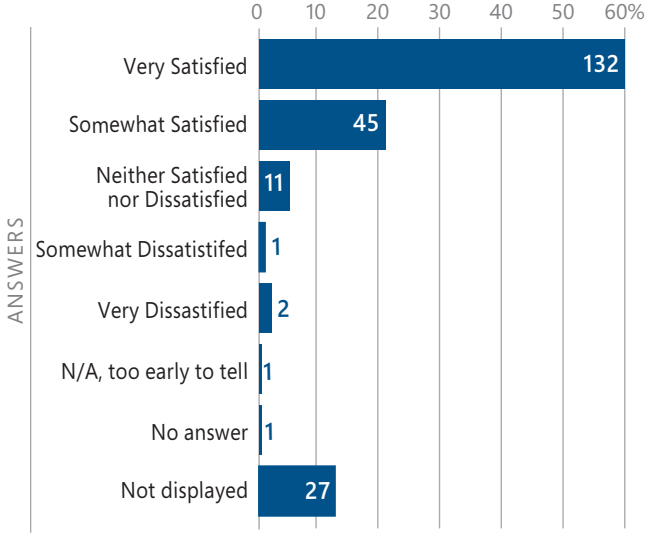
Question 20

How useful has your formal education been to you in your naval career?



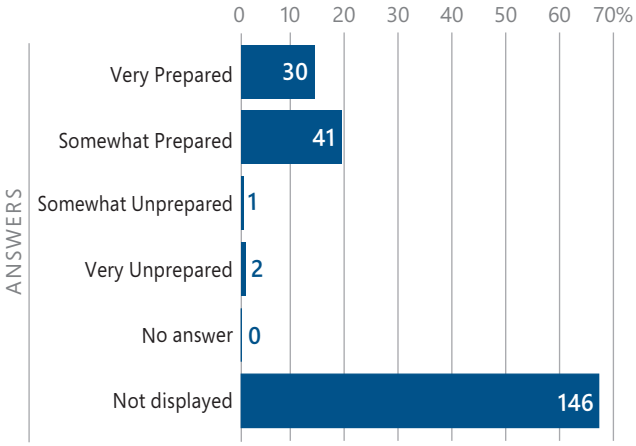
Question 21

How satisfied are you with the quality of the education provided in the programs you attended?



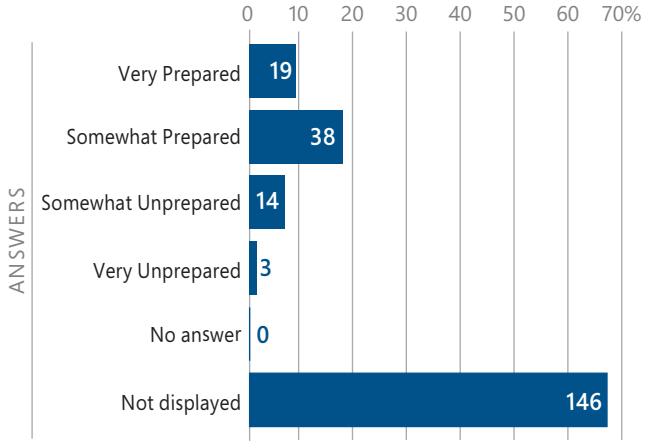
Question 22

Based on your observations as flag or general officer, how well does the naval education enterprise prepare officers for operational assignments?



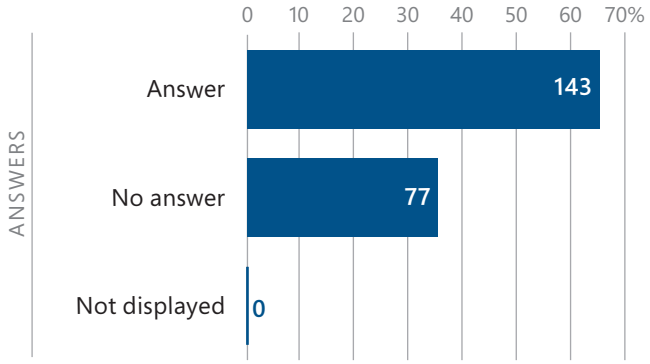
Question 23

Based on your observations as flag or general officer, how well does the naval education enterprise prepare officers for staff assignments?



Question 24

Please use the space provided below to explain how you would improve naval education.



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Appendix C-8: Overlapping Survey Codes

The table below lists the seven most common overlap of codes discovered throughout the survey responses. By analyzing the comments which fall between multiple categories, the following themes have been elicited.

1 | Recommendation/Curriculum & Faculty

Recommendation/Personnel System & Incentives—32 Counts

- The curriculum should align with the career paths of the Navy personnel. This includes adding more hands-on learning to the curriculum.
- An alignment of education and career will incentivize Navy personnel to become educated and take their education seriously as it will directly influence their career.
- Exposure to senior Navy Personnel and option of mentors, while students are undergoing their education would aid in the learning process and would enable deeper absorption of knowledge learned.
- Education needs to fit into the career path of the Navy personnel. There needs to be time allowed for education. In many cases education is seen as a hiatus in career progression rather than an enhancement to.
- Increase student enrollment. This allows more exclusive electives to be offered and can increase the amount and quality of research being conducted which will, in turn, keep the curriculum up to date.
- More officers should serve as faculty, and serving as faculty should not injure their career progression.

2 | Recommendation/Curriculum & Faculty

Recommendation/Organization—31 Counts

- The Education enterprise should update and clarify their mission, vision statement, and goals. If those are clear, then the rest of the organization (curriculum, faculty, allocation of funding, culture, etc) can more easily be aligned to the enterprise's needs. Curriculum, faculty, etc will represent the organization's mission.
- Clarifying the organization's goals will also allow civilian faculty to better understand the needs from education for military students. On the same note, civilian faculty should be given more opportunities to interact with the fleet.
- The DON's Education organization should be allowed more funding in order to hire the top candidates for faculty.

Code	# of Overlaps	Code
Recommendation | Curriculum & Faculty	39	Recommendation | Personnel System & Incentives
Recommendation | Curriculum & Faculty	31	Recommendation | Organization
Problem | Curriculum & Faculty	20	Problem | Organization
Problem | Curriculum & Faculty	18	Problem | Personnel System & Incentives
Recommendation | Culture	17	Recommendation | Personnel System & Incentives
Recommendation | Organization	14	Recommendation | Personnel System & Incentives
Problem | Personnel System & Incentives	13	Recommendation | Curriculum & Faculty

Table 5

- More funding should be applied toward faculty, including compensation and funding for additional resources and professional development.
- There should be more collaboration amongst the various universities so that resources may be shared.

3 | Problem/Curriculum & Faculty

Problem/Organization—20 Counts

- The organization has expanded at a greater rate than the faculty has. Faculty staff are over-burdened. They are currently taking on a lot of administrative work, which takes time away from teaching and mentoring.
- Faculty staff do not have enough funding for resources and professional development.
- The organization's strategic vision does not appropriately cover education and so the curriculum and the Education programs are straying from the core mission.
- Similarly, there is not enough focus in research and it is not aligned with the organization's mission. This is also causing the organization to not spend funding for research appropriately, discouraging high quality research.

4 | Problem/Curriculum & Faculty

Problem/Personnel System & Incentives—18 Counts

- Although there are Education requirements for Navy personnel, they do not align well with their career paths. Most of the learned knowledge and skills are not used on the job.
- The curriculum is not adequately preparing students to become officers.
- The curriculum is outdated and needs to be updated to teach officers how to think creatively and critically in the face of ambiguity rather than relying on methodical training.
- There are not enough Navy officers serving as faculty. This means that students are not gaining exposure to sought-after naval operation knowledge.
- As for officers who are serving as faculty, many of them are not given the preparation necessary to succeed in that role.

5 | Recommendation/Culture

Recommendation/Personnel System & Incentives—17 Counts

- In order for education to become an essential part of the culture, education should be encouraged and incorporated into the career development paths for Navy personnel. The education should also be focused on the specific requirements for success.
- The culture should promote life-long learning by being valuable for Navy personnel in their career.
- The value for education should be emphasized by leadership, and it should be consistent over a period of years, so that it permeates throughout the organization from the top down.
- The Navy can emphasize their value of education by sending their top performers for further education.
- Navy personnel should be incentivized to pursue self-education, so that they are constantly learning and that it becomes a collective habit. This would constitute a bottom-up approach to creating a cultural shift.
- Navy personnel should be well educated on worldly issues and policy so that they can integrate with civilians as well.

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6 | Recommendation/Organization

Recommendation/Personnel System & Incentives—14 Counts

- There should be organizational measures in place to gauge performance. These measures should aid in student selection decisions to ensure that top performers are permitted for further education.
- The organization's mission, vision statement, and goals should encourage higher education for Navy personnel. This includes allowing time to be taken for education throughout the career path.
- There should be interaction between students of various schools. This will encourage broader thinking and open-mindedness.
- There should be an increase in mentorship opportunities and/or programs available for students. This will allow them to gain "real world" knowledge while studying, which will bridge the gap between education and career.

7 | Problem/Personnel System & Incentives

Recommendation/Curriculum & Faculty— 13 Counts

- The curriculum should be tailored for specific Navy career needs, not which ever is easiest to obtain. Consequently, Navy personnel will receive more out of education and hold it in greater esteem.
- A stronger and more directed curriculum will better prepare students for careers as officers.
- There should be a greater Navy presence at the schools, including faculty and students.
- Teaching is negatively viewed as a hiatus in career. More Navy personnel should be granted the opportunity to teach and it should be viewed favorably for one's career and for the betterment of the Education system.

Appendix D: UNSECNAV E4S Memo – Scope & RFI

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THE UNDER SECRETARY OF THE NAVY
WASHINGTON DC 20350-1000

MEMORANDUM FOR DISTRIBUTION

To: Superintendent, United States Naval Academy
President, Naval War College
President, Marine Corps University
President, Naval Postgraduate School
Commander, Naval Service Training Command (ROTC)

Subj: EDUCATION FOR SEAPOWER (E4S) SCOPE AND REQUESTED INFORMATION

REF (A): UNSECNAV MEMORANDUM DTD 19 APR 2018

1. As you know, the Secretary of the Navy and I have initiated a review of all phases of naval education. Our purpose is to assess and, where necessary, to strengthen the impact of naval education in enhancing American seapower and therefore the security and well-being of our nation. Reference (a) announces and frames the imperative for this study, while setting the requirement for instilling and integrating a culture of continuous learning throughout our naval services.

2. This study requires a critical self-analysis and assessment of your institution to determine how well it meets the knowledge and learning standards that are set for your graduates, as well as an evaluation of the relevance and applicability of these standards in order to determine if change is needed. It also requires your candid insights and recommendations for improving not only your institution, but the entire educational enterprise -- and how your institution is linked to career paths and our larger warfighting mission. Your responses will be included in the E4S Final Report as written, without editing.

3. Further, this review will examine naval education to determine strengths, weaknesses, gaps and most importantly actions to improve this vital component of the naval services, and to set the course for a future in which a culture of continuous learning must become a greater and more permanent part of the naval ethos. In addition to your responses, this review will also examine best practices in education across the other U.S. services and where appropriate for foreign militaries; civilian academic and research institutions; and the private sector.

4. Two sets of questions follow for each institution to consider and to respond. The first applies to all. The second applies to specific institutions. I request that each of you address these questions in writing, and be prepared to meet with the Executive Board during two planned sessions this summer, July 13 and August 10, 2018, at the National Defense University at Fort Leslie J. McNair, Washington, D.C. Please identify a point of contact to liaise with my Study Director, Steve Deal, CAPT(Ret), USN, per my previous email and

reference (a).

5. The E4S Executive Board will likely have further questions, either initial or follow-up, that will hold the same weight as those expressed in this Memorandum. As always, I stand ready to discuss your views, and look forward to listening and learning from each of you.

General Questions:

What are the roles and responsibilities of your educational institution, and how do they contribute to establishing a permanent process of continuous learning?

What is your vision regarding the future role of your educational institution?

How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?

How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?

In your critical view, how well do you prepare your students for future assignments?

Based on your mission statement and list of required knowledge and learning, what is your critical assessment of how well you are achieving both? What are the strengths, weaknesses, and gaps of your institution in providing your graduates with these necessary skill sets?

How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?

Do tenure, right to publish, and ability to research constitute major issues that need review?

How is the DON-wide requirement of audit addressed in your curricula?

What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?

Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW)?

What is the role of your advisory board? Where is it most helpful, and how can its contribution be improved?

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Subj: EDUCATION FOR SEAPOWER (E4S) STUDY SCOPE AND REQUESTED INFORMATION

The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?

How are your student bodies changing over time (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?

How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?

What constraints have your experience regarding the execution of your vision for the future? How can this Study best help you in that regard?

If you could make major changes to your institution and to the naval educational enterprise, what might they be?

Does the DON have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how would you create one?

What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in residence, and in your opinion, their capacity for addressing complexity and added lethality? How would you deliver JPME differently?

How should critical thinking and strategic thinking best be taught? Where should it be taught? When?

What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?

For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?

How do you deal with accreditation? Is it an advantage, or a constraint?

What is the selectivity (admission) rate for applicants to your institution?

How many students failed any of your full-time courses last year?

How many admitted students failed to graduate?

For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or paygrade?

For the past five years, what percentage of your military faculty (by year) have ever been

3

passed over for promotion to the next rank or paygrade?

For the past five years, what percentage of your military faculty were considered (in any zone) by any administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of those officers were subsequently selected for command as a member of your faculty?

What do you consider your "peer" institutions, and what do you think they are getting right?

What is your opinion of the quality of students entering your institutions? Trends? What could be done to improve?

How is research, testing, development, and evaluation for educational/learning systems funded for your institution? Who is your SYSCOM for learning?

If you had a 5-10 percent budget cut, what function would you cut?

If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?

Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting?

What percentage of instruction is held at the classified level?

Do you think we need to create an entirely new higher education institution for the USN, and if so, what should it do that would be additive to the service?

Specific Questions:

For the Naval Academy, ROTC, and OCS:

What balance are you striking between bachelor degree completion and preparation for immediate duty in the Fleet/Fleet Marine Force as competent warfighters?

Given changes in the backgrounds of incoming students, how is your curricula changing to keep up with social and cultural changes (technology, networking, etc.)?

For the Naval Postgraduate School:

What differentiates the Public Policy and Business colleges from similar programs offered by civilian schools, and how are the naval services making use of this asset?

Regarding the National Security Affairs college, what is the uniqueness of the foreign officers

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course, and is NPS the best place for it?

What percent of the total student body are: Navy officers and enlisted; Marine officers and enlisted, Navy unrestricted line officers, restricted line officers, and staff? In your view, how are the naval services making best use of the education offered at Naval Postgraduate School?

What is your balance between and among education, basic and practical research?

For the Naval War College:

What percent of the total student body are: Navy officers and enlisted; Marine officers and enlisted, Navy line officers and staff? How are the naval services making best use of the education offered at the Naval War College?

How do you continually increase the relevancy of NWC to the naval services? In your view, how is NWC war-gaming utilized in OPNAV resourcing considerations, war planning and Fleet/Joint exercises?

Of your student body, what is your quota for senior officers, and how is that being met?

What is your assessment of how you are contributing to the development of critical strategic thinking and analyses, and where might this be strengthened?

How is NWC contributing to enhancing warfighting (strategic, operational) capacity amongst your students?

For the Marine Corps University:

What percent of the total student body are: Marine officers and enlisted; Navy line officers and staff? In your view, how are the naval services making best use of the education offered there?

How is MCU connected to the career paths of Marine officers and enlisted? What part does it play in career advancement and placement?

What is the Marine Corps' vision of continuous learning, and how does MCU play a part?

How is MCU connected to warfighting and advancing the operational art of war?

How does MCU identify future strategists?

Thanks in advance for your help with this.
R.T.

Thomas B. Modly

Subj: EDUCATION FOR SEAPOWER (E4S) STUDY SCOPE AND REQUESTED INFORMATION

Distribution:
CNO
CMC
ASN (RD&A)
ASN (FM&C)
ASN (M&RA)
ASN (EI&E)
GC
VCNO
ACMC
DUSN (P)
DIR OCMO
DON/AA
DNS
DMCS
JAG
DON CIO
CHINFO
CLA
CNP
MCCDC
Superintendent, USNA
President, NPS
President, NWC
President, MCU
NSTC
SECNAV FRONT OFFICE
SECNAV PA
SECNAV SAL
SECNAV AA

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Appendix E: Institutional Responses

The following pages are the actual responses to the UNSECNAV Memo(s).

Appendix E-1: NWC Response

3 July 2018

U.S. NAVAL WAR COLLEGE INPUT
FOR EDUCATION FOR SEAPOWER (E4S) QUESTIONS

I. Executive Summary:

Since its inception in 1884, the U.S. Naval War College has been producing graduates well-steeped and skilled in critical strategic thinking and assessment that today extends beyond the post-World War II Title X requirement "to conduct prompt, sustained operations incident to combat." While debate over the specifics of the curricula and pedagogical methods always exists, the Naval War College and naval education face a greater challenge.

That **challenge for the entire naval education enterprise principally rests in that the Navy, over the past decades, has consistently undervalued naval education,** often downplaying its priority and importance when allocating its operational, personnel and financial resources. As a result, many of the Navy's top performers are not war college graduates. To make this point, on December 6, 1941 81 of 83 flag officers were war college graduates (one of the two non-grads was not a line officer). Today, less than 20 percent of line flag officers are graduates of the in-residence Naval War College program.

Many of **the consequences of this cultural undervaluation of education are negative** and limit the intellectual boundaries of the Navy, leading to a smaller cadre of strategically-minded senior leaders and a lack of competitiveness in the joint and inter-agency arenas.

To that end, **the Navy should take the following steps**:

- **Create a process in which the most senior civilian and military leadership are directly responsible for and engaged in the direction, oversight and administration of the entire educational enterprise. That enterprise must be given a higher priority. Manning and budgets cannot alone drive education. Education, in part, must drive manning and budgets.**

- **Create a rigorous Selection Board process to select personnel to attend in-residence so that to attend means standing in the top third of a cohort.** This may require cross-Navy Selection Boards and not community-driven selection.

- **Follow the other Services and mandate a requirement to attend a Service War College in-residence prior to the assumption of Major Command**, so that the Navy will educate its best to the benefit of our Navy, Joint Force, and Nation.

- **Create forcing functions throughout the education continuum to ensure completion of professional military education**. Such forcing functions could include completion of specified courses as a prerequisite to advancement to E-6 or promotion to LCDR or, as is the case today, completion of Joint Professional Military Education Phase I prior to assuming O-5 command. Board precepts and Fitness Report documentation should

include this requirement. Additionally, community briefs should be updated to reflect the requirement for in-residence education and must be modified to include built-in timings to support this education.

- **Recognize that unless JPME is updated to reflect current realities and needs, making necessary changes to naval education will be very much restricted because of specific requirements that create undue inflexibility. We must therefore create Service Flexibility in the Delivery of Joint Professional Military Education Phases I and II**. The law requires a sequential completion of Phase I and Phase II Joint Professional Military Education. We teach the College of Naval Command and Staff intermediate-level program as Joint Professional Military Education Phase I and the College of Naval Warfare senior-level program as Joint Professional Military Education Phase II. There is a 12-week course at the Joint Forces Staff College in Suffolk, VA, that also offers Joint Professional Military Education Phase II. Because the Navy does not value education, there are thousands of personnel enrolled in non-resident courses to get Joint Professional Military Education Phase I with a goal to attend the short Phase II program so as to avoid in-residence education. To increase flexibility for the Navy, we plan to pursue designation of senior College of Naval Warfare courses to offer both Joint Professional Military Education Phase I and Phase II to yield efficiencies and enhance flexibility.

- **Reorganize to Strengthen the Educational Enterprise by creating a Naval University system similar to the other Services.** This would centralize the College or University-level education enterprise within one command and streamline operations that are currently conducted by three different commands.

    - To ensure that the focus remains on education as opposed to training, **recommend that the University be headquartered in Newport.** Each of the other Services have already established a university system (i.e., Air University, Army University, and Marine Corps University) and reaped benefits from the process. Each Service is also represented by a University President (or equivalent) at meetings with the Joint Staff, unlike the Navy. Moreover, the President of the Naval University System would be a key member of the Advanced Education Review Board and would be a key member of the Joint Leader Development Council.
    - To ensure education remains a key Navy line of effort, **consideration should be given to realigning the Naval University such that it is resourced by, and reports directly to, the Secretariat** – an organizational construct that is not unprecedented.
    - Simply stated, in the multi-billion dollar enterprise that is Manpower, Personnel, Training, and Education, the comparatively low-cost educational efforts cannot successfully compete.

- **Mandate that the senior naval leadership conduct a review of the curricula at each of the institutions in the Naval University to ensure that the curricula are evolving to meet any and all new demands and then reviewed on an appropriate basis not to exceed every two years.**

- **Grant Joint Credit to Navy Military Faculty Teaching at the U.S. Naval War College.** Currently, other Service military faculty receive Joint credit for teaching at the Naval War College but Navy military faculty do not. This situation affects the quality of the academic staff since the lack of Joint credit discourages Navy officers from seeking assignment to the faculty in Newport.

- **Waive civilian educators from furloughs in the event of a government shutdown.** Though education is an exempted activity from furloughs, the Navy has repeatedly furloughed our civilian academics unnecessarily, which sends a signal that their value is insignificant. This is a waiver within the authority of the Secretary of the Navy.

Additionally, the "Education for Seapower" **review should not ignore the education of our naval allies, partners, and friends.** The U.S. Navy cannot overcome its emerging challenges alone. Our success ultimately depends upon our ability to gather an international coalition of forces able to operate together successfully across the entire spectrum of conflict. It stands to reason, therefore, that our partner naval officers require the same critical thinking skills we seek to develop in our own naval officers. Secretary Mattis has emphasized this point, tasking the Services with expanding their international Professional Military Education programs. To that end, **we are creating a new six-month program for international students** in order to increase international student throughput.

Finally, in my view, **the Naval Services must seize on the intellectual assets available in our educational enterprise in order to prepare for the rigors of the 21st century**. We can argue whether the enterprise is operating at B, B+, or A- level. The point is that it can and must aim higher. A+ or 4.0 must be the goal and we must achieve it.

II. **General Questions**:

a) **What are the roles and responsibilities of your educational institution, and how do they contribute to establishing a permanent process of continuous learning?**

The Naval War College has seven Chief of Naval Operations-mandated missions with the primary mission to educate and develops future leaders. The College's other missions include:

- Support defining the future Navy and associated roles
- Support combat readiness
- Strengthen global maritime partnerships
- Promote leadership and ethics throughout the Force
- Contribute historical knowledge to shape effective decisions
- Provide expertise and advice to the international legal community

Significantly---and what is often missed by outside observers---the College is a global command that educates far more than the 500-plus students in-residence for the intermediate- and senior-level courses during each academic year. For example, we offer seats to approximately 5,000 intermediate-level students every year through distance

education, graduating about 1,000 per year. Additionally, across a career-long spectrum of courses, carefully tailored for the maturity, education, and experience levels of each student, the College is actively engaged with many thousands of students on-line daily through Navy eLearning (i.e., *Navy* Professional Military Education rather than *Joint* Professional Military Education). The College has graduated more than 112,000 over the last decade. This professional military education continuum provides focused and relevant developmental opportunities from the junior Petty Officer through three-star Admirals. We believe this process has the potential to instill a habit of lifelong learning if they were not seen as "checks in the block" but rather as genuine enhancements to the individual and their career.

b) **What is your vision regarding the future role of your educational institution?**

Since assuming command in July 2016, my vision for the Naval War College has been shaped by two guiding principles. The first is that the College must remain relevant to the Navy, the Joint Force, and our Nation. The second is that **to maintain relevance, the College must continue to adapt to the dynamic and ever–changing challenges to the nation and hence be in the forefront of change. This had led to five areas for the College to pursue: operationalize, navalize, futurize, internationalize, and normalize for the benefit of our students, the Naval Services, and the nation.** (See attached Strategic Plan)

Additionally, **the reach of "Education for Seapower" must also be expanded to include the education of our naval allies, partners, and friends.** The U.S. Navy cannot overcome its emerging challenges alone. Our success ultimately depends upon our ability to gather an international coalition of forces able to operate together successfully across the entire spectrum of conflict. It stands to reason, therefore, that our partner naval officers require the same critical thinking skills we seek to develop in our own naval officers. Secretary Mattis has tasked the Services with expanding their international Professional Military Education programs, and we are creating a new six-month program for international students to increase student throughput.

c) **How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?**

The most recent self-assessment data generated from surveys of the **graduates of both our senior College of Naval Warfare and junior College of Naval Command and Staff consistently show significant growth over the course of the year in all strategic critical thinking outcomes (seven for the senior course and four for the junior course).** (See attached Effectiveness Surveys) Being disciplined in applying critical analysis across a full spectrum of national security environments/ operations showed the most growth.

In general, graduation focus group participants say that the educational experience enhanced their critical thinking ability. Moreover, Naval War College alumni, when surveyed at the one, five, and seven year-points after graduation, highlighted critical

thinking as the key professional ability enhanced by the College's programs. Also, many alumni cited enhanced critical thinking as the most valuable element of the Naval War College educational experience in open-ended comments.

d) **How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?**

Across all academic programs at the Naval War College, **curriculum review and update is a constant and ongoing process. In spite of this, however, needed change is often challenged by an academic culture that resists change. As a result, increased involvement by senior College leadership is required and successful implementation of needed curricular changes would be enhanced by a longer term for the President of the College. Additionally, this effort would be greatly reinforced and complemented by a periodic review on the part of the Navy's most senior civilian and military leadership.**

In general, however, during each academic trimester, faculty use a combination of student feedback (quantitative and qualitative) and rigorous internal self-analysis to determine the relevancy and effectiveness of the course material just delivered. Based upon that analysis, adjustments will be made prior to the next iteration of the course. Those adjustments may include a change in case studies or in the assigned readings, a shift in delivery sequence, or an alteration in the delivery methodology. Next, faculty continuously review the research and published literature in their field of expertise, seeking new or better materials for a given course of instruction. Our most recent curriculum reviews increased the focus on China in the core curriculum and made Leadership and Ethics a year-long program of instruction.

For some programs this review and update includes visits to the operating Forces and Headquarters to ensure that the material taught in Newport reflects best practices observed in the Fleet and keeps pace with emerging Fleet design and fighting concepts. Additionally, faculty are always prepared to adapt the curriculum to meet the specific content requirements levied by higher authority such as Congress, the Secretary of Defense, Chairman of the Joint Chiefs of Staff, or the Chief of Naval Operations. Finally, courses and departments may seek external review by other experts in that field to ensure that the content and rigor of their program is current and appropriate for the level of students.

e) **In your critical view, how well do you prepare your students for both the next and future assignments?**

We inculcate in our students a set of skills and a habit of mind that prepares them well for positions of increasing complexity and responsibility during their next assignment and beyond. This view has been supported by student feedback (attached). Among the 2010, 2012 and 2016 graduates who responded to the graduate survey, student respondents indicated the education was worth the investment professionally, and

that it improved the quality of their contribution to their Service/agency. Additionally, when asked about follow-on assignments, **senior alumni indicated the education helped the most with operational planning skills, while more junior alumni cited decision-making skills**. Naval War College alumni who supervise the College's graduates in follow-on assignments are very satisfied with the quality of Naval War College graduates and pursue other Naval War College graduates in the future. Visiting Flag and General Officers also attest to the quality of our graduates and endorse the value of the Naval War College education. **The main issue regarding effectiveness remains the poor quality of Navy students and the inability to fill quotas.**

Additionally, the vast majority of the **students in the College of Maritime Operational Warfare training courses attend en route to their next assignment**. To prepare these students for their gaining command, we build into the courses opportunities to discuss regional issues pertinent to their future work. This can include presentations from our Fleet Engagement Teams, and from the Fleet Commanders themselves when available. We have conducted several specific convenings of our Maritime Staff Operators Course where all attendees are going to FIFTH Fleet, and include a briefing from the Commander and regionally-focused study. These tailored modifications have proven very successful.

f) **Based on your mission statement and list of required levels of knowledge and learning what is your assessment of how well you are achieving both? What are the strengths, weaknesses and gaps of your institution in providing your graduates with these necessary skill sets?**

The Naval War College's main mission is to educate and develop future leaders by building strategic and cultural perspective, and enhancing the capability to advise senior leaders and policy makers. This is operationalized for the two Joint Professional Military Education programs as follows: The senior-level Course Objective is to produce strategically-minded, critically thinking leaders who are skilled in maritime and joint warfighting. The intermediate-level Course Objective is to produce warfighters adept at critical thought and skilled in the Navy/Joint Planning Process who can effectively operate in the Joint maritime environment.

The College's strengths include a quality faculty, a rigorous academic program, and dedicated students. These all contribute to make the Naval War College education a valued commodity. Alumni graduating in 2010, 2012 and 2016 assessed the College highly in meeting these educational goals. Moreover, June 2017 senior course graduates recorded statistically significant value added growth in all five global Officer Professional Military Education Program Joint Learning Areas, with the largest growth reported in Systems and Processes and the Integration of Joint, Interagency, Intergovernmental, and Multinational Capabilities. June 2017 junior course graduates also demonstrated statistically significant value-added growth in all six global Officer Professional Military Education Program Joint Learning Areas, with the largest increase in Joint Doctrine and Related Concepts. Finally, regarding leadership outcomes, senior course alumni rated their ability to evaluate critical thinking, decision-making, and

communication by strategic leaders the highest and junior course scored their ability to comprehend strategic thinking and decision-making skills needed to anticipate and recognize change, lead transitions, and anticipate/adapt to surprise and uncertainty highest.

The biggest weakness of the institution is overcoming a naval, operational, and headquarters bureaucracy that devalues education and leads to a lack of interest in attending the in-residence educational opportunities the College offers. We are further weakened by:

- **Inability to fill Navy quotas**
- **Poor student quality seen in limited numbers of O-6 attendance, the number of students retiring directly from their War College tour, the lack of unrestricted line officers in the course, a "fill the seats mentality" at the expense of student quality, and the number of student failures (ten in the class of 2018) of which all were Navy students.**
- **The inability to attract the best faculty due to bureaucratic hurdles and inability to compensate the faculty on par with the need to attract the very best.**
- **Inflexibility in resource allocation that results in partially funded missions.**

In essence, the Navy finds itself imbued with a culture where manning drives education rather than education driving manning, as is evidenced in the other Services. Additionally, as a Service which values training over education, the Navy collectively fails to recognize the unique attributes of a college. Without the required cultural and organizational paradigm shift, we will continue to sub-optimize the Naval War College experience for our best and brightest future leaders.

As noted in the executive summary, the greatest institutional weakness of the Naval War College and the naval educational enterprise is the perhaps unintended cultural de-valuation of education as a lesser priority that leads many officers to avoid in-residence education and the Navy's failure to send the "best and brightest" to these institutions in preparation for assignments of higher authority. Indeed, it is noteworthy that while the Navy believes it is difficult if not impossible for officers to attend both junior and senior war colleges, this is essential for promotion in the other Services.

An additional and significant weakness is presenting the academic material needed while simultaneously providing the students the necessary time for critical reflection, all in a compressed timeline. The College, effectively, delivers a two-year graduate-level program of instruction in 10 months. While we have added an additional week of focused warfighting material at the beginning of the course, **consideration might be given to adding some additional educational time to the program**.

Most graduates of our shorter education programs, including operational planner and staff officer courses, report directly to the Fleet headquarters, so we get immediate feedback

on their value to the Maritime Operations Center as compared to their non-graduate peers. That feedback indicates graduates are significantly better prepared to contribute and fight at the operational-level of war. Additionally, since the Maritime Operations Center Assist and Assess Team is embedded in the Naval War College, we personally observe the performance of our graduates during exercises and certifications to validate the education we are providing. Our interactive course design, which includes experiential learning in the form of battle problems and simulations, is most often cited as a strength of the course. However, we are also challenged by the time available to cover all aspects of an evolving and complex spectrum of conflict, meaning there are some areas useful to the Maritime Operations Center that are not covered in all of our courses.

The College of Maritime Operational Warfare training courses employ active, continuous assessment of curricular content and graduate performance through direct interaction with graduates and supervisors at the Navy's Fleet and Task Force staffs. College of Maritime Operational Warfare civilian and military faculty are all specifically affiliated with one of the nine Fleet staffs and develop sustained relationships with senior staff personnel, including Chiefs of Staff, Maritime Operations Center Directors, Deputy Commanders, and Commanders. Additionally, College of Maritime Operational Warfare military and civilian faculty assess and assist Navy staffs on-site during exercises and real-world execution of plans. Active participation with the Navy's warfighting staffs, coupled with established solid relationships with staff personnel, allow the College of Maritime Operational Warfare to continually observe, evaluate, and adapt curricula in all courses of instruction.

The Naval Leadership and Ethics Center serves as a key enabler for promoting leadership and ethics throughout the force. In Newport, the Center delivers a series of courses that prepare the command triad of commanding officers, executive officers, command chiefs and their spouses for success. During these classes, students participate in practical, character-building applications revolving around daily themes, including individual leadership and command team unity. In addition to group work, each student receives one-on-one coaching. Students provide immediate feedback on the attainment of course outcomes using an end-of-course critique.

The Center also is responsible for a series of non-resident leadership courses, designed for delivery at the command level, that provide tools and resources to ensure leadership and management success. These courses are tailored for delivery at specific points in a Sailor's career based on experience and required responsibility. They include courses for Petty Officer Selectees, Chief Petty Officers, and Division Officers.

Significantly, the Center is currently working on an improved and expanded series of courses for both Officer and Enlisted Leader Development designed to fill identified gaps. Currently, an intermediate-level course designed for O-4 Department Heads is taught at Naval Leadership and Ethics Center detachments in San Diego, CA and Dam Neck, VA. In addition to end-of-course critiques, the Center formally seeks post-course feedback to ensure the continued currency and relevancy of the program. A new program for Division Officers is just coming on line. Three new courses are being developed as a

continuum for Enlisted Leader Development. These new courses, Foundational (E-4), Intermediate (E-5), and Advanced (E-6) are not tied to advancement, but are designed to provide the skills needed to succeed at that paygrade.

The Navy Senior Enlisted Academy is the only brick-and-mortar educational opportunity in the Navy enlisted continuum. Student educational backgrounds vary widely. More than half arrive having completed a college degree (associates or higher), with almost 10% having completed a master's degree. Additionally, each year, four to five students attend holding a terminal degree.

Achievement of Senior Enlisted Academy desired learning outcomes is measured through a variety of means. Student feedback is obtained through survey instruments while in-residence, and post-graduation when back at parent command. Additionally, the Senior Enlisted Academy conducts face-to-face, student-to-instructor feedback sessions during class closeout on the last of the in-residence period. Finally, alumni are surveyed one year after graduation regarding the effectiveness and relevance of their Senior Enlisted Academy educational experience in addition to being provided an opportunity to offer constructive criticism as to what was missing from the curriculum.

The Senior Enlisted Academy also seeks external assessment of their program. Periodically, the Senior Enlisted Academy Board of Advisors, comprised of the Fleet Master Chiefs, review the curriculum and provide feedback as to what is and isn't working well from the Fleet perspective. Finally, leadership from the Senior Enlisted Academy travel around the Navy seeking deck-plate feedback as to the relevance and effectiveness of the Academy. The feedback from the 2018 Roadshow/Fleet Engagement was overwhelmingly positive.

g) **How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?**

The overall quality of the faculty, both scholars and practitioners, is good as evidenced by scholarly output and reputation, comments by external parties and examiners, and student feedback. However, the quality of the faculty is NOT as good as it was a few decades ago when the number of "big-name" academics defined the reputation of the college. Challenges to recruitment are due to the College's location, unnecessary government bureaucracy (lack of copyright, salaried status, and tenure), and compensation limitations.

Although the College has undertaken a series of compensation reforms to increase the salaries of our Professors, **the trend of inadequate compensation in the future is worrisome and can only be addressed by additional discretionary funding allotted to the College.**

The best "practitioner Professors," a major component of Naval War College faculty, are recent Captain/Commander-level retirees with Fleet staff currency and teaching experience. We are challenged, however, by the limited number of Practitioners with

command experience. The challenges created with hiring limitations due to both The Veterans Opportunity to Work Act and 180-day waiting period for military retirees to be hired into Federal service can also preclude hiring of the most current practitioner Professors.

We carefully assess our faculty each year to ensure performance standards remain high. They are **evaluated in the areas of teaching, curriculum development, professional development (which includes scholarship and publication as appropriate), and service**.

h) **Do tenure, right to publish, and ability to research constitute major issues that need review?**

Yes, tenure, right to publish, and ability to research are major issues. The College has long had a "tenure-like" system in place, but it recently made the decision to formally institute tenure, and is currently working to carefully navigate the implementation of that policy. With regards to publication and research, the College has consistently and rigorously defended academic freedom and has also provided modest centrally-managed resources (provided by the Naval War College Foundation and NOT the U.S. government) to fund faculty research though the amount is inadequate especially for junior Professors attempting to meet the bar of tenure.

There is a tension between a faculty member's status as a federal employee and full ownership of their intellectual property. This is but one of the civilian faculty normalization issues identified by the Defense Planning Guidance 2017-21 effort. Specifically, work done on government time and on government equipment is defined in law as "government property." This conflicts with a scholar's responsibility to research and advance knowledge in their chosen academic field, which is an assigned element of their terms of employment. Creativity does not recognize the bureaucratic structure of time and attendance. To clarify the distinction between personal work and government property, the College has submitted a legislative proposal to protect both the faculty member and the Federal government, but our efforts are often thwarted by a legal system that does not recognize the unique attributes of a government college. We await the outcome of that proposal.

i) **How is the DON-wide requirement of audit addressed in your curricula?**

The audit requirement is under review for insertion into the War College curriculum writ large. The audit requirements should be incorporated into various training venues such as the Naval Leader and Ethics Center and the Senior Enlisted Academy.

j) **What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?**

The College uses several measures to gauge the overall quality of the education received by students: an overall satisfaction with the educational experience item and a likelihood to recommend the program to others. The College receives high marks on these metrics among a variety of stakeholders. For example, June senior course graduates for the past three years have rated their overall satisfaction with the program consistently high (5.95 on a 7-point scale). Junior course graduates, over the same time period, also rate the program strongly (5.82 on a 7-point scale).

Alumni satisfaction also remains high. College of Naval Warfare graduates from 2010, 2012, and 2016 specify very high levels of satisfaction as do College of Naval Command and Staff alumni respondents for the same period.
Supervisors also report high satisfaction levels with the quality of Naval War College graduates. These results suggest that as graduates progress in their careers, their perceptions of the quality of education delivered improves, attesting to its relevance.

Regarding the likelihood to recommend the program to others, College of Naval Warfare and College of Naval Command and Staff graduates for the past three June classes have all given high marks. Alumni express an even greater likelihood to recommend the program, while supervisors indicate they are very likely to seek Naval War College graduates.

Of note, while enrolled, student survey response rates achieved are effectively 100% as the instruments are mandatory. For alumni, the most recent survey response rates varied by graduation year, ranging from a high of 38.5% for 2016 to a low of 22.3% for 2010. The overall response rate was 30%, well above the typical national rate of 14% for alumni surveys.

As discussed in item (d) above, Naval War College uses a variety of assessments to determine where curricular changes and program improvements are needed, in addition to the institutional-level graduation surveys, graduation focus groups, alumni and supervisor surveys mentioned above. These methods include direct measures of learning via in-class assessments, departmental end-of-course surveys, student feedback collected by departmental academic representatives, and ad hoc assessments of new initiatives. Academic planners triangulate data from a variety of sources to drive program enhancements. For example, student and alumni feedback is informing the design of the new Leadership and Ethics core course, which will focus more on professional leadership development. Student and faculty reaction to a pilot National Security Affairs simulation led to the realization that a more explicit link between the exercise and student learning outcomes was required. Similarly, College of Naval Command and Staff graduation surveys point out the need to continually refine the JMO course. Finally, the response to the Future Warfare Symposium indicates that the event is delivering added value as designed.

College of Maritime Operational Warfare training courses employ similar standardized student assessment tools to the Joint Professional Military Education courses. In-course, graduation, and six-month post-graduation surveys are conducted with high marks for all

courses. However, the most effective assessment comes from face-to-face interaction between faculty and graduates on-site during exercises and real-world events. Another indicator of success is reachback from students during their next assignment. The College of Maritime Operational Warfare often receives calls from graduates involved in real-world operations for support and advice from our faculty. This demonstrates a lasting relationship with subject matter experts and a willingness of students to continue to grow beyond the classroom using this resource.

k) **Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW)?**

From an education perspective, and because of the weaknesses listed above, the Naval War College is not well integrated into the broader mission of the Navy with the exception of its training functions and its role as Executive Agent for Leadership and Ethics. For the last several years, and overseen by the Advanced Education Review Board, the three Flagship institutions have worked only in a limited way on collaborative efforts. For example, a cross-institutional effort on cyber education has resulted in a more refined understanding of the levels of education needed by officers at various points in their careers. The Human Resources, General Counsels, Comptrollers, and Information Resources units of the schools all remain in regular contact sharing best practices, solving common problems, and seeking efficiencies where possible, but senior-level integration is limited at best.

One significant success of cross-enterprise integration, however, is our College of Distance Education that has 18 faculty members embedded at the Naval Postgraduate School to teach the intermediate-level JPME program.

Regarding the College's *training* functions, the College of Maritime Operational Warfare is directly and continuously engaged with the Numbered Fleets, Navy Component Commander staffs, and the Warfare Development Centers. The Assess and Assist Team visits Fleet staffs employing the Maritime Operations Centers construct throughout the world. Knowledge learned from the Fleet is returned to Newport and integrated into the series of courses taught here. Through research and gaming efforts, the Center for Naval Warfare Studies provides rigorous analysis to both the operating forces and the Navy Staff including the Chief of Naval Operations. Core teaching faculty are regularly engaged by Department of the Navy entities for their subject matter expertise. Additionally, as active members of their academic communities of interest, faculty have significant engagement, both formally and informally, with non-Department of Defense academic institutions both in the United States and internationally.

The Center for Naval Warfare Studies' War Gaming Department conducts a variety of games in support of Combatant Commanders, Fleet Commands, and Services all tailored to provide the necessary outcomes in order for the staffs to be more effective.

Additionally, members from the War Gaming Department, the Strategic and Operational Research Department and the Stockton Center for the Study of International Law are continuously engaged with multiple entities throughout the Naval Enterprise providing subject matter expertise and advice for a variety of issues concerning the operational-level of war.

The College of Leadership and Ethics is also directly and continuously in dialogue with the 17 Navy communities, through the Leader Development Coordination Council, working to operationalize the Navy Leader Development Framework 2.0 across the Fleet. The College is also responsible for leader development of Flag officers. The initial 2-star course was delivered in November 2017 with positive results and will be convened biannually moving forward. A 3-star course is under development with an expectation of initial delivery in August 2018. Simultaneously, the College is drafting a Flag Development Strategy for the Chief of Naval Operations. The Naval Leadership and Ethics Center, a subordinate entity of the Naval War College, provides tailored leader development courses for junior enlisted and officers in Fleet Concentration Areas, as well as a full set of command leadership courses in Newport.

l) **What is the role of your advisory board; where is it helpful; and how can its contribution be improved?**

The role of our Board of Advisors, a combined board with the Naval Postgraduate School, is to "advise and assist the Department of the Navy and the respective Presidents in educational and support areas by providing independent advice and recommendations" in a number of defined areas. Historically, the Board of Advisors has had limited interaction with the College, often through no fault of the Board's members themselves. A long and arduous Federal approval process for nominated members often meant the Board was unable to meet due to a lack of sufficient, fully-vetted members. Additionally, some senior leaders have not actively engaged with the Board in the past. Fortunately, for the last two years a much improved relationship has existed. The approval/reapproval process has been reinvigorated, and the Board and related sub-committees have met regularly. For example, the Board of Advisors Naval War College Subcommittee meets annually in April in Newport. Additionally, the overall Board of Advisors with both the Naval War College and Naval Postgraduate School subcommittees meets annually in the Washington DC area in October.

Overall, the Board has advocated for, and been actively engaged in supporting, the College. Perhaps most critically, the Chief of Naval Operations and Secretary of the Navy personally met with the Board during recent meetings. The Boards contributions to the future advancement of the College will be improved so long as the Navy's senior leadership remains willing to engage with, and consider the recommendations of, this body of distinguished external observers. **The Board can be further enhanced by de facto membership in a new Naval University System, streamlined membership, and more frequent collaboration rather than the limited review seen today.**

m) **The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?**

Regarding lethality, overall the Naval War College has added three weeks of additional warfighting curricula in the last year, has tripled the number of hours in its cyber curriculum, added a focused week of instruction on increased lethality and warfighting, and continues to explore ways to expand gaming and experiential learning into the program. The curriculum has been updated to reflect the current geostrategic environment through study of space and unmanned systems. The Naval War College has been teaching joint warfare through a maritime lens, increased the focus on China and Russia, and undergone a renaissance in wargaming to include expanded analysis, playing at highest classification levels, integrating with modeling and simulation, and incorporating new cyber gaming. That said, as part of the curriculum review process, the College continually examines ways to improve the program and the College will continue these efforts in the future.

The College has long been tasked with preparing its students to fight and win its nation's wars if called upon. To that end, its focus on developing strategically-minded, critical thinkers has served to help develop agile and resilient minds in our students. Additionally, the combination of a historically-focused retrospective look at past military actions of many types, to critically examine what actions were most lethal at the lowest cost (blood and treasure), coupled with a more contemporary look at emerging concepts and operational challenges, prepares our students for the uncertainty of the future.

Of particular note, the College of Maritime Operational Warfare conducts the Joint Force Maritime Component Commander Course, offered to select 2-star Flag and General Officers. Taught at a high classification level, the course is specifically focused on fighting and winning at the operational-level of war as part of a Joint Force. Practical exercises include portions of existing operational plans and allow attendees to collaborate and refine their thinking on high-end warfare and conflicts with peer adversaries. In all Flag Officer courses, toughness is a key topic of discussion with our senior facilitators, given the Chief of Naval Operations' focus on maritime superiority and the reality of a maritime battle with a peer adversary. While dealing with devastating losses in conflict cannot be adequately simulated in a given course, it is a topic of discussion in multiple venues as senior leaders must include this in their thinking and planning.

All College of Maritime Operational Warfare training courses focus on the teaching of critical thinking at the operational-level of war in the Joint maritime domain. Intricacies of staff work, including leadership, detailed planning, and orders writing as part of a Joint Force Maritime Component Commander staff operating across the range of military operations, are taught at an appropriate level for each student.

n) **How are your student bodies changing over time (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?**

In general, as mid-grade to senior military officers and civilians, the **student body provided by the other Services and the interagency has been, and remains, mature, focused and highly capable**. Intellectually curious and intent on improving themselves for future assignments, they are a joy to engage with both inside the classroom and beyond. There are a few items to note. During the more than fifteen years of ongoing ground combat operations, our students were bringing a much higher level of direct and personal combat experience to the classroom. This challenged our faculty to stay "on top of their game," but also allowed our students to engage in peer-to-peer education in the seminar room. Regrettably, this higher level of direct combat action also, at times, brought with it the insidious stress-related effects of those experiences and the College had to identify and help those students get assistance where needed. As major ground combat operations have waned, the percentage of students with direct combat experience will likely continue to diminish.

Another trend noted is that more of our students have been promoted from the enlisted ranks, and many obtained their undergraduate degrees from non-traditional sources. Additionally, the maritime focus was previously lacking due to poor quality of Navy students. As a result, some students have arrived at the College less prepared to write effectively at the graduate level. Recognizing this, the College has invested significant resources into its Writing Center, to help all students struggling with their written communication skill to succeed. This effort has proven very beneficial.

o) **How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?**

The Naval War College has very limited budget flexibility that is further limited by expanding missions and demands. The College communicates very closely with its Resource Sponsor and Budget Submitting Office and has flexibility granted to use budgetary resources to meet the financial requirements of its Missions, Functions, and Tasks. Budget execution flexibility, or the ability to finance new initiatives in a given year, is very constrained due to a mismatch between requirements and resources, scarcity of funds, and competing requirements.

Regarding budgetary sourcing, the College's Resource Sponsor (Deputy Chief of Naval Operations, Manpower, Personnel, Training, & Education) and Budget Submitting Office (N1) act as advocates for requirements that compete for resources within the Planning, Programming, Budgeting, and Execution process. In their respective roles as Resource Sponsor and Budget Submitting Office, Manpower, Personnel, Training & Education and the Bureau of Naval Personnel review the College's financial requirements and, based on Navy priorities, allocate funding as part of the Navy budget submission. While Manpower, Personnel, Training, & Education and the Bureau of Naval Personnel assess the full range of education requirements for the Navy, the College conducts and provides its own assessment and identifies its requirements for inclusion in the comprehensive Program Objective Memorandum review held each year.

The College utilizes twelve types of funds to resource its operations: up to five types of appropriated funds; Department of Defense special funds; various reimbursable funds from other Department of Defense and government agencies; gift to the Navy (primarily from the Naval War College Foundation); and International Military Education & Training funds derived from both State Department funding and Foreign Military Sales.

- Operations and Maintenance, Navy
- Military Personnel, Navy
- Reserve Personnel Navy
- Research, Development, Test and Evaluation
- Other Procurement, Navy
- Navy's Latin America Program (Special Fund)
- Official Representation Funds (Special Fund)
- Reimbursable Funds
- International Officer Programs
    - Foreign Military Sales
    - International Military Education and Training
    - International Officer Course Earnings
- Gift Funds

The pivotal constraint is that the College exists in a financial environment where articulated requirements exceed available resources. As a human capital-intensive organization with direct salary and service support contracts consuming approximately eighty four percent (84%) of annual operations funding, there is little trade space to execute additional tasking without waiting for the Planning, Programming, Budgeting, Execution cycle to determine resource priorities and availability. This cycle, which can delay execution of a new program up to three years, requires the College to fund initiatives "out of hide" or rely upon the Budget Submitting Office to provide bridge-funding for programs in the year of execution, creating competition for scarce resources.

p) **What constraints have you experienced regarding the execution of your vision for the future? How can this Study best help you in that regard?**

The most persistent challenge facing the Naval War College moving forward is the mismatch between mission and resources. The College consistently has been asked to take on additional tasks by Chief of Naval Operations and other senior leaders, often with a promise of resources later in the Program Objective Memorandum cycle. While some resources have been forthcoming, they have never fully-funded the additional taskings. As a result, the College has been forced to take internal efficiencies and assume risk in other, previously funded missions that continue to have a demand signal.

We are now at the limits of what the physical infrastructure can support in terms of education and gaming, particularly following the loss of Brett Hall. As such, the College is at a point that any new mission requests will necessarily result in a degradation or loss of a mission currently being performed.

This study would be most beneficial if it forced a holistic, Navy-wide review of the missions being assigned to the Naval War College to help identify and remove those of lesser value to the wider Navy and:

- **Illuminate the problem of undervaluing education**
- **Resolve bureaucratic impediments**
- **Properly resource those missions assigned**
- **Increase Sustainment funding to 100%**
- **Increase Restoration and Modernization funding**

Finally, the deliberate and focused engagement of the Navy's senior leadership in refining and updating the intermediate- and senior-level educational outcomes is a must.

q) **If you could make major changes to your institution and to the naval educational enterprise what might they be?**

From the Naval War College's perspective, the single greatest improvement for the naval education enterprise would be to create a forcing function to improve student quality and create a Naval University System. This would centralize the education enterprise within one command and streamline operations that are currently conducted by three different commands. The Naval University could be commanded by a senior Flag Officer, to signal the importance of education, with oversight of the Navy's flagship institutions including the Naval War College, the Naval Postgraduate School, and the Naval Academy, NROTC programs, and the Federal Executive Fellowship Program, and should be fully integrated with the Marine Corps University under the leadership of the Secretariat. The President of the Naval University System would be a key member of the Advanced Education Review Board and the Joint Leader Development Council. To ensure education remains a key Navy line of effort, consideration should be given to realigning the Naval University such that is was resourced by, and reported directly to, the Secretariat – an organizational construct that is not unprecedented.

Simply stated, in the multi-billion dollar enterprise that is Manpower, Personnel, Training, and Education, the comparatively low-cost educational efforts cannot successfully compete. This single initiative, aligning the Navy's educational enterprise in the undergraduate, graduate, and professional military education realms would potentially serve as the catalyst for shifting to a culture where education drove manning throughout an officer's career.

The initiative would enable coordination and continuity along the continuum of curricula providing lifelong learning and the development of personnel and future leaders and strategists. Additionally, closer coordination across mission support areas such as Information Technology and Cyber development architectures in support of education and research along the learning continuum would benefit the enterprise.

Of note, each of the other Services have already established a university system and have reaped benefits and cost savings from the process. Each Service is also represented by a 3-star University President at meetings with the Joint Staff, unlike the Navy.

A number of other institutional changes would benefit the Naval War College and our Navy. These include:

- Create a Cyber Policy and Innovation Center. We plan to transform our Cyber Conflict Studies Program into a more robust Cyber Policy and Innovation Center. The niche for the new center will be cyber maritime policy.

- Increase wargaming capacity. We have a world-class wargaming center staffed with talented individuals that currently support many games. If funded, we could increase the number of games played each year to increase the benefits of gaming throughout the Navy.

- Increase integration of Operations Analysis. Wargaming, modeling and simulation, and experimentation all offer different benefits. The College continues efforts to integrate these three different types of operations analysis. We recently concluded our second Operations Analysis Integration Conference.

- Consider increasing course length. We have a robust and rigorous curriculum and adding new and dynamic concepts requires other material be taken out of the curriculum. We believe that an additional week or two of classes would yield great dividends to the individual, the Navy, and the Department of Defense.

- Grant Joint Duty Credit to US Navy instructors. Military Service members from other Services already receive Joint Duty Credit for serving at the College. Extension of this authority to US Navy faculty would enable the College and the Navy to improve the quality of US Navy military faculty members.

- Centralize selection of Navy strategists. Students currently enrolled in the Advanced Strategist Program are self-selected. We recommend that the Navy, like other Services, select and manage strategists through a deliberate process. Follow-on assignments should also be centrally managed for this elite group to leverage their talent throughout the Navy.

- Implement Character Touch-Points. The new Leadership and Ethics core course will be implemented during the next academic year for all resident students. The Navy Leadership and Ethics Center is also concentrating on this initiative with the department head course and revitalization of the petty officer indoctrination.

- Create a NWC PhD program. Exploring options, this could be used for the Permanent Military Professors and for other programs pursuing history or national security affairs.

r) **Does the DON have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how to create one?**

While I firmly believe that the Navy, as an institution, is a "learning organization," there remains an internal dissonance when it comes to valuing education as opposed to training. Virtually all in the Department value training. Once trained, one can adequately perform a task that he/she could not perform before. An expenditure of "x" results in another trained "y" ready to support mission accomplishment, a direct causal relationship easily understood by most.

Education, alternatively, develops a "habit of mind," that does not immediately evidence itself in all cases. As a result, the return on investment is hard to recognize in the near term – in essence, educators are "venture capitalists." At the same time, the Navy, as a diverse, dispersed, and deployable force, has long valued experience at sea over formal educational opportunities. As a result, the "best and brightest" have often avoided, or were dissuaded from, broadening opportunities away from the Fleet because they feared losing their competitive edge for advancement and promotion. This review effort, and recent decisions by the Chief of Naval Operations and Chief of Naval Personnel to improve the quality of students assigned to resident educational opportunities, are positive steps forward in resolving that internal challenge. However, to accomplish this laudable goal, specific forcing functions must be instituted at key points in an officer's career such as the "in-residence senior-level Service College before assumption of Major Command."

s) **What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in-residence, and in your opinion, their capacity for lethality? How would you deliver JPME differently?**

We teach the intermediate-level program (with Joint Professional Military Education Phase I embedded) and the senior-level program (with Joint Professional Military Education Phase II embedded). Each of these educational levels has a number of required (Congress, Office of the Secretary of Defense, and Chairman of the Joint Chiefs of Staff) core curricular elements that must be taught at a given cognitive level, all through the lens of Seapower. **These Joint requirements do shape the contours of the program and focus on the capacity for lethality.** This bifurcation is part of a Congressionally-mandated three-phase approach to Joint education that made perfect sense as part of the Goldwater-Nichols Act reforms. However, the Joint Force has matured significantly since 1989 and a re-examination is likely in order.

Most Services have intentionally created space in an officer's career for two in-resident educational opportunities, and indeed use such slots as key career potential discriminators. Navy officer career paths are challenged by this model given the

significant underway requirements of the Navy's operating forces. Given these challenges with regard to compressed career progressions and unrelenting deployment demands, if career path adjustments cannot be realized that would offer the opportunity to offer our best officers the "trade" space to complete a sequenced approach to Joint Professional Military Education, then a chance to streamline the educational process would be welcomed.

Provided that leeway, we would seek to have each of our educational programs accredited to grant both Joint Professional Military Education I and Joint Professional Military Education II in a "single-phase" course of instruction. Maintaining two levels of instruction retains the robustness of our international program, allows for full participation by the sister Services, and allows for significant peer-to-peer interaction at each level.

t) **How should critical thinking and strategic thinking best be taught? Where should it be taught? When?**

Critical thinking skills should be addressed at each step along the Navy's career-long Professional Military Education Continuum. These are skills that can be appropriately addressed at each level and contribute to students' capacity as lifelong learners. For example, the Chief of Naval Operations' Professional Reading Program is an excellent tool to reinforce critical thinking skills.

The Naval War College is the appropriate place to inculcate and refine these skills in our officers, as it offers the requisite qualified faculty and the needed time for reflection. Strategic thinking skills should first be addressed at the intermediate-level and reinforced again at the senior-level course and beyond. These skills are best taught in seminar using the Socratic Method. Students learn from peers and faculty in the ensuing discussion.

u) **What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?**

Science, Technology, Engineering, and Math education is clearly a priority in the US Navy today especially because of the advanced weapons systems and requirements for hands-on proficiency. It could be effectively argued that a greater focus on Science, Technology, Engineering, and Math education should occur at the undergraduate level to ensure that the Navy has a sufficient number of individuals ready to excel in high tech fields such as the Navy's Nuclear Power Program. However, technology can also be infused in non-technical graduate education as has been done in the Future Warfighting Symposium at the College.

However, there is great value in a liberal education and the creation of the habits of mind that foster critical thinking. Therefore, except for a smaller cadre of officers needing a highly technical graduate degree for their career field (meteorologists as one example), a shift towards a more liberal education should occur as an officer rises to higher ranks and

levels of responsibility. This is the approach taken at the Naval War College. Students are exposed to a variety of different disciplines in the curriculum (i.e. economics, philosophy, operational arts) and are encouraged to continue their education after graduation as lifelong learners.

v) **For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?**

The Naval War College Foundation provides about 12 percent of the College's discretionary income each year. This significant annual contribution funds a number of items that we simply can't internally resource given fiscal constraints. This includes a significant contribution towards faculty development efforts as well as conference support, funding of endowed chairs, as well as numerous outreach programs. **The single biggest change to allow our Foundation to be of greater assistance, an organization that exists solely to support our school, would be to completely eliminate its designation as a prohibited source to allow for coordinated planning. We should also change the policy to allow for leadership to publicly endorse the Foundation, and therefore allow for solicitation of student membership**.

w) **How do you deal with accreditation? Is it an advantage, or a constraint?**

Accreditation is a normal and essential part of academic "business practice" and, while it is very time-consuming on an episodic basis, it is as an advantage to the institution since successful completion of each reaccreditation demonstrates external validation of the continued rigor and relevance of our modern academic programs of instruction, and compliance with policy mandates of higher headquarters.

Accreditation is designed to accomplish two interrelated tasks: quality assurance and process improvement. As is true with most academic institutions, the Naval War College is subject to accreditation by more than one external body. For our master's degrees, the College is regionally accredited on a ten-year cycle by the Commission on Institutes of Higher Education of the New England Association of Schools and Colleges. For our professional accreditation to award Joint Professional Military Education Phase I and II credit, we are subject to periodic (every six years) accreditation by the Chairman of the Joint Chiefs of Staff through the Process for the Accreditation of Joint Education process.

x) **What is the selectivity (admission) rate for applicants to your institution?**

The Naval War College admissions rate is effectively 100 percent. Our military students are all selected by their host Service and then receive orders to attend either the intermediate- or senior-level courses, or one of the series of short Operational Level of War courses delivered by the College of Maritime Operational Warfare. Similarly, following invitation by the Chief of Naval Operations, International officers are nominated by their host nations. Unless that officer fails to demonstrate sufficient skill in

the English language, all are admitted. In all of these instances, no independent screening process is conducted by the College.

In the case of our interagency students, their host agency conducts a rigorous review prior to nominating them to the College for admission. While the College does perform an admissions review on those students, it is rare that a student is denied admission. This is largely due to the care that the agencies take in selecting their top candidates for these educational opportunities.

Non-resident programs delivered through the College of Distance Education also have acceptance rates of 100 percent. However, as most of these students are "self-selecting," no detailer reviews their educational records prior to selection except at the War College's program at the Naval Postgraduate School. As a result, for those student in the Fleet Seminar Program who wish to continue on to complete the Defense and Strategic Studies degree, a selection board is held prior to a student's admission into the Graduate Degree Program.

y) **How many students failed any of your full-time courses last year?**

During the last year, ten students, or 1.5%, failed one of the core courses in either College of Naval Warfare or College of Naval Command & Staff.

z) **How many admitted students failed to graduate?**

During the last year, of the ten students who failed a core course, seven were not awarded a master's degree but were awarded Joint Professional Military Education credit. The remaining three failed to receive either a master's degree or Joint Professional Military Education credit.

aa) **For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or paygrade?**

The Naval War College does not track this metric. This analysis should be assigned to OPNAV N1.

bb) **For the past five years, what percentage of your military faculty (by year) have ever been passed over for promotion to the next rank or paygrade?**

The Naval War College does not track this metric. This analysis should be assigned to OPNAV N1.

cc) **For the past five years, what percentage of your military faculty were considered (in any zone) by any administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of those officers were subsequently selected for command as a member of your faculty?**

The Naval War College does not track this metric. This analysis should be assigned to OPNAV N1.

dd) **What do you consider your "peer" institutions, and what do you think they are getting right?**

The Naval War College peer institutions include other professional military education institutions such as the other Service War and Command & Staff Colleges and National Defense University. In addition, the most appropriate civilian peer institutions are the Ivy League and members of the Association of Professional Schools of International Affairs, since they have a focus on a practical policy-based education and grant master's degree to mid- and senior-level career professionals.

ee) **What is your opinion of the quality of students entering your institutions? Trends? What could be done to improve?**

In general, **the quality of our Joint student body has been high, but the Navy struggles to fill all quotas with the best available officers.** This is largely due to current control grade officer shortages, the perceived value of an in-residence program when there is a "short course" (Joint Forces Staff College) alternative available, and the demands for high-performing officers to fill critical staff and Joint billets.

At the intermediate-level, all Services are making excellent use of the educational opportunities for their higher performing, due course officers. As noted above, some students have arrived at the College less prepared to write well at the graduate-level than in the past. Recognizing this, the College has invested significant resources into its Writing Center, to help all students struggling with their written communication skills to succeed.

Of note, the Chief of Naval Operations has recently directed that all officers be board-selected for attendance at the War Colleges and, most significantly, that all officers selected for major command shall attend an in resident, year-long senior program. This should result in an increase in senior Navy students assigned, and an increase in student quality.

ff) **How is research, testing, development, and evaluation for educational/ learning systems funded for your institution? Who is your SYSCOM for learning?**

Funding for educational and learning systems comes from a combination of Operations and Maintenance, Navy, International Military Education and Training, and International Officer Course Earnings funding. Wargaming systems also receive Research, Development, Test and Evaluation funding. The institution has no "SYSCOM for learning."

gg) **If you had a 5-10 percent budget cut, what function would you cut?**

Given the mix of education and training missions currently assigned to the Naval War College, if faced with a significant budget cut the College would seek to transfer some of its training functions back to the Fleet Concentration Areas under the auspices of Fleet Forces Command.

hh) **If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?**

Given a significant plus-up in funding, the College would initially target a number of key initiatives. First, the College would seek to fund and develop its **Cyber Policy and Innovation Center** and related cyber lab. Additionally, the College would work to expand its **wargaming program**, increasing experiential learning for the student body. Next, we work to ensure that the expansion of Enlisted Leader Development, spearheaded by the Naval Leadership and Ethics Center, is properly resourced. Third, the College would implement additional compensation and faculty development reforms to attract and retain the best faculty. Finally, we need to focus on the **rehabilitation of critical portions of our physical infrastructure**. While welcoming the return to "Flagship status," it remains a hard fact that the College has been under-resourced for a number of years and much repair is needed.

ii) **Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting?**

To maintain a maritime focus, seminar composition must have a minimum of 40% U.S. maritime officers (Navy, Marine, or Coast Guard). The vast majority must be unrestricted line officers with a mixture of maritime officers with other career backgrounds.

jj) **What percentage of instruction is held at the classified level?**

Due to the full integration of our international partners in the core academic program, the Colleges of Naval Command and Staff and Naval Warfare are taught almost exclusively at the unclassified level. Each course has less than three hours of classified instruction for U.S. students. In the electives program, about 10 percent of the main elective offerings are taught at the classified level, while the Advanced Research Group programs are almost all taught at the classified level (approximately 85%).

With the exception of the international Combined Force Maritime Component Commander course, all College of Maritime Operational Warfare, training courses are taught at the classified level. Additionally, one version of the Combined Force Maritime Component Commander course has been taught at a North Atlantic Treaty Organization-classified level.

kk) **Do you think we need to create an entirely new higher education institution for the USN, and is so, what should it do that would be additive to the service?**

I do not believe that the Navy needs to create an entirely new higher education institution. What is needed, and is being partially addressed to some degree right now, is that we must ensure that our highest performing officers are given the time in their careers to fully benefit from the broadening opportunities offered by attending year-long educational programs. We have partially invested in the faculty, the staff, the supporting structures, and the educational programs. All we need to do now is invest in the right Navy students.

However, as noted earlier, consideration should be given to the establishment of a Naval University System. This would centralize the education enterprise within one command and streamline operations that are currently conducted by three different commands. The Naval University could be commanded by a Vice Admiral, to signal the importance of education, with oversight of the Navy's flagship institutions including the Naval War College, the Naval Postgraduate School, and the Naval Academy. Moreover, the President of the Naval University System would be a key member of the Advanced Education Review Board. To ensure education remains a key Navy line of effort, consideration should be given to realigning the Naval University such that it is resourced by, and reports directly to, the Secretariat. This single initiative would potentially serve as the catalyst for shifting to a culture where education drove manning throughout an officer's career.

The initiative would enable coordination and continuity along the continuum of curricula providing lifelong learning and the development of personnel and future leaders and strategists. Additionally, closer coordination across mission support areas such as Information Technology and Cyber development architectures in support of education and research along the learning continuum would benefit the enterprise.

III. <u>Naval War College Specific Questions</u>:

a) **What percentage of the total student body are: Navy officer and enlisted; Marine officers and enlisted, Navy line officers and staff? How are the naval services making best use of the education offered at the Naval War College?**

For the College of Naval Warfare (senior course), Navy officers comprise 21.1% of the total student body, while Marine officers makeup another 8.6%. For the College of Naval Command and Staff (junior course), Navy officers comprise 40.1% of the total student body, while Marine officers makeup another 6.7%. Of these Navy officers (169), 68% are Unrestricted Line officers, 16.6% are Restricted Line officers, and 16.4% are Staff officers. There are no enlisted students currently enrolled in this program, although we anticipate Master Chiefs starting in March 2019 if the required legislative proposal is approved.

For the College of Distance Education, Navy officers comprise 74% of the total student body, while Marine Corps officers make up another 4%. Of the Navy officers, 61% are Unrestricted Line officers and 39% are Restricted Line/Staff officers.

The College of Distance Education Navy eLearning Online Professional Military Education Program courses for E-1 to E-9 and O-1 to O-3 have a current enrollment of 299,252 students, of which 98% are Navy. Of that number, 281,157 (94%) are Enlisted Sailors.

For the operational-level of war courses taught by College of Maritime Operational Warfare, the breakdown is as follows:

> Maritime Staff Operator's Course: 93% Navy Officers, 5% Navy Enlisted and 2% Civilian. Of the Navy Officers, 85% are Unrestricted Line and 15% Staff.
>
> Maritime Operational Planner's Course: 99% Navy Officers, 1% Marine Corps and U.S. Coast Guard. Of the Navy Officers, 95% are Unrestricted Line and 5% Staff.
>
> Executive Level Operational Level of War Course: 75% Navy Officers, 20% Marine Corps and Coast Guard, and 5% Navy Civilian. Of the Navy Officers, 75% are Unrestricted Line and 25% Staff.
>
> Combined Force Maritime Component Commanders Course: 75% Partner Nation Flag Officers, 20% U.S. Navy Flag Officers, and 5% U.S. Army/Marine Corps/Air Force/Coast Guard. This ratio can vary with the various regions, but is a good general guide. Of the U.S. Navy Flag Officers, 90% are Unrestricted Line officers.
>
> Joint Force Maritime Component Commanders Course: 90% U.S. Navy Flag Officers, 7% U.S. Army/Marine Corps/Air Force/Coast Guard and 3% Senior Executive Service Civilian. Most of the attendees of the course are Unrestricted Line officers.

All students attending Naval Leadership and Ethics Center courses are U.S. Navy, while ninety-five percent of all students attending the Senior Enlisted Academy are U.S. Navy.

At the intermediate-level, both the Navy and Marine Corps are making excellent use of the educational opportunities for their higher performing, due course officers. At the senior level, the Marine Corps continues to send their best officers, but the Navy struggles to fill all quotas with the best available officers. This is largely due to current control grade officer shortages and the demands for high-performing officers to fill critical staff and Joint billets. Of note, the Chief of Naval Operations has recently directed that all officers be board-selected for attendance at the War Colleges. This should result in an increase in senior Navy students assigned, and an increase in student quality.

b) **How do you continually increase the relevancy of NWC to the naval services? In your view, how is NWC war-gaming utilized in OPNAV resourcing considerations, war planning and Fleet/Joint exercises?**

The College would challenge the premise of this initial question. **The College is already relevant**. **The issue as noted above is that education does not have the priority it should and thus its relevance could be much greater if fully appreciated by our leadership and culture.** The College is the only Navy institution positioned to provide the critical thinking and strategic skills sought by our national security establishment, as well as the required Joint skillsets. What needs to change is the value that the Service places on this institution. That said, the College continues to evolve to meet the needs of the Naval Services.

The most important way the Naval War College proves its relevance is through its graduates. These officers immediately return to (or are already embedded in, with the case of College of Distance Education) the Fleet and staffs with updated knowledge and strategic and critical thinking skills to make an immediate impact. In addition, the Naval War College faculty is constantly engaging with the Navy at various levels on a plethora of topics. This interaction not only ensures the latest cutting edge research is reaching the Fleet, but also the current operating procedures and challenges are informing updates to the curriculum.

At the College of Maritime Operational Warfare, our credibility and value rest in the currency of our faculty in the maritime domain. With many of our students en route to an operational command, we must ensure they understand evolving concepts like Fleet Design and Distributed Maritime Operations, as well as operational plans. We demand that our faculty routinely visit Fleet Commander Headquarters to ensure we keep pace with their operations. This, along with the solid grounding in history, doctrine, processes and learning theory that our faculty possess, allows us to remain a critical component in our Navy's ability to fight at the operational-level of war. We must also understand that we will not fight alone, and therefore we must engage our partner Navies at all levels to build trust and cooperation. This is done routinely through the shared growth among the resident students during their time in Newport, as well as in our dedicated Flag Officer courses. The Naval War College has the unique ability to bring maritime leaders together in a safe, academic venue where problems and issues can be discussed and solved outside of a more pressurized operational and political environment.

The Center for Naval Warfare Studies research, analysis and gaming activities serve as a focal point, stimulus, and major source of strategic and operational thought within the Navy, Joint and Interagency communities. These efforts generate strategic and operational alternatives, tactical imperatives, qualitative and quantitative analysis, wargaming outcomes and reports, and political-military assessments, and provide recommendations to the Chief of Naval Operations, Component Commanders, numbered Fleet Commanders and the Secretary of the Navy regarding the formulation and

execution of maritime options for the President of the United States and decisions regarding the future shape of the maritime force.

c) **Of your student body, what is your quota for senior officers, and how is that being met?**

For Fiscal Year 2018 the Navy quota for the senior College of Naval Warfare was set at 71, with 43 fills (61%). This quota was 12 below Fiscal Year 2017 levels and represents the third year with a fill rate below 70%. By comparison, quotas for Fiscal Years 2011 through 2015 averaged 80 with fill rates of over 90%.

d) **What is your assessment of how you are contributing to the development of critical strategic thinking and analyses, and where might this be strengthened?**

The Naval War College is the appropriate place to inculcate and refine these skills in our officers, as it offers the requisite qualified faculty and the needed time for reflection. Strategic thinking skills should first be addressed at the intermediate-level and reinforced again at the senior-level course and beyond. These skills are best taught in seminar using the Socratic Method. Students learn from peers and faculty in the ensuing discussion.

We have been very successful in improving the ability of our students to think critically and strategically, and this is borne out through institutional assessment efforts. Using the most recent self-assessment data available, graduates of our senior course demonstrated statistically significant growth from indoctrination to graduation on all seven strategic critical thinking outcomes. Being disciplined in applying critical analysis across a full spectrum of national security environments/operations showed the most growth.

Likewise, graduates of our junior course reported statistically significant growth in all four operational critical thinking indicators. Being imbued with a comprehensive operational-level perspective displayed the largest amount of growth. In general, graduation focus group participants say that the educational experience enhanced their critical thinking ability. Moreover, Naval War College alumni, when surveyed at one, five, and seven years after graduation, highlighted critical thinking as the key professional ability enhanced by the College's programs. Also, many alumni cited enhanced critical thinking as the most valuable element of the Naval War College educational experience in open-ended comments.

At the College of Maritime Operational Warfare, critical thinking is emphasized as part of the immersive planning and battle lab experience. Students must interpret Commander's guidance, develop relevant facts and assumptions, creatively build executable courses of action in a complex scenario, wargame to determine a recommended course of action, and brief their results. While there is a "checklist" approach to the steps taken, each requires knowledge, insight, and deep understanding of capabilities and consequences to be successful. In building and applying these critical thinking skills in complicated maritime scenarios, we are preparing our warriors for distributed maritime operations in a communications-challenged environment. We will

continue our efforts to bring in the emerging dimensions of cyber operations, space, and electromagnetic maneuver warfare so our graduates apply critical thinking in a wider spectrum.

e) **How is NWC contributing to enhancing warfighting (strategic, operational) capacity amongst your students?**

The College has long been tasked with preparing its students to fight and win its nation's wars if called upon. To that end, its focus on developing strategically-minded, critical thinkers has served to help develop agile and resilient minds in our students. Additionally, the combination of a historically-focused retrospective look at past military actions of many types, to critically examine what actions were most lethal at the lowest cost (blood and treasure), coupled with a more contemporary look at emerging concepts and operational challenges, prepares our students for the uncertainty of the future. That said, as part of the curriculum review process, the College continually examines ways to improve the program. In the last year, the College has dramatically increased its focus on cyber operations, added a focused week of instruction on increased lethality and warfighting, and continues to explore ways to expand gaming and experiential learning into the program. The College will continue these efforts in the future.

Graduates of the various College of Maritime Operational Warfare training courses are specifically prepared for the operational-level of war. The courses include various battle labs and practical exercises that require collaboration and creativity to counter a complex, thinking adversary. Students are grounded in the Navy Planning Process and experience a variety of positions on planning teams in the Maritime Operations Center, preparing them to immediately function and contribute on a Fleet staff. Flag Officer courses range from US only high-end warfighting, to coalition building and partnership for a variety of other missions like counter-piracy. Finally, the College of Maritime Operational Warfare directly contributes to doctrine review in development to keep pace with the evolving fight.

The Center for Naval Studies also conducts multiple games throughout the academic year specifically focused on educating the students in the operational- and strategic-level of warfighting. In certain instances, these games will serve as the capstone event for the Joint Military Operations course and is run as a joint-planning, group-style session, in which the students conduct operational design for a problem in a country they have been studying throughout the semester. Other games may focus on certain theater-specific problems, providing operational outcomes which could have strategic implications.

IV. <u>Attachments</u>:

A) U.S. Naval War College Strategic Plan 2017-2021.

B) U.S. Naval War College 2016-2017 Annual Review.

C) Surveys of Institutional Effectiveness

Appendix E-2: NPS Response

DEPARTMENT OF THE NAVY
NAVAL POSTGRADUATE SCHOOL
1 UNIVERSITY CIR
MONTEREY, CA 93943-5000

IN REPLY REFER TO:
5400
Ser 00/426
6 Jul 18

From: President, Naval Postgraduate School
To: Under Secretary of the Navy

Subj: RESPONSE TO EDUCATION FOR SEAPOWER REQUESTED INFORMATION

Ref: (a) UNSECNAV Memo, DON Education for Seapower Study, dtd 19 APR 2018
(b) UNSECNAV Memo, E4S Scope and Requested Information, dtd 29 May 2018

Encl: (1) OPNAV NOTICE 5400
(2) Draft OPNAVINST 5450.210E
(3) NPS Strategic Plan 2018-2023, dtd 23 April 2018
(4) Sailing Directions to Support the Strategic Vision, dtd 27 April 2018
(5) NPS Info Paper: Developing Tactics and Assessing the Value of the New Technology in Naval Warfare, NPS Military Operations Research Society Symposium, dtd May 2018
(6) NPS Wargaming Activity Hub Quarterly Report, Spring AY2018
(7) NPS POM 17-20 Program Requirements Summary, dtd June 2018
(8) NPS ltr to ASN (FMC), Categorical Waiver Request for 51 Percent Rule, dtd 24 May 2018
(9) Air Education and Training Command Force Development Commander, dtd 26 Oct 2017
(10) NPS and Foundation Memorandum of Understanding, dtd 3 December 2013
(11) NPS Institutional Priorities for 2018, Ltd to NPS Foundation, dtd 17 January 2018
(12) NPS WSCUC Thematic Pathway for Reaffirmation Proposal, dtd 14 May 2018

1. The Naval Postgraduate School (NPS) commends the initiative outlined in reference (a) and appreciates the opportunity to provide detailed input in response to the questions and further guidance directed in reference (b). With the recent publication of a new *Strategic Plan* and enabling *Sailing Directions* memorandum to support its execution, NPS firmly believes this institution is on the right trajectory in support of the nation's maritime and national security strategies. We look forward to working with your staff on this important and impactful Education for Seapower (E4S) initiative and responding to its recommendations and conclusions in support of the same objectives.

2. As directed in reference (b), NPS provides the following responses.

a. <u>General Questions</u>

Subj: RESPONSE TO EDUCATION FOR SEAPOWER REQUESTED INFORMATION

(1) What are the roles and responsibilities of your educational institution, and how do they contribute to establishing a permanent process of continuous learning?

(a) NPS recently updated its mission statement via Director of the Navy Staff (DNS) approval of enclosure (1). The mission statement was recently updated in order to provide a more accurate description of the thesis and research experiences available to our students and the inherently joint, inter-agency and international programs available at NPS. There was no change to command location, manpower assigned, or financial support provided NPS as a result of this action. Enclosure (1) modified the NPS mission to the following:

1. To provide relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. In support of the foregoing, and to sustain academic excellence, foster a program of relevant and meritorious research that provides thesis and research experiences for NPS students, informs the curricula, supports the needs of Navy and Department of Defense, and builds the intellectual capital of NPS faculty. To support the core Navy mission, NPS's programs are inherently joint, inter-agency, and international.

(b) In addition to the updated mission statement, the NPS Mission and Function instruction, OPNAVINST 5450.210E in enclosure (2), reflects the more detailed breakdown of this mission statement and its supporting functions. The instruction is currently in final draft staffing with the CNO Staff and is expected to be approved soon. It reiterates the mission statement above and outlines several supporting NPS functional areas and supporting activities. These areas are further defined and provided below.

1. NPS Education Program

a. Naval and Total Force Education. Educate, as CNO may direct, commissioned U.S. naval officers to the level essential for professional performance. Educate other authorized U.S. and allied military officers and civilians consistent with the requirements of the individual services, DoD, and foreign governments, within available resources. Educate civilian and enlisted personnel within the U.S. Government consistent with their sponsoring organizational needs and within available resources. Provide education programs that support intellectual innovation and growth throughout the careers of the total force.

b. Military and International Education. Maintain direct liaison with the other services' graduate education program managers and international student program managers concerning their requirements, curricula content, curricula establishment, and curricula status.

c. Reserve, Civilian, Contractor Education. Under Navy's total force concept, provide education to support reserve naval forces, civilians, and contractors, as authorized by law, to meet requirements in fulfillment of Navy mission and as resources allow.

d. Graduate Academic Programs. Design graduate academic programs to equip officers with enhanced intellectual and analytical capacity, and make them more effective warriors and specialists. Align NPS programs with the rapidly changing needs of the naval services to support our national security.

e. Education for Navy Career Paths. Coordinate with appropriate Navy leadership to educate and provide opportunities to those Navy officers and civilians who require education, but whose career paths do not always permit full time resident education.

f. Education Development. Research and exploit innovative learning technologies, pedagogy and practices to enhance the educational experience for NPS students and provide cost-effective education.

g. Navy Fleet Concentration Areas. Operate fleet concentration area offices to coordinate educational opportunities for naval personnel and provide information on available programs to interested personnel.

h. Education/Academic Infrastructure. Maintain library, information technology, and laboratory facilities to support the graduate education program. Conduct long-range planning of library, information technology and laboratory requirements and means to achieve optimum utilization of these resources.

i. Curriculum Reviews. Conduct, at least biennially, subspecialty reviews for all curricula offered by NPS resident and civilian institution (CIVINS) programs resulting in a degree per reference (b). Coordinate subspecialty reviews with major area sponsors (MAS) and subject matter experts. Endorse recommendations of MAS, on educational skill requirements (ESRs), the program content to meet those ESRs, and educational resources which should be used to most effectively meet curricula (i.e., NPS, other DoD, or CIVINS) requirements. Director, Total Force Manpower, Training and Education Requirements (OPNAV (N12)) has final approval authority for subspecialty reviews.

j. Guest Lecture Program. Conduct a program of relevant and distinguished guest lectures to enhance currency of curricula taught. This lecture series enhances the academic experience for our students and provides opportunities to hear from senior leaders about their personal and professional lives, what worked and what didn't. The lectures also provide opportunities for students to ask questions and learn more, with each lecture a time to reflect on one's own experience and leadership skills and what could be improved.

2. Research Program and Faculty Expertise

a. Research. Engage in research to satisfy mission requirements and maintain accreditation as a graduate institution. Coordinate and approve Navy student officer research at NPS. Maintain a strong, relevant and viable faculty research effort at the NPS to support student, Navy and DoD research requirements. Research assures the continued relevance of the NPS

faculty capabilities and that the latest processes, materials, and technologies can be transferred to Navy and Marine Corps to help strengthen the nation's defense.

b. Develop Relevant Faculty Expertise. Recruit and maintain a faculty under reference (b) that is fully competent to support the required advanced programs of study and capable of applying their expertise in support of the naval service and DOD.

c. NPS Naval Research Program. Administer the NPS Naval Research Program (NRP) to provide relevant thesis and capstone project opportunities for NPS students, to provide operational awareness for NPS faculty, and to contribute to problem solving and increased capabilities across the naval service.

d. Interdisciplinary Expertise. To sustain its role as a leading center for education, research and technological development, NPS should continue to build its programs in interdisciplinary areas. This development should enhance the education of NPS students and assure the NPS faculty remain globally competitive in research and teaching.

3. Executive Education / Professional Development Education

a. Executive Education/Professional Development Education. Provide executive and continuing education programs that support innovation and intellectual growth throughout the careers of the total force.

b. Professional Education. Plan, produce, conduct and administer programs of educational services to help naval officers, authorized U.S. military officers and authorized government service civilian personnel acquire, maintain and improve their competence through continuing education and update their abilities in a cost effective manner.

c. NPS Naval Flag Executive Education. Design, develop, manage, and conduct a unique and relevant executive education program for the Navy's senior leaders that provides results-oriented seminars, workshops and tailored-support short courses. Through NPS's Center for Executive Education (CEE), create strategic-oriented educational opportunities that prepare Navy senior officers and leaders, and their staffs, to lead effectively in increasing complex US Navy and Joint organizations.

d. Joint Professional Military Education (JPME). In partnership with the Naval War College, provide opportunities for students to complete Joint Professional Military Education Phase I as a part of their NPS residential program.

e. Defense Resources Management Institute (DRMI). Direct and supervise the daily operations of the Defense Resources Management Institute, Monterey, CA, in management education courses.

4. Civilian Institutions (CIVINS)

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a. CIVINS Management. Conduct program administration, management and resource control for Navy funded graduate education programs for naval officers attending civilian universities through the Civilian Institutions Programs Office, including fully funded graduate education, advanced education, and law education programs.

b. CIVINS Student Management. Supervise, administer, control and monitor all officers enrolled in fully funded graduate education at CIVINS and select DoD institutions through the designated reporting and administrative senior officers. Publish appropriate directives to the supervisory officers to ensure efficient military supervision of students using standardized administrative and managerial procedures.

5. Navy Education Support

a. Navy Doctoral Program. Conduct administrative academic screening and administration of applicants for the Doctoral Studies Program. Recommend the selection of institutions and qualified applicants to Chief of Naval Personnel.

b. NAVPERSCOM. Maintain direct liaison with Navy Personnel Command (NAVPERSCOM) Distribution Management (PERS-45) and appropriate assignment and or placement officers concerning routine "duty under instruction" officer status changes.

c. Student Personnel Records. Maintain student and academic records on all students pursuing graduate education at NPS and CIVINS. Ensure all students' fully-funded graduate education academic achievements are reported to appropriate NAVPERSCOM personnel management offices to guarantee appropriate subspecialty coding and/or education level coding in personnel databases in a timely and accurate manner, as well as NAVPERSCOM documentation of service obligation and NAVPERSCOM follow-up in the case of those students not completing degree requirements prior to detachment from NPS.

d. Academic Profile Codes. Determine academic profile codes (APC) and maintain a database of APCs and transcript abstracts for NAVPERSCOM official use in the selection of personnel for graduate education.

6. Relationships and Partnerships

a. Relationships/Partnerships to Advance the Force. Develop and maintain strong working relations with combatant commanders, type commanders, Office of the Chief of Naval Operations (OPNAV) organization, Naval Warfare Development Command, industry, and other organizations and universities. Ensure the integration of NPS graduate students with faculty working on advanced concepts to ensure our forces remain dominant across the full spectrum of military operations.

b. University/Industry/International Partnerships. Develop and maintain partnerships with other colleges and universities, business and industry, government and the

international community. Achievements by NPS when working in collaboration with others have resulted in both direct and indirect impact on warfare developments, technical and research support for DoD, and the creation of new technologies and new military applications of technology.

c. FCA University Partnerships. Enter into partnerships with other universities in fleet concentration areas to achieve NPS and Navy objectives.

d. International Relationships. Serve as an effective instrument of U.S. foreign policy by initiating and continuing action programs which promote positive relations between the command and other nations with regard to graduate level and continuing education in support of DoD programs.

e. Partnership for Peace. Act as the United States North Atlantic Treaty Organization (NATO) Partnership for Peace Training and Education Center. Note: NPS was designated the NATO Partnership for Peace Training and Education Center (PTEC) in May 2004 by SECSTATE as part of the U.S. commitment to a revitalized NATO and its Partnerships concept to expand NATO to the east. This was an acknowledgement of the value NPS brings to the alliance and its partnership network with high-quality graduate-level programs and academic courses. NPS has proven itself to be a valuable member and leader within this PTEC community for the past 14 years.

7. Governance

a. Board of Advisors. Manage the Board of Advisors to the Presidents of NPS and the Naval War College and its subcommittees per reference (e).

8. Business and Financial Activities

a. University Reimbursable Model. Operate using a hybrid financial model built upon both direct Navy appropriations and the acceptance of significant reimbursable funding. NPS receives substantial funding both from annual direct appropriated Navy funds through its budget submitting office and from reimbursable funds from sponsors. Sponsor funding is comprised of Department of the Navy, Department of Defense and other federal agency reimbursable resourcing that supports advanced education, research, and professional development education. Accomplishment of NPS's full mission and functions requires, and is predicated on, the receipt and execution of substantial reimbursable funding.

b. Funding and Tuition. Exercise budgetary and funding control over funds allocated by CNO; develop and coordinate long and short-range financial plans and programs. Collect the cost of instruction from the Department of the Army, the Department of the Air Force, the Department of Homeland Security, other agency and defense industry contractors for instruction provided to their members.

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c. Reimbursable Funding. Receive and control funding in concert with reimbursable work including research projects at NPS.

d. Reimbursable Work Acceptance Process. Maintain a Work Acceptance Process (WAP) at NPS that reviews all proposed reimbursable work in terms of: 1) Alignment with the naval core mission, 2) Enhancement of NPS Mission and Functions, and 3) Accomplishment within NPS's FTE authorization. The "Core Mission" for NPS is defined as the education of Naval Officers (USN and USMC), including supporting research and professional development education. NPS's "Mission and Functions" is defined by this Instruction. The WAP will be applied to all NPS reimbursable activities, including: a) reimbursable education, b) reimbursable research, c) reimbursable professional development, and d) reimbursable support activities.

e. Managers' Internal Control Program (MICP). NPS recognizes MICP as a critical tool and integrates it into key processes to improve governance and mitigate risks. The program also contributes directly to audit readiness. In the end, NPS leverages MICP to ensure we have reasonable assurance, supported with appropriate documentation, that our operations are effective and efficient, that our reports are reliable, and that we comply with applicable laws and regulations. This, in turn, enables NPS to exercise purposeful management in support of accomplishing the mission and achieving the goals and objectives we set in support of this world-class institution.

f. As a premier graduate education and advanced research institution in DoD, NPS plays a key role in providing rigorous in-residence advanced education that serves as the key element in the professional development of our naval force while targeting junior to mid-grade officers at a pivotal period in their career for maturing strategic and critical thinking skills. NPS has also been a key institution in developing distance learning opportunities that provide advanced education to a broader audience of DoD professionals. Furthermore, the institution's development of graduate certificates in relevant and burgeoning disciplines provides avenues to support continuous learning throughout a career. These relatively new opportunities illustrate that NPS is committed to evolving and perfecting advanced education programs in response to a dynamic and complex national security environment.

(2) What is your vision regarding the future role of your educational institution?

(a) NPS's vision of its future role as an educational institution is reflected in our recent five year *Strategic Plan*, enclosure (3). The supporting requirements to execute this plan were defined in enclosure (4), *Sailing Directions to Support the Strategic Vision*. The strategic plan is publicly available at https://my.nps.edu/strategic-plan. The plan describes thematic areas and actions that best fulfill our recently-revised and approved mission statement.

(b) Briefly summarized, the plan calls for NPS to expand interdisciplinary teaching and research, grow new programs in important and emerging fields of technology, and improve

the effectiveness of our teaching and administrative processes. The strategic plan lists concrete actions in ten distinct areas:

1. Education improvement
2. Operations effectiveness
3. Innovation
4. Talent management
5. Ethics
6. Global Strategy
7. Emerging technologies
8. Data science
9. Environment
10. Cyber operations

(c) Some of the actions in these ten areas have already been initiated using available resources. Other areas will require new resources and new partnerships, particularly coordinating with the private sector to a much greater extent than in the past. In addition, some proposed actions may require new authorities that make it possible to create and manage consortia with industry and the non-profit sector, operate more like a working capital organization, incorporate seed funding in our indirect cost rate, and serve a wider range of students.

(3) How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?

(a) The competency of strategic assessment and thinking is an attribute NPS takes great pride in developing across multiple curricula and programs. While each degree program develops unique skills and attributes in our students, a consistent objective in all of our programs is for students to develop critical thinking and strategic analysis skills. If a student encountered a novel problem, new type of issue, or even a question, would an NPS education help them resolve that problem, understand that issue or answer that question? We feel confident that the answer to that question is "yes." The goal of our pedagogy is to inculcate students with the theory, relevant empirical knowledge and methodology needed to undertake critical thinking and assessment. We teach students to evaluate the situation, explore competing hypotheses in the search for causal factors, and then to select an appropriate diagnosis, policy response or technical solution based on theory, logic and empirics.

(b) Each of our curricula are based in academic disciplines that utilize the scientific method. While they embrace different subjects, highly diverse paradigms and different methodologies, they each introduce the student to the scientific method, which is the foundation of "critical strategic assessment and thinking." Our capstone exercise usually takes the form of a Master's Thesis, which is designed to allow the student to practice critical thinking and assessment under controlled conditions. Faculty advisors evaluate the quality of the thesis along several important dimensions in an effort to evaluate curricula effectiveness—especially our success at fostering students' critical thinking.

(c) To illustrate the above, in the NPS Strategic Studies program, students will possess a comprehensive knowledge of US national security and defense policy and military strategy. They will have the ability to develop and coordinate national and military strategy; to develop concepts and plans to employ military forces at the national and theater levels; to write strategic- and operational-level vision and guidance documents; and to formulate, articulate, and coordinate the employment of all dimensions of military power to support the ends of American national policy. The Strategic Studies program is a multi-disciplinary degree program grounded in the fields of history, international relations, comparative politics, and political economy, and requires completion of a Master's thesis as the capstone degree requirement.

(d) Moreover, in the NPS Operations Research and Systems Engineering Analysis programs, students integrate quantitative assessments in warfare analysis between the United States, China, and Russia. Both programs require Navy students to take the Joint Campaign Analysis course. The Joint Campaign Analysis class leverages previous course work in simulation, optimization, decision analysis, search theory, and probability theory by challenging our officers to apply them in a campaign level scenario. In this class students must develop a concept of operation to meet campaign objectives, model that concept to assess risk using appropriate measures for their objective, and assess "new" technical capabilities introduced by comparing them to their base line concept analytical results. The results are quantitative military assessments of new concepts and technologies, identification of force capability gaps, and risk assessments. These students are then allowed the opportunity to apply these lessons in a follow course of wargaming to obtain the human decision element.

(e) Further, Operations Research students will frequently conduct additional warfare analysis for their thesis. Systems Engineering Analysis students conduct a cross campus interdisciplinary study on a warfare topic selected by OPNAV N9I in lieu of a thesis. Our objective is to enhance our students' educational experience and sharpen their combat skills. Enclosure (5) is provided as an info paper exemplary of this activity at NPS. The paper was written for the recently held Military Operations Research Society Symposium on developing naval tactics and assessing the value of new technology in maritime warfare at NPS. It is clear evidence that NPS does develop critical thinking and strategic assessment skills in our graduates and indeed *Educates for Seapower*.

(4) How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?

(a) Curriculum Review

1. The Naval Postgraduate School conducts curriculum reviews on a biennial cycle. These reviews enable a continuous review and refinement of curricula by means of Core Skill Requirements (CSRs) and Education Skill Requirements (ESRs) that are intended to align a

set of quantifiable skills, traits, expertise, and educational objectives to allow officers to perform effectively in subspecialty-coded billets. Communication with major area sponsors on curricula is constant.

2. Per SECNAVINST 1524.2C, "Each curriculum leading to an academic degree shall be formally reviewed every 2 years by the curriculum sponsor. NPS shall maintain an ongoing dialog with curriculum sponsors to ensure curriculum relevancy, sound investment of limited resources, and that educational content fulfills the needs of the DON."

3. Per OPNAVINST 1520.23C, "Periodic review of curricula and learning outcomes is fundamental to developing a military force of adaptive, proficient, innovative leaders and experts with the knowledge and skills relevant to the strategic and technological challenges of today and tomorrow."

4. The NPS President acts as academic coordinator for all Navy graduate education programs and maintains approved curricula by means of the review process. Each curriculum has a Major Area Sponsor (MAS) who is responsible for defining current and future Navy requirements in terms of CSRs and ESRs. The President, NPS Provost, and MAS jointly validate any changes to curriculum with OPNAV N12 approval.
Academic Program Review:

a. In parallel to the curriculum review process with Navy/DON/DOD curriculum sponsors, NPS maintains an Academic Program Review (APR) process. APRs are reviews of our academic departments and programs conducted by an expert team of external reviewers selected from academia. APRs are common practice in higher education and expected for maintaining accreditation. APRs provide NPS with an objective assessment of the quality, effectiveness and currency of our programs by peer academics. APRs are conducted for each NPS departments on an approximately 5-year cycle.

(4) In your critical view, how well do you prepare your students for future assignments?

(a) NPS works closely with stakeholders and major area sponsors to ascertain and codify billet requirements so that they are reflected in the Core Skill Requirements (CSRs) and subsequently embedded into the Educational Skill Requirements (ESRs). This is accomplished in conjunction with the biennial curricula review process addressed separately within this document. Once ESRs are agreed upon and approved, the curricula and corresponding matrices are tailored to reflect the stakeholder and community needs. This process is implemented to provide each graduate with the necessary educational skills and competencies for future coded assignments.

(b) NPS oversight on the curriculum review ensures that all proposed changes to courses meet all (100%) of the ESRs. Therefore, NPS is highly successful in preparing students for future assignments in accurately coded subspecialties. Having a graduate level education in

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general broadens the perspective of Naval Officers and strengthens soft skills as well as technical expertise to meet the demands of future naval leaders.

(c) Graduate Education Learning Outcomes

1. Attention to ESRs assure that each of our curricula will prepare officers appropriately for specific job assignments. ESRs will differ depending on the curriculum and field of study. Beyond that, all of our master's degree programs are designed to satisfy general, institutional-level educational outcomes. All NPS master's degree programs provide graduate-level education with these objectives to be achieved:

a. Subject Matter Competence. Student demonstrates graduate-level knowledge and competencies in their academic field.

b. Methods and Technical Merit. Student demonstrates the ability to apply technical expertise and appropriate methodological rigor in conducting research and analysis.

c. Critical Thinking. Student demonstrates the ability to apply critical thinking and logical reasoning to research questions and to implement creative or innovative approaches to answer them.

d. Communication Skills. Student demonstrates proficiency in communicating and presenting the results of their inquiry and learning in written documents and/or oral presentations.

e. Defense Relevance. Student demonstrates the ability to apply education and learning to problems of relevance in the defense or national security community.

(d) These general educational objectives reflect the core benefit from a graduate education: Knowledge, Competence, Critical Thinking, Communications – all applied in a Defense setting. NPS believes these core skills prepare officers to better fulfill **all** future assignments—"Every tour is a payback tour!"

(5) Based on your mission statement and list of required knowledge and learning, what is your critical assessment of how well you are achieving both? What are the strengths, weaknesses, and gaps of your institution in providing your graduates with these necessary skill sets?

(a) As referred to in the previous question, the required knowledge and learning is established by defining and maintaining the Education Skill Requirements (ESRs) and Core Skill Requirements (CSRs) with Major Area Sponsors, stakeholders, subject matter experts, community managers and sponsors. NPS curriculum reviews promote the necessity of ESRs and CSRs to be linked to specific knowledge, skills and abilities defined in Navy billet requirements. CSRs specify the functional areas covered by a subspecialty discipline. They are a set of quantifiable skills, traits and experiences that a sub-specialist must possess to perform acceptably

in a coded billet. ESRs are the degree program elements required to meet a subspecialty's CSR. NPS degree programs require a formal education curriculum that meets these occupational requirements.

(b) The NPS Curriculum review process is one of the critical strengths to achieving the required learning and knowledge objectives to meet ESRs. However, as requirements change or evolve with current operational needs and emerging warfare capabilities, there is a finite amount of available classroom time, length of program, and resources within each curriculum to accommodate further growth. The challenge becomes prioritizing which skills sets and competencies are most critical for our graduates. Some NPS curricula are experiencing academic overload and along with JPME qualification becomes a depth versus quantity challenge.

(6) How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?

(a) NPS expects incoming and onboard faculty to be subject matter experts in their field of study, excellent instructors, and providers of DoD/DoN relevant research and instruction. NPS recruits the core tenure-track faculty from top Ph.D. granting institutions, with the majority having earned their degree from top 50 universities. By number, the largest sources of NPS' tenure-track faculty are:

1. UC Berkeley
2. MIT
3. Stanford
4. USC
5. UCLA

(b) NPS has both advantages and disadvantages in recruiting new faculty and maintaining quality. Major reasons new faculty are attracted to NPS include:

1. NPS' unique defense-oriented mission and programs – where it's a fit
2. Desired balance of teaching and research workload and expectations
3. Appealing Monterey location
4. Mature, committed students

(c) Major challenges in attracting new faculty (and sometimes retaining existing ones) include:

1. Non-competitive compensation for PhD-qualified faculty (particularly at higher ranks and in engineering/technical/business fields)
2. High cost of living
3. Expectation that scholarship and research activities should align with defense community interest and needs

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4. Federal government rules and regulations that constrain "normal" faculty work activities

(d) Departments often leave vacancies unfilled if no candidate meets the standards. Some faculty positions at NPS are hard to fill based on an inability to compete on salaries with other educational institutions and/or commercial entities. (Current challenging areas to hire include cyber/computers, data science, accounting, finance, engineering fields.)

(e) While at NPS, faculty are evaluated regularly and thoroughly. Expectations for faculty work activities and accomplishments vary depending on faculty type (Tenure-Track vs. Lecturers vs. Research Faculty). NPS' workload model and performance expectations for tenure-track faculty are appropriate to a graduate-level, research-oriented civilian university. Similar to peer universities, tenure-track faculty are evaluated on Teaching/Instruction, on Research/Scholarship, and on Service.

(f) Various review processes and methods are employed to evaluate faculty accomplishments and effectiveness. A few examples include: Instructional effectiveness evaluated by students (Course Evaluation Forms). Scholarship and publication reviewed by peers as part of the normal publication process. Sponsored research, or other sponsored work, assessed by reimbursable sponsors. Annual reviews performed by department chairs and/or senior faculty. "Third Year Review" for new tenure-track faculty. Formal promotion and tenure review by NPS' institutional P&T process. While the vast majority of candidates receive tenure, the process itself still enforces standards because faculty who do not anticipate meeting the standards often leave before the tenure process begins or convert to non-tenure track positions.

(7) Do tenure, right to publish, and ability to research constitute major issues that need review?

(a) Awarding tenure, allowing faculty to publish, and facilitating faculty research activities are all essential aspects of NPS' university and faculty model. Accomplishment of NPS' mission requires it to operate as a graduate-level, research-oriented institution. To attract top faculty, NPS must provide a faculty work environment that is comparable and competitive with peer civilian universities. Tenure, publishing and research are each necessary to attract and retain an NPS faculty capable of accomplishing NPS' mission.

(b) Permitting and maintaining tenure, research and publishing at NPS does not need review, and compromising any of these activities would be significantly detrimental to NPS and the performance of the NPS mission.

(c) Generally, NPS' current environment with respect to tenure, publishing and research activities is satisfactory. NPS's ability to tenure faculty members (defined by the "Pink Book") and the process of doing so are adequate and do not need review. Faculty at NPS have full academic freedom to publish with an appropriate policy of publication review. In terms of conducting research, NPS's faculty workload model incentivizes faculty to maintain a relevant

and continuous research program, which in turn feeds back into the instructional mission. In all, the ability of faculty at NPS to access reimbursable research funding is good, with strong relationships with sponsors across DoN, DoD, and beyond. (Pink Book is the Naval Post Graduate School Policy Regarding Appointment, Promotion, Salary, and Tenure of Office of the Civilian Members of the Faculty, dtd 26 January 2015)

(d) Nevertheless, there are serious issues related to conducting research, mostly centered around externally imposed business practices and oversight that go beyond the requirements of compliance and auditability. These are addressed in the *Sailing Directions* memo addressed in this document. There are also special issues, a consequence of NPS faculty being federal government employees, that result in additional hurdles to publication not experienced by faculty at civilian universities (e.g., intellectual property and copyright control; security review of publications). Relaxing such constraints, if possible, would enhance the research and publication environment at NPS.

(8) How is the DON-wide requirement of audit addressed in your curricula?

(a) The following table reflects the percentage of audit readiness material in each of the Graduate School of Business and Public Policy (GSBPP) courses listed below.

Audit Content in School Curricula			
Course Name	**To Whom Offered**	**Content**	**% of Content**
Financial Reporting & Analysis	All MBA students, regardless of subspecialty; all EMBA students	This is our first quarter core financial accounting class. We compare corporate accounting to government accounting. Students learn the types of audit opinions (unqualified, qualified, adverse, and disclaimer). We review the DON annual report and discuss the disclaimer of opinion and the internal control weaknesses that the auditor identifies as the basis for the opinion.	20%
Defense Budget Policy & Financial Management Systems	All MBA and EMBA students, plus students in MS (Mgmt.), MS (Contract Mgmt.), MS (Program Mgmt.), MS (Systems Analysis), MS (Cost Estimating)	This is our key public policy and budgeting class. Faculty discuss auditing as a policy issue where students learn to compare accrual-based accounting to budgetary accounting, and discuss the public policy aims of the Chief Financial Officers Act and other pertinent legislation.	10%
Defense Financial Management Practice	All MBA-FM students, plus students in EMBA, MS (Systems	Where the budget policy class covers strategy and the processes that result in broad budget allocations to support that strategy, this class is focused on the detailed budget formulation and	30%

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	Analysis), and MS (Cost Estimating)	execution processes. The class is framed by internal controls to ensure an accurate budget, compliance with fiscal law, and proper accounting for reimbursable and the NWCF.	
Conrad Seminar in Financial Management	All MBA-FM students	Taught by a former OPNAV N8, this seminar features a number of presentations on matters of practical and current interest to Navy FM, including presentations by FMO on Navy audit readiness.	10%
Internal Control and Audit	All MBA-FM students	In this auditing class, we cover both industry auditing standards as well as Government Auditing Standards (The Yellow Book), both the COSO Internal Control Integrated Framework as well as Standards for Internal Control in the Federal Government (The Green Book), and fraud issues in the military and the federal government. We also cover Financial Improvement and Audit Readiness (FIAR) and DOD Instruction and guidance related to the MICP and audit readiness in DOD, DON, and other federal agencies. In addition, we discuss auditing from both the auditor and the auditee perspectives.	100%
Financial Management for Acquisition Professionals	Students in MS (Program Mgmt.) and MS (Systems Engineering)	While this course is designed for the unique aspects of budgeting and financial management for acquisition programs, the importance of the audit requirement is covered and how proprietary accounting differs from budgetary accounting.	10%

Course Name	To Whom Offered	Content	% of Content
Financial Management in the Armed Forces	Required for students in MS (Info Tech Mgmt.) and MS (Network Operations); commonly taken as elective by students in other programs.	This course is a hybrid of the budget policy and budget practice courses described above and is designed for students outside the School of Business and Public Policy. Auditing topics emphasize the policy aims of the audit requirement and the role of IT systems in achieving auditability.	10%
Other			
Certification Preparation	Elective courses, taken primarily by MBA-FM students	We offer prep courses for the following professional certifications: Certified Management Accountant (CMA), Certified Fraud Examiner (CFE), and Certified Defense Financial Manager (CDFM).	10-20%
Navy Senior Leader Seminar (Center for Executive Education)	Navy O-6 and GS-15; 7 classes per year.	Every class includes a presentation and discussion on the background, status, and importance of audit readiness, and what seminar participants can expect to experience during an audit and what they can do to assist.	10%

(b) The following table reflects the GSBPP programs and the corresponding audit readiness attributes included within the curriculums.

Program	Policy Requirement & Status of DoN	Internal Controls	What to Expect When Being Audited	Compare Proprietary & Budgetary Accounting	Compare Corporate & Federal Accounting	Auditing Standards
MBA (all subspecialties)	X		X	X	X	
MBA (FM subspecialty)	X	X	X	X	X	X
EMBA	X	X	X	X		
MS (Management)	X			X	X	
MS (Program Mgmt.)	X	X	X	X		
MS (Contract Mgmt.)	X	X	X	X	X	
MS (Systems Analysis)	X	X	X	X	X	
MS (Cost Estimation & Analysis)	X	X	X	X	X	
MS (Systems Engineering)	X	X	X	X		
MS (Information Technology Mgmt.)	X	X	X	X		
MS (Network Operations & Technology)	X	X	X	X		
Navy Senior Leader Seminar (Executive Education)	X		X			

(9) What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?

(a) The Naval Postgraduate School has administered a Graduating Student Survey (GSS) since 1993. Approximately 60% of expected graduates respond each quarter. The survey is comprised of 40+ questions with responses on a 5-point scale. Questions cover students' experience with their curriculum, instructors, thesis, satisfaction, labs, classrooms and the library.

(b) The survey ends with an open-ended comments section. Many students express their positive experience and thanks in the comments section. Examples include:

1. NPS has been one of the best experiences of my career thus far. The staff were heavily invested in my education and growth as both a student and a professional military

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officer. The training afforded a means to explore complex military challenges in a less traditional manner.

2. The experience at NPS has been truly rewarding. It has provided me with a broad intellectual horizon: capacity and capabilities to think and analyze unforeseen problems and provide a just and workable solution. That is my take-away from my scholarly engagement at NPS.

3. The experience and knowledge I gained at NPS has been a tremendous benefit to my professional career as well as benefits to my command in the quality of the work and analysis I can provide.

4. I consider myself extremely privileged to have been given the opportunity to participate in such an informative and knowledge-rich program. I am eternally grateful for the experience.

5. NPS fills a critical niche in defense-related graduate education. My experience here exceeded my expectations.

6. I am honored and very appreciative of the opportunity and knowledge that I gained at NPS. Thank you.

7. From the GSS, NPS aggregates responses from specific questions to measure Student Engagement. The underlying premise is that high student achievement follows from students being highly interested in, actively involved, and "engaged" with their studies. Aspects the students' education experience we assess via Student Engagement include:

a. Enrichment – Diverse Learning Experiences
b. Challenge and Involvement
c. Student Satisfaction
d. Student-Faculty Interactions
e. Enrichment – Student Diversity
f. Defense Relevance of the Program
g. Capstone/Thesis Experience

(c) The most current Student Engagement report in 2016 found:

1. In general, NPS students score NPS very highly on each of the seven dimensions, with average scores between 4 (Positive) and 5 (Strongly Positive).

2. Two areas are consistently highest: NPS students are most strongly satisfied with their program at NPS (Student Satisfaction) and their interactions with NPS faculty (Student-Faculty Interaction). Although still positive, one area is consistently lower: Students are less satisfied with the Diversity of their Learning Experience.

3. In the Student Satisfaction dimension, graduating students would overwhelmingly recommend NPS to other officers or government civilians (4.50 score 2016, 4.55 average score 2007-2016).

4. Highly important is the Defense Relevance dimension, where students report on the alignment of their education programs to their military/defense career. While it's not a surprise, given NPS' education mission, to see high ratings here, it's still satisfying to know students appreciate the relevance of their education from NPS.

(d) Students also write comments regarding their instructors, programs, policies. They provide feedback on the campus library, the condition of the classrooms, and issues unrelated to their education (health services and housing provided by outside agencies). Comments are gathered (anonymously) and distributed to NPS administration, school deans and chair people for their analysis.

(e) Beyond the GSS, NPS employs other student surveys that provide additional assessments of NPS' programs. To mention three:

1. Department/Program Surveys: Exit surveys are also conducted by several of the academic departments at NPS. These surveys have questions related to the specific curricula and programs within each department. Student assessments from these department or program surveys are collected and utilized by the individual departments, and are used to inform the Curriculum Reviews.

2. Course Evaluation Forms (CEFs): Formerly called Student Opinion Forms (SOFs). CEFs are administered for each individual course taught at NPS. CEFs provide student feedback on the effectiveness of instruction and the learning experience in the course.

3. Alumni Survey: Although not conducted recently, NPS has previously surveyed its alumni population, to assess the value of NPS' program later in graduates' careers. NPS is in the initial stages of designing and conducting its next alumni survey.

(10) Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW)?

(a) NPS is highly integrated with the Navy and Marine Corps through curriculum sponsors on the education side and research sponsors on the research side. Navy and Marine Corps senior leaders actively participate in curriculum reviews to ensure the NPS degree programs are meeting the current and emerging requirements for the sponsor. The normal cycle for a curriculum review is every two years with regular contact between the sponsor and the department in the intervening period. That periodicity is just right as more frequent changes

would be disruptive for students and faculty. On the research side, the Navy and Marine Corps engage with NPS through reimbursable research and the Naval Research Program. On the reimbursable side, the research portfolio includes the Fleet Warfare Development Centers, Naval War College's Warfare Analysis Group, USFF, NAVAIR, NAVSEA, the Marine Corps Warfighting Lab, Marine Corps University, NRL, ONR, NAVSEA, Navy Cyber Warfare Development Group, OPNAV, and Space and Naval Warfare Systems Centers (SSC). The Naval Research Program connects NPS to a broader group of research sponsors across every code in OPNAV, Fleet Forces, Marine Corps Operating Forces and Supporting Establishment.

(b) This dedicated funding draws NPS faculty and students to work on the most urgent or important issues facing the various commands within each service. The wargaming classes integrate real world sponsors into the classroom. As students learn to design, develop, and execute a wargame, they are given actual commands to design, develop, and execute a game, then must analyze and summarize the game's results for the sponsor. Sponsors include United States Fleet Forces command; Commander, Naval Surface Forces Command; SPAWAR; and NAVWARCOM. Issues addressed by the students include advancing the Distributed Maritime Operations; integration of MEU/ARG assets in war at sea strikes; concept of employment for the Undersea Constellation; and the future role of naval special warfare.

(c) NPS also conducts a campus-wide and annual Warfare Innovation Continuum. This continuum addresses a major topic of maritime warfare interest and provides a common unclassified great power scenario for use by relevant faculty across the campus. Past topics included "Distributed Air and Surface Warfare," "Leveraging the Undersea Environment," and "Cross Domain Operations." The continuum activities include capstone courses like the wargaming class, Joint C4I class, tactical oceanography class, the joint campaign analysis class; the Warfare Innovation Workshop; the Total Ship Systems Engineering design sequence; and CRUSER research efforts. It is not uncommon for 400 faculty, students, and sponsors to be involved in this effort. An annual executive report is distributed to interested Navy commands and OPNAV. Enclosure (6), the NPS Wargaming Activity Hub Quarterly Report (Spring 2018), provides a recent summary of campus wargaming activities for faculty and students.

(d) Notably, NPS has recently established a resident network of Warfare Community Chairs on staff, including those representing USW, MIW, Surface, Aviation, IW, NSW, and USMC. These Warfare Chairs, all of which are at the O-6 or above level, are fully integrated with our respective schools and students, and ensure an institutional linkage with each of their respective DON Type Command (i.e., SUBFOR, SURFOR, AIRFOR, IFOR and CNSWC) and Warfare Development Command (NUWDC, NSMWDC, NAWDC, NSWDEVGRU, MCCDC). The warfare chairs facilitate access to research and the flow of current, relevant Fleet data and information to NPS leadership, faculty and students. One recent example of our Warfare Chair impact: Our MIW Chair, a RADM(Ret), organized the recent 13th International Mine Warfare Technology Symposium for OPNAV N95, ONR, Mine Warfare Association, and NPS sponsors. There were Navy, laboratory, acquisition, industry, and about 25 International attendees. This symposium is the only U.S. Navy sponsored Mine Warfare Event. NPS students and faculty

attended free of charge and five NPS student groups presented their thesis and thesis equivalent projects to Symposium attendees.

(e) Regarding cooperation with non-DoD academic institutions, NPS at one point had fruitful and ongoing relations with a number of FFRDCs and UARCs. Unfortunately, activities along these lines has dwindled, perhaps as an unintended byproduct of the 2012 IG inspection and attendant management oversight restrictions. It would be to the benefit of DoN and DoD to have a renaissance in the relationships between NPS and the FFRDCs/UARCs, to provide for cooperative research and faculty/student experience tours.

(f) Looking forward, NPS should be more integrated with the broader DON educational enterprise and other academic institutions mentioned above. Many Navy professional military educational programs are clustered in Newport, Rhode Island. Most Marine Corps professional military educational programs are clustered in Quantico Virginia. On the positive side, NPS is unique in DoD and very distinct from being another PME (read JPME) institution. On the negative side, NPS is disconnected from the education of the majority of officers in the Navy and Marine Corps. Those officers in the normal PME pipeline who are not

familiar with NPS do not know how to leverage its educational and research programs. More importantly, those officers in the general PME pipeline do not get exposed to the latest developments in fields such as data science, machine learning, space systems, and information warfare. By contrast, officers at NPS must complete their normal (J)PME program while completing their rigorous academic program. NPS students get the benefit of PME and a high quality master's program. Officers in the Navy and Marine Corps PME pipeline do not get the benefit of the NPS graduate education experience. Brigadier General Bowers, USMC, Commanding General of Education Command in Quantico Virginia, identified this problem and is developing opportunities for students at Marine Corps University system to work with their peers at NPS. This is a model that should be expanded and applied across the DON.

(10) What is the role of your advisory board? Where is it most helpful, and how can its contribution be improved?

(a) The NPS and the Naval War College (NWC) currently share one overarching Advisory Board with two separate and distinct subcommittees overseeing each institution. The charter of the NPS and NWC Board of Advisors specifies that it provides advice to the Secretary of the Navy (SECNAV) on naval graduate education programs. The overarching Board and both subcommittees meet in the Washington DC area in the fall. Each subcommittee also meets at their respective institution in the spring. This allows each of the subcommittees to interface with students and faculty and get to know the institutions to provide feedback and recommendations to improve. The Navy Staff has a representative on each of the subcommittees as a conduit for information. Formal reports from these meetings are then furnished to the SECNAV (via the CNO and Commandant of USMC) with the members' independent perspectives on issues vital to the operation of the institutions, to include the administration, facilities, state of the student body, fiscal affairs, faculty, and overall climate of the institutions.

(b) NPS and NWC are graduate institutions with degree-granting authority accredited by the Senior College Commission of the Western Association of Schools and Colleges (WASC) and the New England Association of Schools and Colleges (NEASC). WASC and NEASC accreditation requires that institutions have "an independent governing board or similar authority that….exercises appropriate oversight over institutional integrity, policies, and ongoing operations." The accreditation agencies also require that institutions show clear lines of responsibility and resource allocation policies. At present, the Board of Advisors to the Presidents of NPS and NWC is considered as this independent governing board uniquely established to provide appropriate oversight.

(c) The current advisory board structure for NPS is well functioning and value-added. For minimal resources (total annual cost for both NPS and NWC is approx. $33K), the advisory board provides effective oversight and timely input to both the President and SECNAV.

(11) The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?

(a) NPS recently modified its Mission and Strategy to ensure alignment with the National Defense Strategy. NPS strives to provide relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. NPS maintains a program of defense-relevant research to provide thesis and research experiences for Navy Officers, to improve the curricula, to support the needs of Navy and Department of Defense, and to build the intellectual capital of NPS faculty. To support NPS' core Navy mission, NPS' programs are inherently joint, inter-agency, and international.

(b) In general, NPS recognizes a continuing need to remain cognizant of the changing defense environment and, where appropriate, to evolve its programs accordingly. It's a standing practice of NPS to monitor and review major strategy, policy and guidance reports from DON and DOD. NPS both circulates for attention and keeps a library of such documents on a "From the Pentagon" intranet webpage, highlighted with the most current documents on the site's homepage. Recent entries and attention includes:

1. National Defense Strategy 2018
2. CNO Way Forward for 2018
3. SECDEF Memo on Stewardship 2018
4. DOD Nuclear Posture Review 2018
5. US Navy Health of the Force 2018
6. National Security Strategy 2017
7. Navy - Strategic Readiness Review 2017
8. Navy - Comprehensive Review 2017
9. Navy Leader Development Framework 2017

(c) NPS' new *2018 Strategic Plan* addressed earlier in this document was developed with reference to the National Defense Strategy and the current broader defense context. This *Strategic Plan* set directions for NPS as an institution.

(d) At the academic program level, continuous review and refinement of the curricula, at least once every two years, using subject matter experts and critical stakeholders, provides a means to evaluate, assess, and identify needed adjustments to adapt to the current national/defense/security strategy and environment, and provide the required capabilities to support.

(d) More broadly, NPS' education mission itself puts us in a position to support the 2018 National Defense Strategy. While curricula differ widely in their technical subjects, the objective of all NPS' education programs is to further develop the analytical reasoning and critical thinking abilities of our students. We strive to inculcate innovative and agile thinking into the officer corps.

(12) How are your student bodies changing over time (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?

(a) In general, the current NPS student body has the same career goals, aspirations, and thirst for knowledge as previous generations. But to attract the best officers and future leaders, our naval officers must be convinced their education will be appreciated and utilized. In the 1960s, line officers wanted technical and engineering education because it had obvious use to the fleet. Gradually, line officers came to realize – in fact they were told – that fleet skills (i.e., in the air) counted more than the education and skill necessary to improve the machines they operated or to develop new tactics. Additionally, current officers want to know their skills are valued and appropriately considered at promotion and selection boards. Simply put, they desire an honest opportunity to achieve their individual definition of success by applying their interests and talents.

(b) In practical terms, a higher fraction of NPS students coming to the Physics, Mechanical Engineering and Systems Engineering programs are requiring refresher quarters than in previous years. In fact, the June 2018 influx of students included 13 students (of 64 total) requiring refreshers. And five (5) of those 13 needed two refreshers (note: requiring two refreshers has always been very unusual). This may be a reflection of a lower STEM population in undergraduate programs in general, creating a smaller pool for DON Detailers to fill quotas with qualified people. Without qualified applicants, but with the same demand to produce graduates with subspecialty codes, NPS is adding time to some student's programs in order to get them from a lower input baseline up to graduation. That said, recent students who have come directly from the USNA have been top notch—better than in the past (~10 years ago).

(c) The student population is becoming more diverse as the military becomes more diverse. Students are current and comfortable with technology and want to embrace it in the classroom, however, not all of them want to program it or rush off to start their own business.

The students have the intellectual capacity to complete the NPS program; however, there have been a few who did not have the proper undergraduate education to succeed without a lot of extra work on the part of the instructors. Also, another graduate student trend is as the technology is becoming more complex, they have less familiarity with what drives the technology they use. Some students approach problems with a "black box" mindset (i.e., they understand that X goes into the box and Y comes out of the box), but they don't have even a conceptual understanding of what happened inside the box.

(d) In general terms, it is difficult to quantify curiosity, aspirations, background, and intellectual capacity across a student body. That said, the opinions offered by multiple post-major command O6s on staff at NPS suggest the current student body is as talented and motivated a group as ever. In one CAPT's experience—now in his fourth command tour, having led a squadron conducting combat operations, a fleet replacement squadron training our youngest Sailors and officers, and a wing command for 22 fleet squadrons—our young military members are as good or better than he's observed over 31 years in the Navy. Much has been said about the millennial generation—some have said they have short attention spans, entitled attitudes, and an expectation of immediate gratification. While there may be some elements of truth there, this generation—when given a meaningful task and the resources to succeed—is as capable, often smarter, more inclusive, and more creative than any other generation. NPS is confident our DON recruiting efforts are succeeding in delivering the best and brightest. Our challenge as leaders is to stay far enough ahead of them to keep them engaged.

(13) How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?

(a) For direct mission funds NPS has one resource sponsor—the Chief of Naval Personnel (CNP/OPNAV N1). CNP/OPNAV N1 is also the fiscal authority as their Comptroller serves as the Budget Submitting Office (BSO-22). NPS direct funding is programmed and advocated for via the same BSO office. As a result, funding issued to NPS is well known in advance of each year and in-year adjustments occur (up or down) as a result of Congressional action or priorities set by SECNAV, CNO or CNP.

(b) The NPS President has a standing bi-weekly meeting with OPNAV N12 and the BSO Comptroller to discuss current and future issues. The NPS Comptroller has a similar monthly meeting with the BSO Deputy Comptroller. Notably, while NPS is designated as an Echelon II command, the school is financially subordinate to CNP/OPNAV N1. As a result, NPS' budget flexibility is tied to the overall funding status and priorities of BSO-22 and CNP/OPNAV N1. All NPS priorities and unfunded requirements compete against BSO-wide priorities and unfunded requirements, many of which are separate and distinct from the mission of graduate education and research.

(c) NPS budget resources historically have been derived from previous POM submissions to CNP/N1. In recent POM cycles, only a few NPS issue submissions above our

core requirements have been approved. Enclosure (7) provides a compilation of the past four NPS POM issue submissions; a summary of each POM submission is provided below. Those issues that were approved for funding are noted accordingly; all other issues were not approved in that budget cycle.

1. POM20. *All issues are still pending funding approval*

   a. FSEP Funding Continuation
   b. NPS All-Student General Cyber Course
   c. NPS Learning Spaces Upgrades
   d. Recapitalization NPS Laboratories
   e. Classified Computing Modernization
   f. Data Science Center of Excellence
   g. Sea Land Air Military Robotics (SLAMR) Facility

2. POM19

   a. Civilian Institutions (CIVINS) FYDP Add-On—*Issue Funded*
   b. Recapitalization to Support Naval Operational Curricula

   c. Recapitalization to Support Naval Technical Curricula
   d. Recapitalization NPS Laboratories
   e. Naval Distance Learning Education Evolution
   f. NPS All-Student Cyber Course
   g. Navy Talent Management Data Repository

3. POM18

   a. Civilian Institutions (CIVINS) FYDP Add-On—*Issue Funded*
   b. Recapitalization to Support Naval Operational Curricula

4. POM17

   a. Command Business Practices/Compliance—*Issue funded via FTE plus-up in Direct Funding*
   b. CIVINS Tuition
   c. NPS Learning Spaces Upgrades
   d. Naval Force Education
   e. Educational/Technological Infrastructure
   f. Cyber Certificate-To-Degree Program
   g. Systems Engineering P-Code DL Program

(d) NPS has established and funded (internally) new programs of instruction; however, NPS attempts to be as flexible as possible when new educational requirements are

executed. The problem with the existing process is that requirements for educational programs are requested by Navy leadership but without additional funding. As a result, NPS must cut something out of existing programs or forgo planned equipment procurement, classroom recapitalization or laboratory upgrades.

(e) NPS Total Obligational Authority (TOA) is comprised of Navy direct O&M, and RDT&E funding and reimbursable funds from various federal and non-federal sources. The O&M/RDT&E funds and reimbursable funding is roughly evenly split. NPS may execute its direct Navy non-labor (O&M) without constraints; however, reimbursable funds have been significantly reduced the past five years due to policy constraints primarily related to the Navy "51 percent rule" for accepting reimbursable work. Due to the nature of NPS research and sponsored activities, requirements often conflicted with the Navy Comptroller's directive that a minimum of 51 percent of reimbursable work be completed in-house. While waivers may be requested, from 2015 to mid-2018, no waivers were submitted or entertained. In May 2018, NPS submitted the first 51 percent rule waiver via enclosure (8). ASN (FMC) approved this categorical waiver for hiring post-doctoral candidates on 2 July 2018. NPS intends to submit additional categorical 51-percent waiver requests to ASN (FMC) in the coming weeks. We expect these waivers will dramatically improve NPS' ability to accept reimbursable activities and perform substantively more graduate research activity.

(14) What constraints have you experienced regarding the execution of your vision for the future? How can this Study best help you in that regard?

(a) The new NPS *Strategic Plan* in enclosure (3) reflects the expansive and cutting-edge relevancy the Secretary of the Navy articulated for the school in early 2018. As previously addressed, the plan was also accompanied by an NPS memorandum to the Secretary of the Navy titled *Sailing Directions to Support the Strategic Vision,* enclosure (4). This memorandum defined the barrier removal, enablers and policy actions necessary to achieve the Secretary's shared vision for NPS and it's well suited to address this question.

1. The contents of the *Sailing Directions* memo are included below.

a. NPS recently submitted a revised Mission and Functions instruction for approval. The new instruction provides a revised mission statement and multiple other key updates related to our education programs, research and faculty expertise, relationships and partnerships as well as business processes. NPS requests immediate approval of this important overarching instruction. In addition, NPS continues to evaluate its relationship with the NPS Foundation and how it can be expanded into a more robust and productive partnership. NPS appreciates your staff counsel's continued support and collaboration with this critical initiative.

b. Regulations and rule sets that have been imposed or reinterpreted to manage oversight of a standard annual appropriations command have created significant barriers and often paralysis within our academic institution and its complex business model. NPS

requires flexibility with discrete, targeted waivers to current regulations in order to effectively execute its advanced research and education mission. More specifically, NPS requires:

(1) ASN(FMC) and CNP/OPNAV N1 approval of NPS:

(a) Authority to waive the 51 percent rule on Economy Act Orders to support sponsored education and research. This waiver would be used on a case-by-case basis when the NPS President assesses it's in the best interest of the Navy for education and research funded by DoN/DoD sponsors.

(b) Authority to charge overhead using a total direct cost model for reimbursable work. The current cost model is limited to labor and travel only and does not accurately or equitably capture indirect costs across all reimbursable work.

(c) Authority to coordinate all contracting support for any NPS centers (e.g., Center for Homeland Defense and Security, and Center for Civil-Military Relations) with Naval Supply Systems Command (NAVSUP) via NPS memorandum of agreement when that support is funded via other sponsors.

c. To execute the mission effectively, NPS needs to maintain a world-class faculty and staff. In the academic world this requires enablers such as a more flexible salary cap and the ability to approve faculty appointments longer than one year. More specifically, NPS requires:

(1) ASN(M&RA) and CNP/OPNAV N1 approval of NPS:

(a) Authority to increase the DoN faculty pay schedule "Pay Cap" to enable NPS to compensate our tremendous faculty where appropriate, based upon distinct positions, qualifications and specialty.

(b) Authority to establish time-limited General Schedule (GS) positions under Schedule A in the excepted service to support variable reimbursable work performed in the academic schools. The key words here: time-limited.

(c) Authority to hire foreign nationals under Schedule A of the excepted service on a limited case basis and based upon critical subject matter expertise that will serve in key non-critical sensitive faculty positions.

d. As stated in (the SECNAVs) 1 February speech, NPS serves as "a critical component in the retention, education, and development of the talent we have in the Navy-Marine Corps team, our fellow services and government entities." To continue to attract and educate the best students, NPS requires the Navy to place an increased value on in-residence graduate education. Further, the Navy should leverage our international relationships to enhance

this in-residence education and build maritime partnerships with an increase in foreign students. Specifically, NPS requires:

(1) ASN(RDA), CNP OPNAV N1 and/or OPNAV N3/N5 approval and support of:

(a) Ability to attract the most talented and career competitive naval students possible, to include due course officers in the unrestricted line communities.

(b) Adjustment of promotion and administrative screen board precepts to reflect the distinct nature and career value of in-resident graduate education.

(c) Efforts to increase international student enrollment by enhancing the visibility and stature of NPS in DoD security cooperation and maritime partnership efforts. This action would in turn enhance in residence education and build further trust and interoperability with our international partners.

(b) The actions summarized in the above paragraphs will provide NPS the academic agility and regulatory flexibility to enable the Strategic Plan while operating in an effective and innovative manner. This will in turn raise our national and global profile as a world class institution of advanced research and graduate education, creating an institution that is laser-focused on relevancy in direct support of the National Defense Strategy and the Design for Maintaining Maritime Superiority.

(c) The NPS Team looks forward to coordinating with the Education for Seapower Executive Board to continue to enable this plan and vision.

(15) If you could make major changes to your institution and to the naval educational enterprise, what might they be?

(a) NPS addressed this question in the *Sailing Directions* memorandum referred to in the previous question. The answer is included below.

(b) Long term, the Navy may need to develop a new paradigm and organizational construct for NPS, one less constrained by ubiquitous bureaucratic processes and barriers; a construct that could allow the institution to function in an innovative and more effective manner with an ability to truly leverage the best practices of the non-DoD academic and research domain. NPS recommends the Navy charter an independent study to evaluate new organizational alignment and operational constructs for NPS, such as that of a working capital fund or a federally funded research and development center.

(16) Does the DON have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how would you create one?

Subj: RESPONSE TO EDUCATION FOR SEAPOWER REQUESTED INFORMATION

(a) The DON has a consistent culture of learning the same things over and over again. If we define learning as "the acquisition of knowledge or skills through experience, study, or by being taught," then the DON excels at imparting knowledge and skills to incoming personnel. The DON possesses a well-defined and smoothly operating network of training and educational institutions to replicate its existing organization, practices, and operations. The existing training and education framework ensures all personnel achieve the required minimum standards of performance in their positions. All that said, while there are many examples of individual commanders instilling a "culture or learning" in their units, a "culture of learning" does not exist across the Department of Navy or across the services.

(b) The DON lacks a "culture of learning" that inspires a desire to learn in each individual to achieve levels of performance that exceed the minimum standard required. In this case, the "culture of learning" is measured by the number of personnel that exceed the minimum standard and pursue excellence through self-directed education. This self-directed education includes a professional reading program, participation in conferences, publishing in professional journals, and instilling a passion to improve in peers and subordinates. This culture of learning exists in specific commands with particular leaders at specific moments in time. LtGen Van Riper created such a "culture of learning" while assigned as Commanding General, Marine Corps Combat Development Command (MCCDC) in 1995-1997. As Commandant of the Marine Corps, General Krulak promoted that "culture of learning" through organizational constructs such as the Marine Corps Warfighting Lab, interactions with new officers at The Basic School, and an emphasis on professional military education.

(c) The greatest challenge to instilling a true "culture of learning" is the tyranny of the urgent. Commanders at all levels expect instantaneous feedback to email taskers. Unit training and exercise schedules are packed with activities and have minimal white space by design. Learning requires "reps and sets" as General Robert Neller, USMC, has often stated. Learning requires reflection and informed discussion. The DON has systematically increased the general training and administrative burden over the last fifteen years, often for good reasons, but the net effect was to appropriate the majority of commanders' time to requirements for pre-deployment training, unit training, and administrative tasks—with little room for anything else. It is impossible to create a culture of learning unless there is a systematic effort to create white space for leaders and units at all levels.

(d) The Navy recognizes fleet skills are perishable, which is why, for example, it provides refresher training for aviation and surface officers returning to the fleet. Although there are opportunities with continuous learning programs and certificates, there is no comparable, formalized program for refreshing educational skills. Technology and cyber warfare are changing so rapidly that officers must have refreshers to stay current in science and engineering. This presents the challenge of upholding the level of importance of continuous learning when compared to operational requirements and training for those operational requirements. This real-word constraint—which tightens the time on a shrinking fleet and its personnel—demands the organization places most value on those career choices which optimize at sea time or positions supporting operational forces. One solution to this challenge is end strength. If manning

requirements were artificially expanded to account for additional officer and senior enlisted educational time (similar to buying additional aircraft for training purposes), and additional qualification designators and select sub-specialties were valued in promotion and selection and educational boards selected personnel for specific programs, we may be able to increase the value of education in the institution.

(e) Instilling a "culture of learning" requires space, time, and command interest. The DON should require all of its members to get involved. SECNAV could identify a book for the DON to read. During subsequent visits to a unit, ship, or installation, the SECNAV could ask who read the book, what insights they gained and what they recommend moving forward. In short order, all DON personnel would be very interested in reading. CNO and CMC could identify a topic for discussion during a quarter and provide facilitator packages to leaders at every level. Personnel should be encouraged to provide feedback online, at scheduled symposia, and in conversation when senior leaders visit. This example from the top could be explicitly discussed at commander's courses, new flag and general officer courses, and in entry level training.

(f) Moreover, higher level education (not training) should be mandatory for promotion (for O-6 and above) as a demonstration of critical thinking skills and capability. Progression within all USN warfare designations should have an explicitly defined construct of required stages for promotion, tailored to the needs of the specific USN warfare community: initial qualification, practical application and experience, JPME, tactical level mastery, higher level education, joint billeting/JMO2, warfare command, major command. This

experience and education construct will be longer than the traditional "up and out" timeline and require longer durations of time in rank (i.e., the stage has been set with "above zone" removal).

(g) Within NPS, there is no real metric to capture the relevance of our research and learning efforts to the larger DoN and DoD. While some faculty research and student theses have had direct impacts on shaping Navy policy and technological development, many theses seem to just "sit on the shelf" in the library with their true value untapped. Thus, one recommendation NPS intends to consider is creating a sponsor feedback mechanism whereby each student thesis or faculty research paper should, within 90 days of publication, receive a short statement from the sponsoring organization describing whether that product is providing value and if it is likely to influence follow-on policy or research/technical development.

(h) Lastly, the SECNAV and OPNAV should carefully study current USAF initiatives to supplant the P-code system with a more nuanced and detailed composite indicators of skills by individuals over a career continuum, which combines an officer's unique education, training, and experience into a portfolio of skills accessible to a more flexible detailing marketplace. Enclosure (9), the USAF's concept of operations on addressing education across an Airman's entire career, is provided via our resident NPS USAF Military Associate Dean.

Subj: RESPONSE TO EDUCATION FOR SEAPOWER REQUESTED INFORMATION

(17) What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in residence, and in your opinion, their capacity for addressing complexity and added lethality? How would you deliver JPME differently?

(a) The Naval War College (NWC) Monterey, a satellite office of the United States NWC, College of Distance Education (CDE) is located on the NPS campus in Monterey. In partnership with NPS, NWC provides qualified officers and select DoD civilians attending NPS with the opportunity to earn a Naval War College Command and Staff program diploma. The NWC program is designed to educate professional naval officers in areas that will enhance their performance in command and in decision making positions on major staffs. NWC Command and Staff program graduates are eligible for "joint coded" billets and those officers can negotiate class dates for the Joint Forces Staff College (JPME phase II) with their detailers or await assignment to a senior level service school.

(b) Eligible officers and select DoD civilians who wish to earn a Command and Staff program diploma need to complete an NWC course in all three core disciplines: Strategy and War (S&W); Theater Security Decision Making (TSDM); and Joint Maritime Operations (JMO). Course options include Fleet Seminar, Web-enhanced correspondence, and NWC Monterey courses. Courses may be completed in any order and in any combination of course options. Students do not earn a NWC Masters degree in Monterey as the program does not offer Fleet Seminar course requirements for the degree.

(c) As part of the agreement between NWC and NPS, the program is structured at NPS so that students enrolled in a Masters Degree program are able to earn a NWC, College of Distance Education Command and Staff diploma in four quarters. The NPS and NWC agreement stipulates a level of effort equating to four (4) credit hours per quarter which can be achieved by enrolling in one course per quarter. NPS and NWC assess this construct is optimal for allowing JPME and graduate education completion during the same tour for the majority of our students. The only exception is for NPS students who are too junior (ENS, LTJG) to receive the diploma. This group of students is typically small and represents newly commissioned officers who attend NPS immediately after commissioning (note: NPS has two such groups—Bowman Scholars are slated for the Nuclear Power Program, and the Shoemaker Scholars are slated for the Aviation Pipeline).

(d) In summary, the advantage of the NWC at NPS program is that NPS students study the profession of arms in a multi-service and multi-academic discipline environment which allows them to bring their NPS academic experience to bear as they proceed through the NWC program. This exposure to academic and intellectual tools increases officers' ability to address complexity and increase lethality through their own skill set, reaching out to peers with needed skills, or reaching back to the school house. While studying the profession of arms can assist officers to select proper weapons and apply current doctrine, these added intellectual tools can increase the probability that officers will plan operations that will create conditions to optimize their desired effect. Consequently, the impact of the NWC at NPS program has been very positive. The added benefit of having NWC in Monterey is that students who successfully

complete both programs depart NPS with their Master's Degree, subspecialty code, NWC diploma, and JPME Phase I credit. It's hard to fathom a more optimal construct to provide this breadth of advanced professional military educational.

(18) How should critical thinking and strategic thinking best be taught? Where should it be taught? When?

(a) Critical thinking is best taught the same way you teach a 3-year old how to ride a two wheeled bicycle. To the child, riding the bike appears to be based on some form of magic, and a lengthy technical description of how to do it or an exposition on the physics behind the matter is not going make things easier. In any event, the child will be able to ride the bike in less than an hour if you remove the pedals and lower the seat so the child's feet can touch the ground. In other words, give the child the right tools, a mental picture of how to proceed, and a little practical application and things will progress naturally to the desired end state.

(b) While most of the neophytes in our classrooms do not believe that critical and strategic thinking is based on hocus-pocus, most of them do believe that it is just a lot of hokum. Growing up in a world where it appears that validity is based on the emotional ferocity with which an opinion is expressed, some of them are rather incredulous to learn that people actually believe that it is possible to select among competing alternatives based on theory, logic and data. Many actually see the world as being driven largely by opinion, and in their mind's their opinion is better than the other guy's opinion. In any event, we generally proceed in the same way as the bike lesson: classroom assignments and our Capstone Exercise, which usually takes the form of a Master's Thesis, are designed to allow the student to practice critical thinking. Their diploma is a permission slip to put the pedals back on the bicycle.

(c) Strategic thinking is the art of using all the resources under one's control to get a target to act in a way that suits one's political purposes. At a minimum, strategic thinking entails coordination across the different levels and domains of conflict and an appreciation of the causal factors that govern the situation. Strategists seek to manipulate the dialectic inherent in conflict in all its dimensions.

(d) Critical thinking is a pre-requisite to strategic thinking because it gives the strategists the tools needed to understand how the world works in general, and how a specific conflict is unfolding in particular. Strategy is about manipulating those causal factors so the situation evolves in one's favor. Not every critical thinker is a strategist, but every strategist must be a critical thinker. Strategic thinking can be taught the same way as critical thinking, but some worry that attempting it for the first time on the job can carry a heavy price tag. Students must first be educated as critical thinkers, then they can proceed to an education that focuses on an appreciation and manipulation of conflict's dialectic, i.e., strategy. People exposed to strategic education who lack any appreciation of the scientific method usually just come away with a trove of war stories and half-baked rules of thumb.

(e) Critical thinking skills and strategic thinking are well taught through scenario case studies at every Navy educational institution. These case studies can be applied at the tactical, operational, or strategic level at all officer ranks. This is against common wisdom, until one recognizes that strategic choices are greatly influenced by tactical capabilities or vulnerabilities.

(f) As an example, inculcating strategic analysis and critical thinking skills occurs in the National Security Affairs Department by the following:

1. Students have to take a mix of foundational courses that ensure exposure to multiple disciplinary approaches to national security challenges. These foundational courses introduce analytical concepts and theoretical debates that train students to think in terms of competing perspectives and alternative hypotheses

2. Students have to take a minimum of eight courses for their specific degree track, exposing them to multiple topics, faculty, readings, and assignments. This produces both breadth and depth of knowledge and provides opportunities to hone critical thinking and writing skills

3. Students are required to write a substantial thesis based on independent research of a problem relevant to national security. This capstone follows the scientific method and encourages students to demonstrate higher levels of knowledge synthesis and knowledge production

4. Students are encouraged to hone their oral communicative skills through class discussions and formal presentations. Extensive writing assignments hone their written communicative skills and they receive additional support through the Graduate Writing Center at NPS

5. Students take advantage of out-of-classroom learning opportunities by participating in international educational events (CCMR Mobile Education Teams) and attending a range of speaker series events that feature national and international speakers

(18) What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?

(a) The 2018 National Defense Strategy characterizes the current operational environment:

1. This increasingly complex security environment is defined by rapid technological change, challenges from adversaries in every operating domain, and the impact on current readiness from the longest continuous stretch of armed conflict in our Nation's history. In this environment, there can be no complacency—we must make difficult choices and prioritize what is most important to field a lethal, resilient, and rapidly adapting Joint Force.

(b) Officers cannot be successful at operating in an environment of rapid technological change in domains such as Space and Cyberspace without a minimum STEM background. Being able to operate at the tactical, operational, and strategic level requires a basic understanding of the science and that minimum level will only increase in the future. Mesh networks, autonomous systems, machine learning, and cyber operations require a minimum technical background to employ successfully and understand the risks associated with each system.

(c) Operational art is the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Just as a commander or military planner must know the capabilities and limitations of their assigned forces to plan effectively, the commander or military planner must understand the operational environment. The operational environment is characterized by rapid technological change, the integration of physical and cognitive dimensions of conflict, and significant uncertainty. Adversaries can adopt technologies and practices at an extraordinarily rapid rate based on low barriers to entry and open information environment.

(d) Commanders and military planners must understand the basics of technology, the domains of warfare, and the limitations of adversary capabilities to effectively plan and execute military operations.

(e) The proper balance for technical understanding, operational art, and strategic education is dependent on the level of officer. The entry-level naval officer requires a minimum STEM background to operate the units and platforms currently in service and to adopt new technology. The minimum STEM requirement may be different for each service, but should include at least two math courses and two hard science or engineering courses regardless of degree program. NPS has several multi-disciplinary academic groups that offer well-rounded curricula as opposed to programs of study dedicated to a single traditional academic discipline. However, the NPS recognizes that any blend of STEM and non-STEM education at the graduate level requires a strong STEM education integrated systemically in undergraduate education, where operational and strategic education is of relatively less value. A well-balanced STEM undergraduate is well-prepared to study STEM, operational, and strategic topics later in life, while a non-STEM undergraduate education, may in general, restrict opportunities for later graduate education in STEM-related fields without the cost and time of remedial education.

(f) A company grade officer requires an even balance between technically focused education and how to integrate technical capabilities into tactical and operational level planning. A field grade officer requires refresher education on STEM subjects and exposure to the current technical capabilities built around a focused education on the operational art and the operational environment. The field grade officer should be familiar with the development and application of strategy to exercise the operational art. The senior officer at top level school requires a refresher on STEM subjects and exposure to the latest technological developments built around a focused education on strategy and policy. The rapid pace of change in science and technology requires senior naval officers to constantly refresh their understanding of what is technically possible,

ethically sound, and fiscally supportable. In the absence of that education, the bureaucracy will continue to slow roll progressive ideas and stymie the best efforts to adopt new practices.

(g) At present, a variety of factors appear to be hindering the sustainment of sufficient STEM education across the naval service: societal trends, generational perceptions, changes in the mix of commissioning sources, and the inherent difficulty level of STEM-based curricula. This shift away from STEM-based education appears particularly pronounced among the URL communities (Submarine Officers excepted) and should be addressed via a variety of incentives. The unrestricted line community must have career-spanning opportunities to obtain STEM competencies at the right level, at the right time and place in their careers, and this drives a requirement to develop a new paradigm away from episodic education of select individuals towards fleet-wide, throttle-able education in a culture of lifelong learning.

(h) When naval members (unrestricted and restricted line) encounter opportunities for education, convenient options must become readily available of the right duration, complexity, and appropriateness of skill and academic discipline linked to their career development needs. Long-term educational competencies and pedigrees must be separable into smaller opportunities (e.g., degrees that are comprised of certificates that are in-turn composed of courses of several types: full-length graduate courses; condensed, intensive versions of full-length graduate courses; and non-credit continuing education courses that are particularly useful to maintain currency in STEM topics that dissipation over time).

(i) To summarize, there are four factors that the Navy should consider when developing a balanced graduate education quota plan for the service:

1. Needs of the Navy. At present, this priority is represented merely by examining the P-coded billet base and generating quotas based on expected vacancies. There does not seem to be any mechanism for senior leadership to examine what mix of skill sets are needed for their organizations and articulate that in a structured manner. All that can be done is add or delete P-coded billets, which is a cumbersome and somewhat opaque process. I wonder if most senior leaders are aware of what billets they have that are P-coded? The Navy's focus on STEM education at the undergraduate level would send a clear message as would initial officer training with a heavy stem application that would allow non-STEM undergraduates early opportunity to exhibit and/or acquire STEM skills (and possibly to identify the need for improved focus or remedial efforts). Junior to mid-grade officers could have opportunity to focus on STEM graduate education based on identified Navy needs.

2. Needs of the Institution (NPS). In order to create a viable means of educational delivery, each institution has constraints in terms of cohort size minimums. NPS is particularly vulnerable to cohort shortfalls for hard-to-fill curriculums. This is one area where many civilian institutions have an advantage.

3. Needs of the Detailing System. The detailing system favors degree programs which are short in duration in order to minimize number of Not Observed FITREPs and ensure

career timeline is maintained. Similarly, detailers value curriculums which have multiple annual convening so that they have flexibility in officer sequencing. Unfortunately, the hard-to-fill curriculums often are forced to drop convening due to inability to meet cohort minimums, exacerbating their challenges.

4. Desires of the Individual. Graduate education is a powerful recruitment and retention incentive, but to be effective in those roles, it must be responsive to the "demand signals" from the target demographic. If a generation of junior officers comes to value certain degrees over others, the less desired ones will become harder to fill. Generationally, MBA and International Relations programs tend to be viewed as particularly desirable by the junior officer demographic, which is why there is seldom any difficulty in filling those quotas.

(j) As a general recommendation, OPNAV should establish an overarching requirement and fiscal incentives for under-manned educational skill sets. This might look similar to the old CREO groups for enlisted ratings which would inform the amount of retention bonus offered; areas where there was an excess of inventory would get no bonus, areas properly manned would get a modest bonus, and undermanned areas would get big bonuses. OPNAV should also consider enhancing and strengthening selection board precepts as they relate to key educational disciplines. Lastly, OPNAV should draft a formal requirements document recognized by NETC and Navy Personnel Management to fund creation of and continual support for a permanent process of continuing learning for the fleet. The tasking and recommendation being addressed here cites the 19 April memo from the Undersecretary as "setting the requirement for instilling and integrating a culture of continuous learning throughout the naval services", but a formal requirements document is a must.

(19) For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?

(a) The NPS Foundation—a non-federal entity (NFE) and 501(c) 3—provides direct support to the NPS within DoD regulations. The Foundation has been providing support to NPS for over 40 years, with its charter and sole purpose to support NPS' Mission, Vision and Priorities. The organization's primary purpose is to support the students, faculty, and staff of NPS above the level of appropriated funds with funding and resources that provide a margin of excellence in support of strategic institutional prioritiesidentified by NPS leadership. The Foundation's ability to provide support to NPS is governed by the Joint Ethics Regulations, and its relationship with NPS is governed by a 2013 memorandum of understanding approved by both parties, enclosure (10). The NPS Foundation forecasts significant growth potential for the Foundation over the next five years based on an assessment of the donor base and NPS' unique brand of cutting edge DoD research initiatives. The current objective is to be a $25M Foundation within five years with a floor of $10M.

(b) NPS addressed improving the relationship with the NPS Foundation in the *Sailing Directions* memo in enclosure (4). While the Foundation provides critical margin of excellence support to the school, that support has been encumbered the past few years by overly restrictive

rules and/or regulations or legal interpretations thereof. As the Foundation is well postured to expand its support for the school, NPS continues to evaluate its relationship and how it can be expanded into a more robust and productive partnership. In response to our *Sailing Directions* memo, the Acting General Counsel of the Navy and the Judge Advocate General of the Navy provided substantive legal guidance to NPS that defined how the school could expand its partnership with the Foundation. NPS is currently evaluating that guidance but we are confident the school can expand its Foundation partnership in a deliberative and effective manner.

(c) NPS submitted our institutional priorities to the Foundation in April 2018 via enclosure (11). To support these priorities, the NPS Foundation 2017 vision forecasts significant growth potential for the Foundation over the next five years based on an assessment of the donor base and NPS' unique brand of cutting edge DoD research initiatives. The below table provides the 2018 Foundation Priority Project allocation.

Funding for NPS "Margin of Excellence" Priority Projects – 2018			
Research Programs			
2018 SEED Program Phase 2 Projects		$80,000.00	Per NPSFI ltr dtd 19Oct2015, Ph2 allocates $10K designed to turn NPS Faculty "Big Idea" research into a detailed project plan. This funding will support Phase 2 funds for 2018 projects.
SEED Program Phase 3 Projects		$1,500,000.00	Per NPSFI ltr dtd 19Oct2015, Ph3 selects Ph2 research projects plans for follow-on funding which will be provided in staged funding to PI's on a quarterly basis.
Mission / In-Kind Support			
Big Ideas Exchange (BIX)		$15,000.00	NPS Iniative that brings forward new and potentially game-changing thinking developed by NPS faculty and students to address grand challenges in American national security. These fresh approaches can become the lifeblood of future innovations in military and naval organizations, doctrine and strategy.
Institution Advancement		$40,000.00	Supports NPS efforts to engage potential students, military and defense leaders, and the citizens of the United States in understanding the strategic value and importance of NPS to our national and international security. Includes Discover NPS Day.
Cyber Engagement		$50,000.00	Supports NPS Cyber conference such as Cyber Endeavour, Hack the Machine.

NSA Global Speaker Series		$35,000.00	Speaker series engages students and faculty in conversation with experts in the field of security studies to gain insight into the latest research and development affecting America's national security interests and emerging threats.
TOTAL:		**$1,720,000.00**	

(d) Moving forward, NPS and the Foundation both recognize that graduate universities have long been the most fertile ground for innovation for both industry and the military. The phenomenon that has become Silicon Valley grew from cooperative public-private research in the electronics and later the integrated circuit and computer design industries resident in the Bay Area and elsewhere. Private support of graduate universities provides essential fuel for this innovation engine. The only graduate school in the nation wholly dedicated to the advancement of innovative research and education in naval technology, policy, business practices, and processes is NPS. Unlike other leading academic research institutions, NPS is currently restricted in how it partners with the Foundation and all other private and academic organizations.

(20) How do you deal with accreditation? Is it an advantage, or a constraint?

(a) NPS is required by Title 10 legislation (para 7048) to maintain accreditation by "the appropriate civilian academic accrediting agency". NPS has been accredited by WSCUC (Western Association of Schools and Colleges, WASC, Senior College and University Commission) since 1955. WSCUC is the regional accreditation agency responsible for accrediting NPS as an institution.

(b) Additionally, selected NPS departments and programs are accredited by professional accrediting agencies, as follows:

1. ABET: Accredits NPS' master's programs in Engineering fields (three NPS departments – Mechanical, Electrical and Systems Engineering)

2. AACSB: Accredits NPS' master's programs in the Graduate School of Business and Public Policy.

3. NASPAA: Accredits NPS' master's programs in Public Affairs and Administration.

(c) Accreditation by these professional accrediting agencies is not required for NPS, but NPS' policy has been that it will seek (and achieve) accreditation, not only for the institution, but for all major programs for which it is eligible. Why? NPS distinctly views accreditation as an advantage (not a constraint). There are two major benefits from accreditation:

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1. The accreditation process is a form of peer review for the institution that provides assurance of maintenance of standards of performance and effectiveness. Accreditation motivates continuous improvement of NPS' academic programs.

2. Successful accreditation is a mark of the quality of NPS. This is beneficial to NPS in both attracting top faculty, and in collaborating and partnering with other universities.

(d) NPS has gained a strong, positive reputation in higher education, in part because of the visibility provided and the successful results achieved via accreditation.

(e) NPS was last accredited by WSCUC in 2010. WSCUC accreditation periods (assuming positive accreditation) typically range from seven to a maximum of ten years, with only ~10% to 15% of universities achieving the maximum 10. NPS was among the set of universities re-accredited for 10 years. NPS' next accreditation review will be in 2020, but the run-up to that re-accreditation has already begun. As a benefit of the previous 10-year accreditation, NPS has been selected to be in the first cohort of universities that will be permitted to follow a new, abbreviated "pathway" to re-accreditation, based on "themes". NPS submitted its Thematic Proposal to WSCUC this past spring (and accepted by WSCUC in June), per enclosure (12). The Thematic Proposal outlines areas where NPS will work to advance itself over the next couple of years, and provides the framework in which the 2020 accreditation review will occur. NPS' Themes outline initiatives related to the Curriculum, to Teaching and Learning, and to Support for Faculty.

(21) What is the selectivity (admission) rate for applicants to your institution?

(a) Admissions Rate

1. The Naval Postgraduate School (NPS) is not comparable to other universities in regards to a selectivity (admission) rate. NPS is asked to screen applications for potential enrollment of naval officers early in their careers, with actual enrollment to occur in both the current academic year or in a future academic year. NPS' review of applicants serves to screen individuals in terms of academic qualifications for potential enrollment in various curricula. Assuming satisfaction of minimum admissions qualifications, actual selection of officers is made by BUPERS and the officers' community. We can create an admission rate or "selectivity" rate by comparing the # of admissions applicants reviewed per year with the # of enrollments per year. This statistic (enrollments/applications) is, on average, about 30%. Understand this percentage is skewed and does not directly portray a selectivity rate. The nature of our application review process for all the services may have an applicant enrolled 2-5 years after their record has been officially reviewed by NPS Admissions for academic eligibility. The services then make their selections of their service members to attend NPS. Some of those that have applied may never be selected by their service, may attend other universities or may leave the service before they receive any graduate education.

(b) Waiver Rate

1. Minimum qualifications for admissions to individual NPS curricula are specified by an Academic Profile Code (APC). The APC, a 3-digit score, sets the minimum academic qualifications required for candidate students to enter individual curricula, and reflects 1) undergraduate GPA, 2) mathematics background and preparation, 3) technical background and preparation. STEM curricula will require higher degrees of math and technical preparation. The NPS admissions process will initially screen applicants for satisfaction of the minimum APC, but deeper review of applicants (conducted by faculty in the relevant academic departments) can permit a waiver of the minimum APC and eventual enrollment. It is part of NPS' mission, and its education model, to admit and enroll officers who may not sufficiently qualified or prepared to enter graduate programs at civilian universities. For entering students admitted with a waiver of admissions requirements, NPS provides "refresher" education to bring officers up to speed to enter the graduate program. NPS keeps statistics on the percentage of waiver admissions and the success of these students in the graduate program. Overall, about 24% of students enrolled at NPS required a waiver (more in the tech curricula ~30%; less in the non-tech curricula ~18%). Ultimately, students admitted by waiver perform almost as well as non-waiver students (graduate rates and graduate GPA are only marginally lower). Accepting students who require an admissions waiver is not a significant detriment to success at NPS. In general, NPS' education model supports these students through our programs effectively.

(c) Comparison to Admissions Standards at Civilian Universities

1. A different indicator of selectivity is a direct comparison of the academic qualifications of actual NPS students with stated admissions standards at civilian universities. We've conducted ad hoc comparisons from time-to-time. Citing one: We compared the undergraduate GPAs of students enrolled in NPS' Graduate School of Business and Public Policy with the stated minimum undergraduate GPA required for admission to graduate business programs at three universities in the San Diego fleet concentration area (San Diego State Univ, Univ of San Diego, UC San Diego). Comparisons revealed that 55% of enrolled NPS students met the SDSU minimum; 43% met the USD minimum, only 20% met the UCSD minimum. In summary: Only 55% of NPS enrolled students would have met the lowest (stated) GPA threshold for admissions at these San Diego fleet concentration area civilian universities. Comparisons in other disciplines (e.g., engineering) with other civilian universities (e.g., in the Norfolk area) come to the same conclusion – that NPS' GPA threshold for admissions is generally lower.

(d) The Bottom Line is NPS is not highly selective in admissions – at least in the traditional sense of requiring high undergraduate GPA and undergraduate preparation. But this is largely by design. NPS' mission includes accepting students whose academic qualifications may not permit them to be admitted into top civilian graduate programs. NPS' accepts students, in part, based the Navy's (or other services') choice of officers they wish to invest in by sending to Grad Ed. NPS' education model then provides the necessary refresher education to permit students with lesser academic qualifications to succeed at the graduate level. But what NPS' student population may lack in initial preparation for Grad Ed, they make up for in personal characteristics. Officer students typically arrive at NPS with significant responsible work

experience, and approach their studies with a maturity and discipline that allows them to succeed.

(22) How many students failed any of your full-time courses last year?

(a) NPS' Average Onboard (AOB) enrollment in academic programs last year, Academic Year 2017 (AY17), totaled 2697, with 1432 in resident degree programs, 909 in distance learning degree programs, and 356 in non-degree programs (both resident and DL). Students are enrolled all four quarters of the year, with resident degree students typically taking 4-5 courses per quarter, DL degree students typically taking 2 courses. Failures of individual courses are few. This table summarizes both instances and rates of course failure in AY17:

	# Course Failures	Rate of Course Failures
Resident	71	.24%
Distance Learning	110	.69%

(b) To graduate, NPS students must achieve a minimum QPR (Quality Point Rating, AKA GPA) across all courses taken of 3.00 (a "B" average). While we don't have ready comparison statistics for peer graduate universities, we believe these course failure rates, while low, and are quite typical for graduate school programs. One of the joys of teaching at NPS is the maturity and discipline of NPS' student body, which is reflected in high rates of passing their academic courses.

(23) How many admitted students failed to graduate?

(a) NPS tracks two measures of graduate rates: "On Time" Graduation Rate (graduated at completion the standard length for a program) and "Overall" Graduation Rate (total graduates, by additionally including "late" graduates). And NPS tracks graduation rates by: 1) student type, 2) education mode (resident vs DL), and 3) program or curriculum. This table summarizes graduation rates over the 2002-2017 period.

Mode	**Students**	**On Time Rate**	**Overall Rate**
Resident			
	All	87%	94%
	Naval (USN/USMC)	88%	94%
Distance Learning			
	All	72%	81%
	Naval	82%	85%
All Programs			
	All	83%	90%
	Naval	87%	92%

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(b) The single summary number reflecting all students and all programs is 90% of admitted students graduate, 10% fail to graduate. But there are interesting differences to note. Naval students (active duty USN and USMC) graduate at slightly higher rates than non-Naval students, although there is not an overwhelming difference.

(c) More significant is the different graduation rates between resident and DL, with resident about 13% higher. Contrasting them:

1. Resident:

a. Overall Grad Rate: 94%

b. Resident students are almost entirely full-time students, sent by the Navy or other services for full time duty under instruction (DUI), for a specified period at NPS to complete their program.

c. Although there are administrative and/or disciplinary reasons a resident student may fail to graduate, or occasional failure in coursework, the single largest reason is failure to complete the Graduate Thesis (or Capstone) requirement of the master's degree programs.

2. Distance Learning:

a. Overall Grad Rate: 81%

b. DL students are almost entirely part-time students, each working a full-time job at their home command. DL programs from NPS usually require enrollment in two courses per quarter, about ½ the load of a full-time student. So work-life demands are significant for these students adding education on top of their jobs.

c. Our analysis shows that, of the students who fail to complete DL programs, over 40% of them have dropped from the program within the first two quarters of enrollment. The principal reason for leaving are not academic. Students choosing to leave a DL program do so because of work-life pressures and, even more so, because they report that the program did not meet their expectations concerning its alignment with their job needs or value to their career.

(24) For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or paygrade?

(a) NPS does not track or maintain all the data to accurately answer this question. However, preliminary estimates for 2016 are: 3.39%, 2017: 4.03%, and 2018: 3%. We are

coordinating with the Chief of Naval Personnel Staff to provide a complete response and expect that to be completed in the next few weeks.

(25) For the past five years, what percentage of your military faculty (by year) have ever been passed over for promotion to the next rank or paygrade?

(a) NPS does not track or maintain all the data to accurately answer this question. However, preliminary estimates for 2016: 14.63%, 2017: 19.41%, and 2018: 12.20%. We are coordinating with the Chief of Naval Personnel Staff to provide a complete response and expect that to be completed in the next few weeks.

(26) For the past five years, what percentage of your military faculty were considered (in any zone) by any administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of those officers were subsequently selected for command as a member of your faculty?

(a) NPS does not track or maintain the data to accurately answer this question. We are coordinating with the Chief of Naval Personnel Staff to provide a complete response and expect that to be completed in the next few weeks.

(27) What do you consider your "peer" institutions, and what do you think they are getting right?

(a) Depending on the reason for comparison, NPS uses three sets of peer institutions used for reference:

1. DOD Education Institutions: e.g., NWC, USNA, MCU, AFIT, NDU, etc.

2. California Institutions: e.g., University of California (various), Stanford, Cal Tech

3. Selected National Universities: In 2008, NPS identified a specific set of universities with institutional characteristics that would be useful for benchmarking NPS. Criteria used to identify the peer group focused on 1) graduate programs, 2) technical/engineering emphasis, 3) quality.

(b) Major criteria included:

1. Percent Graduate Degrees > 30%

2. Percent Technical/Engineering Graduate Degrees > 50%

3. US News Ranking Engineering Graduate Schools

4. US News Rank within top 50

(c) The resultant list of 15 peer National Universities is:

1. California Institute of Technology	Cal Tech
2. Carnegie Mellon University	Carnegie Mellon
3. Claremont Graduate University	Claremont
4. Duke University	Duke
5. Georgia Institute of Technology	Georgia Tech
6. Illinois Institute of Technology	Illinois Tech
7. Massachusetts Institute of Technology	MIT
8. North Carolina State University	NC State
9. Rensselaer Polytechnic Institute	Rensselaer
10. Rice University	Rice
11. Stanford University	Stanford
12. Stevens Institute of Technology	Stevens Tech
13. University of California, Santa Barbara	UC Santa Barbara
14. University of Illinois, Urbana-Champaign	UI Urb.-Champ
15. University of Southern California	USC

(d) While the last comprehensive benchmarking study vis-à-vis this peer group was conducted a decade ago, NPS has continued to use this set of institutions as a comparison reference group during the years since. NPS is a unique institution with a mission unique in higher education across the country. There are few institutions that have only graduate programs, few still with the defense-focus of NPS, and none with the exact characteristics of NPS. Hence comparisons are always to be made with caution. We note four areas where NPS lags relative to the peer group, and thus represent areas for NPS improvement.

1. Faculty Compensation: Once comparable (over a decade ago), NPS' faculty salaries for most tenure/tenure-track ranks and disciplines are no longer competitive with peer institutions. Recruiting and maintaining a quality faculty has become more challenging.

2. Research Activity: NPS was once in the "middle" of this peer group on indicators of research activity or intensity (e.g. research dollars per tenure- track faculty). But the past five years have seen a decline in NPS research funding to about 40% of its prior peak. This decline is explained by principally by increased constraints on reimbursable activity at NPS in recent years. This is one major area where the peer institutions are "getting it right" compared to NPS.

3. Diversity: NPS historically has a smaller percentage of females, both students and faculty, than civilian institutions. This is explainable by NPS military orientation and composition, but none-the-less and area for attention. (Is in NPS' strategic plan.)

4. Support: Although as a federal entity NPS is difficult to compare with civilian peers, NPS' Staff/Faculty ratio is low when compared to the peer reference group. This is a somewhat crude metric, but is a rough indicator of "support" for faculty activities.

(28) What is your opinion of the quality of students entering your institutions? Trends? What could be done to improve?

(a) The quality of the students entering the Naval Postgraduate School varies by service and by community. "Quality" has two dimensions when describing students: academic aptitude, and professional excellence. Academic aptitude describes the likelihood the student will do well in the academic environment. Professional excellence defines the likelihood the student will promote and be selected for screened positions over the course of a long military career.

(b) All incoming students must meet minimum academic standards for enrollment, but the USN is not consistent in screening naval students for professional excellence. The USMC, USAF, and USA students ARE screened for professional excellence—only the best officers in these services with a track record of sustained superior military performance are offered the NPS opportunity. Many restricted line communities in the USN also screen candidates to ensure the best, most professional candidates get one of the few available quotas. Historically, however, the USN has not offered NPS to the best unrestricted line officers (aviation, surface, submarine). There are multiple reasons for this:

1. First, due-course, upwardly mobile, unrestricted line officers are in high demand. The number of billets that require a proven strong performing URL officer often outstrips available inventory.

2. Second, the "unobserved" FITNESS reports officers collect while attending in-residence postgraduate education do not compete well against operational or major staff FITNESS reports in competitive summary groups. Consequently, the USN URL communities have often filled NPS quotas with officers that are not in high demand, do not have a proven track record of professional excellence, and are not upwardly mobile.

3. Third, as long as individual graduate education is viewed by the Navy's personnel command as a retention tool instead of an instrument to improve the value for the organization's educational strength, we will continue to receive average "due course" officers from the staff, restricted line, surface warfare, and submarine community, and very few aviators other than those whose operational careers are ending.

(c) Notably, the number of unrestricted line officers in warfare related curricula like Undersea Warfare, Operations Research, Systems Engineering Analysis, and Joint Operational Logistics is decreasing due to decreasing quota assignments, decreasing quota fills, and simply less URLs in the Navy. Consequently, the USN URL communities have often filled NPS quotas

with officers that are not in high demand, do not have a proven track record of professional excellence, and are not upwardly mobile.

(d) In an effort to reverse the above trends, many USN URL communities are changing detailing policy and selection board precept language. Of the two, detailing policy changes will be most impactful. As an example, PERS-43, the aviation detailing office, plans to send top performing post-department head O4 officers to an in-residence postgraduate education institution. If all strong candidates for O5 promotion and O5 command screen have a series of non-observed FITNESS reports from an academic institution, then none of them will be disadvantaged at future selection boards. Changing precept language to make a postgraduate degree from an in-residence institution a prerequisite for O6 or for major command screen will also increase the likelihood of increasing the number of proven, professional, career minded officers enrolled in NPS and other postgraduate institutions.

(e) Lastly, the Navy's organizational education strength is of concern to the most senior Navy leadership and therefore should be managed at a level beyond the personnel system. Quotas and the sub-special system lag behind organizational needs by years (two examples being cyber warfare and data science). This system requires major overhaul where a Navy Education Board representing operational and OPNAV commands establish annual needs based on fleet, system command, warfare centers, and OPNAV input. Officers can then be selected for those requirements and assigned an appropriate educational institution to receive those skills. After graduation, officers can be slated either to operational positions or staff positions for those skills. In lieu of a "sub specialty" system, the Additional Qualification Designator system should be used to increase these officers' use across the naval organization.

(29) How is research, testing, development, and evaluation for educational/learning systems funded for your institution? Who is your SYSCOM for learning?

(a) NPS has several formal "education/learning" systems currently in use to support conducting and delivering our academic programs, including, but not limited to:

1. PYTHON: Student registration and information system. Course information and scheduling system.

2. SAKAI: Course learning management system.

3. Collaborate: Distance Learning course delivery system

4. FAIRS: Faculty activity and information reporting system

5. COEUS: Faculty research management system

(b) These enterprise systems are funded principally via an annual internal allocation of NPS' core mission funds, the amount determined in the annual budget process. Investments

in these enterprise education/learning systems has been and will continue to be important for NPS to maintain state-of-the-art instructional capability. In recent years, NPS has included in the annual POM process funding requests to support continued upgrading of our education/learning systems, but such requests for a sustained increased funding stream to support continued upgrading of these systems have not been satisfied. (Exception: A couple of times, OPNAV has provide ad hoc within-year funds to support systems.)

(c) Concerning our "SYSCOM", we interpret this as asking who at NPS has the responsibility for developing and implementing learning systems. The planning, requirements and choice of learning systems is a joint effort by several offices at NPS. NPS has a steering group, the Academic System Planning Committee (ASPC), but leading members include the NPS CIO (LoPiccolo), Vice Provost for Academic Affairs (Moses), Associate Provost for Graduate Education (Gera), Registrar (Andersen), Director for Distance Learning (Master), Institutional Research (Laney) and others as appropriate. The NPS CIO has lead responsibility for the development, implementation and operations of these learning support systems.

(d) In addition to our enterprise systems, we might also interpret "education/learning systems" more broadly to include the departments and functions at NPS whose role is to directly support the education and learning of our students. Other examples exist, but we'll note the recent creation of a new Associate Provost for Graduate Education position (now filled by Professor Ralucca Gera) and the establishment of a Teaching and Learning Commons (TLC). These efforts are in line with NPS' new strategic plan, and are intended to coordinate activities across NPS to put additional attention and focus on teaching and learning in our academic programs. In particular, TLC will be a forum for advancing pedagogical practices of the faculty and incorporating new and innovative teaching/learning technology into the classroom. Resourcing for these activities comes from two sources: 1) an internal allocation of NPS mission funds, and 2) reimbursable funds created from faculty-initiated research projects and grants related to advancing teaching and learning practice at NPS.

(30) If you had a 5-10 percent budget cut, what function would you cut?

(a) In the past, NPS typically responded to reduced budgets by making small cuts to many different areas, including both administrative and academic activities. We believe that this approach would not be the best way to respond to any future cut of the scale of 5-10 percent.

Given that even at our current funding level, we have a wide range of unfunded requirements, we believe that best way to accommodate such a cut would be to select one or more academic degree or certificate programs to be closed entirely. This would be no different than our standing practice of always asking ourselves what we can stop doing to free up resources for higher priority activities.

(b) While it impossible to state precisely which programs would be closed, the programs we would consider for closure would be based on the following criteria:

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1. The importance of the program to the Navy, determined by considerations such as the demand signal for graduating students, and discussions with Navy leadership about future plans and the relevance of the program to those plans;

2. The number of Naval and non-Naval students in the program;

3. The cost of delivering the program, including the number of credit-hours taught, whether the program needed expensive lab facilities, and the extent to which we offer courses specific entirely to a program so that closure of the program allows us to stop teaching courses;

(c) It should be noted that the non-Naval services pay tuition to NPS for their students to attend. In some cases, it might be possible to expand non-Naval enrollments to generate additional revenue that might offset reductions in our direct navy funding.

(d) As usual, we would also explore ways to reduce costs in the administrative parts of NPS's budget, particularly in those areas that have grown to meet compliance requirements. These cuts would ideally be aligned with reductions in compliance requirements and greater stability in financial and other supporting software systems. The consequences of such cuts could include a lengthier response time to data calls from DON or DOD, slower processing of travel requests, and a longer period to handle financial transactions, reduced frequency of internal inspections, and longer response times to various inquiries such as FOIA requests.

(31) If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?

(a) NPS would expend any increases in funding on investments in actions detailed in our new strategic plan. As discussed in our response to the question 2, this new strategic plan reflects our current view on what are the most significant opportunities for NPS to better fulfill its overall mission.

(b) However, in brief, an expanded budget would be largely committed to actions that either: directly improve the education; or expand our capabilities in areas we think will be most critical to the future of the Navy and the rest of our military.

(c) In the area of educational improvements, we would:

1. Increase our faculty in areas for which there is currently high student demand, including cyber operations, global strategy, data science and emerging technologies;

2. Fulfill our currently unfunded requirements for improved classroom and lab facilities, including updating the technology infrastructure that serves our classrooms and labs, implementing improved uses of technology in our classrooms by creating "classrooms of the

future" tailored to serve different pedagogical methods, and supporting teaching innovation, particularly in distance learning.

(d) The areas in which we would expand our educational and research programs include:

1. Data science and analytics;
2. Additive manufacturing;
3. Quantum technologies, including quantum computing, communications and sensing;
4. The ethics of warfare
5. Cyber operations
6. Military applications of blockchain technology
7. Autonomous vehicles and systems
8. Talent management
9. Global strategy
10. Advanced materials relevant to military needs
11. Modeling, simulation, visualization and virtual reality technologies

(32) Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting?

(a) In general, the composition of a class is less important than the topic the class is considering. The "tipping point" assumes that all students and faculty are equal in their influence on a seminar discussion. There is not a one-size-fits-all response. For example, one or two motivated and proactive Navy or Marine students in a seminar of 12-15 officers might have more influence on maintaining focus on the maritime fight than 10 Navy or Marine officers who are not fully engaged. In addition, an Air University seminar focusing on the USAF contribution to at sea strike and how to integrate it across the Joint Maritime Operations Center and Joint Air Operations Center can be as valuable as an all Navy officer seminar at the Naval War College considering the same topic. In view of these two examples, the tipping point should be viewed through a qualitative lens than an artificial quantitative constraint. Of course, faculty also determine the level of focus on high-end maritime warfighting by what they require from the students and what they enable the students to pursue.

(b) Due to the focus of the last two decades on the low-end ground fight, having a certain percentage of Navy and Marine students is no guarantee that they will be focused on the high-end maritime fight. With the release of the 2018 National Defense Strategy and the focus from senior leaders, students are focused on the high-end maritime fight even when they lack personal operational experiences in that regard. The percentage of naval officers needed to maintain a focus on the high-end maritime fight includes international students. International students from a partner Navy or Marine Corps add significantly to the high-end maritime fight focus.

(c) At NPS, particularly within the Defense Analysis and Operations Research curriculums, we focus on maritime scenarios but we ensure to integrate our joint and allied (international) officers to explore how they may contribute to this domain. For example, Army and USMC land-launched anti-ship cruise missile capabilities were explored as a technical warfighting capability at NPS almost ten years ago. Army Tactical Missile System (ATACMS) and High Mobility Artillery Rocket System (HIMARS) are now being considered to fill that role. Of larger concern is when NPS doesn't have sufficient unrestricted line officers in analytical and technical curricula to provide the subject matter experts in maritime warfare. This is not a question of having less joint officers, but more Navy officers with Fleet operational experience.

(d) In the NPS technical programs (i.e., Mechanical Engineering, Systems Engineering and Physics), there is no perceived or measurable negative impact by increasing the diversity of student makeup. In fact, a diverse student body of any share which includes USN, USA, USCG, USMC and international students, improves the overall the educational experience. This benefit is primarily because the classroom subject material in these STEM programs is fundamental engineering and science principles, applicable to all students. A high-end warfighting focus comes once a STEM student is involved in their individual thesis research. How each student's own research area drives the application of science and technology into various joint/interagency applications, serves as a further educational experience benefiting the other students as they learn the breadth of the potential applications. Seeing science and technology principles outside their traditional area of professional applications, only broadens their understanding. The bottom line in STEM subjects is the broader application of fundamental principles, brought about through a diverse student make up in the class, only serves to expand and improve the understanding of the subject material.

(e) NPS produces graduates with a set of academic tools in a wide array of academic disciplines that will prepare students to better solve tactical, operational, and strategic fleet challenges throughout their careers. Having a strong mix of joint, interagency, and foreign perspectives at NPS only serves to expand students' perspectives and improves agility of thought. As a general proposition, if 50 percent of students in the seminar are from the Navy and Marine Corps, then it is likely that the focus will remain on the maritime domain. Recent resident student demographics have held combined Navy/Marine Corps/Coast Guard enrollment at approximately 55 percent of the student body which, when combined with international students of naval background, is sufficient to ensure a majority representation of sea services across campus. NPS recommends that SECNAV and OPNAV set a threshold for resident enrollment such that a minimum of 50 percent of the student body must be Navy-Marine Corps in order to ensure this majority is sustained.

(33) What percentage of instruction is held at the classified level?

(a) As of June 2018, 3.4 percent (54 of 1554) of NPS course instruction is held at the classified level. Additionally, 13 percent (12 of 92) of NPS curriculum is held at the classified level. Of those 12 classified curriculums, five are offered at the unclassified level if requested or desired by an international student.

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(34) Do you think we need to create an entirely new higher education institution for the USN and if so, what should it do that would be additive to the service?

(a) In short, NO! NPS is the ideal Institution for DoN higher education, with a world class faculty, a professional student body representing all of DoD and our international partners, and a graduate education and research program that provides the environment and opportunities for advanced learning. As addressed above in question "q", NPS suggests the Navy should reevaluate how NPS is structured and aligned within the Navy to perform its critical role and mission in lieu of establishing a new higher education institution.

b. Specific Questions for NPS

(1) What differentiates the Public Policy and Business colleges from similar programs offered by civilian schools, and how are the naval services making use of this asset?

(a) The mission of the Graduate School of Business and Public Policy (GSBPP) sets it apart from schools of business and management in other universities:

1. To serve our Nation by educating U.S. and allied military officers as well as defense civilians in defense-focused business and public policy, by conducting research in defense management and public policy, and by providing intellectual resources for leaders and organizations concerned with defense business management practices and policies.

(b) GSBPP's degree programs differ from other universities' programs in their explicit focus on defense business and systems management. GSBPP's programs consist of a core sequence of business and management courses, together with several defense-specific courses in one of the following specializations and degrees:

1. Resident curricula

a. Financial Management – Master of Business Administration (MBA)
b. Acquisition and Contract Management - MBA
c. Program Management - MBA
d. Supply Chain Management – MBA
e. Transportation Management - MBA
f. Materiel Logistics Management - MBA
g. Logistics Information Technology - MBA
h. Manpower Systems Analysis – MS in Management
i. Defense Systems Analysis – MS in Management

2. Nonresident (distance learning) curricula

a. Executive MBA (emphasis in financial and acquisition management)
b. MS in Program Management

c. MS in Contract Management

(c) Naval students who complete GSBPP degrees are awarded an appropriate subspecialty code (P-code or MOS) in a functional area, demonstrating that they have satisfied that area's requirements for specialized knowledge and skills. For example, USN officers completing GSBPP's Financial Management MBA are awarded the 3110 subspecialty code.

(d) Additionally, for those functional specializations with unique (e.g., Defense Acquisition Workforce Improvement Act (DAWIA)) certification requirements, GSBPP graduates satisfy those requirements. For example, naval officers who complete the Program Management and Contract Management programs (both MBA and MS) satisfy DAWIA requirements in those career fields. No civilian university offers such a range of defense-focused programs, nor with the depth of defense-related content, as those delivered by GSBPP.

(e) Another distinctive aspect of GSBPP that does not exist at civilian schools is its relationship with curriculum sponsors. Flag/SES-level sponsors are designated for each of the subspecialty curricula listed above. For example, DASN (Acquisition and Procurement) sponsors GSBPP's contract management programs, and Director, Office of Budget and Fiscal Management Division (N82) sponsors the financial management programs. These sponsors and other sponsors identify to GSBPP the specialized knowledge and skill requirements for their respective subspecialties, and GSBPP in turn tailors its graduate courses to satisfy those requirements. Sponsors are then able to observe and assess graduates' performance in their subspecialty assignments. Sponsors' requirements and how GSBPP meets them are the subjects of biennial reviews, thus providing a means for continual review, assessment, and improvement.

(f) The clear distinctions between GSBPP's programs and those of civilian schools were noted in 2015 by two separate and successful accreditation site visit teams from AACSB and NASPAA whose members were administrators from five different civilian universities. Some extracts from the teams' reports are included below:

1. The mission and vision for [GSBPP] clearly articulate its distinctive emphasis on "educating US and allied military officers as well as civilians in defense-focused business and public policy" as well as conducting research for this population and providing intellectual resources for its leaders. It is the only accredited business school within the federal government and occupies not just a distinctive but indeed a unique place in business education in higher education.

2. The impact of the School's programs for the navy officers and others who pursue them has been profound and positive. They have near immediate feedback on the ability of their graduates to succeed in the GSBPP-degree-enabled career paths to which they return upon completion, The GSBPP program leaders meet regularly with the sponsoring organizations to assess—and improve—curricula and program experiences.

3. The [Site Visit Team] was impressed with the thoroughness of [the curriculum review] process, its integration, and the line of sight to the organizational mission, particularly as stakeholder requirements are nested in the work of the program and in each course and activity, leaving us with no concerns.

4. The GSBPP program's ability to integrate key stakeholders in alignment of its strategies, structures, and systems with its mission may be unique, but to the extent that this model is transferrable, it is a very well-documented, organized system for continuous improvement and program development. The system is worthy of showcasing at a NASPAA conference and would be beneficial to programs experiencing difficulty with the nexus between course delivery and mission/vision/stakeholder engagement.

(g) GSBPP's reputation and distinctiveness are reflected in the most recent US News & World Report rankings. GSBPP ranked number one nationally among schools with "Homeland/National Security" specialization and in the top 20 percent of all public affairs schools.

(h) Utilization of Naval officer graduates

1. Since 1986, over 4,700 Naval officers have graduated from GSBPP degree programs, for an average of about 150 graduates per year. A list of representative subspecialty jobs and assignments filled by these graduates follows:

a. Logistics Management Curricula

(1) NAVSUP, NAVAIR, NAVSEA, SPAWAR
(2) Fleet and Industrial Supply Centers
(3) DLA Defense Supply Centers
(4) Aircraft Intermediate Maintenance Departments (ashore and afloat)
(5) Marine Corps Systems Command
(6) Joint Staff or Joint Command (TRANSCOM, CENTCOM, etc.)

b. Acquisition Management Curricula

(1) Comptroller: Naval Bases/Naval Air Stations/SYSCOMs

(2) Budget Analyst: Office of Budget, N-82 SYSCOMS, U.S. STRATCOM

(3) Business Financial Managers: Program Offices

(4) Action Officer/Program Analyst: OSD

(5) Budget Analyst: OPNAV

(6) Budget Officer: CINPACFLT/CUSFFC

c. Logistics Information Technology Curriculum

(1) Project /Program Manager – NAVSEA, NAVAIR, SPAWAR

(2) Project Officer, PEO/CIO

d. Defense Systems Analysis Curriculum

(1) HQ USMC - Defense Systems Analyst

e. Manpower Systems Analysis Curriculum:

(1) Military Personnel Policy and Career Progression (N13)

(2) Joint Manpower Management Branch, JCS (J-1)

(3) Manpower Resources Branch, Director Total Force Programming/Manpower (N12)

(4) Manpower Plans, COMCDRPAC/COMCDRLANT (N1)

(5) Naval Manpower Analysis Center (NAVMAC)

(6) Headquarters - United States Marine Corps Manpower and Reserve Affairs (M&RA)

(7) Marine Corps Combat Development Command (MCCDC)

(2) Regarding the National Security Affairs college, what is the uniqueness of the foreign officers course and is NPS the best place for it?

(a) The Navy Foreign Area Program sends the majority of new Foreign Area Officers (FAO) through the National Security Affairs (NSA) Department's regional studies programs. This Department is part of the NPS School of International Graduate Studies (SIGS). The NSA Department offers unique military-centric curricula that can't be duplicated at any other civilian university. NSA's tailored courses meet the needs and requirements developed and approved by the FAO community guaranteeing our young officers have the toolset to excel in their future assignments. NSA's Regional Security Studies Program is time tested and globally recognized. Established in 1974, NSA offers specialized military-centric Regional Studies Programs not found on any civilian campus. Many civilian universities offer a regional studies degree focused on International Affairs; NSA offers a blended approach of teaching International Relations with

a regional and historical perspective, but the relevant and unique NPS curriculum provides FAOs the operational skills to succeed in real-world operations.

(b) Courses and curriculums are exclusively designed for FAOs in that the NSA Department tailors their regional programs to meet the unique military centric needs of new DoD FAOs. The Department created regional study curriculums that comply with the U.S. Army's academic requirements for new FAOs, but they exceed the Army standards by emphasizing national security in all of NSA's regional courses. While many civilian programs may offer specialized FAO-like courses, there is wide variance on the content and quality and no guarantee the topics taught meet the needs of our new FAOs.

(c) A key aspect of the NSA curricula is Navy sponsor engagement and support. Every two years NSA's sponsor (OPNAV N3/5) certifies and approves all of the regional curricula. This unique relationship between NPS and its sponsors ensures sponsors play a key role in tailoring the curricula to meet DON needs and it ensures senior Navy FAO leadership receive the properly educated FAOs to meet their real-world requirements. Simply put, no civilian university would likely allow this sponsor relationship and permit a military component to dictate their curriculum content. The Department also has significant in-house regional security expertise. The majority of NSA's faculty are not only recognized regional experts, but are also well schooled in regional national security issues. The majority of their sponsored research and published work is focused on national security and NPS's military-centric nature is unmatched by civilian universities and provides a unique insight and opportunity for FAO students.

(d) Another key distinction is the ability to offer classified courses. NPS has the capability and infrastructure to offer coursework and research opportunities at the Secret/Top Secret Level. No civilian university has this capability, and NPS FAOs are provided a classified understanding of regional engagement.

(e) The majority of NSA Instructors are civilians with PhDs and there are no Teaching Assistants. NSA class size is usually small (less than 20) and our students have a much closer relationship with the NSA tenured faculty and lecturers. There is also strong student mentorship provided by a mix of civilian and military faculty. This is not true at most civilian universities.

(f) NPS has a unique FAO synergy and strategic benefit of learning in a joint, allied, and whole of government environment. The Department leverages a combination of in-resident international military students, the Center for Civil Military Affairs (CCMR), who oversees/teaches 400+ educational events for foreign military/civilian students annually, and the nearby Defense language Institute (DLI) makes NPS unique in educational opportunities for FAOs. This synergy offers a peer network of opportunities with US officers from the other services and officers from allied nations, which is how DoD typically fights wars.

(g) Notably, as a U.S. Army command at the Presidio of Monterey, the DLI mission and location provides the perfect setting for educating FAOs and offers the following areas of cooperation that NPS fully leverages with all of our applicable academic programs.

1. The DLI is located three miles away from the NPS campus. Having DLI in close proximity to NPS brings educational flexibility and opportunity.

2. The NPS NSA regional curricula allows for a successful completion of language training at the DLI to serve as partial substitute for a Master's thesis along with a comprehensive exam.

3. The NPS NSA academic certificate programs at NPS allows for language maintenance courses to be taken simultaneously at DLI.

4. The DLI also provides availability for FAOs who have already learned a language to work out arrangements to keep current using its contacts and facilities. In addition, NPS FAOs have the opportunity to attend the annual Joint FAO Conference at DLI with no travel costs.

5. The NPS/DLI relationship is a one-stop-shop for graduate education and language training which produces significant PCS cost savings and supports family harmony and stability.

(g) Beyond the cost savings associated with a single PCS for both requirements, the presence of DLI in Monterey facilitates a seamless transition from regional studies at NPS to language training. FAOs find their regional training reinforced at DLI as they learn not only about the language, but also about regional culture. DLI benefits from the presence of NPS in its ability to tap foreign-language-speaking faculty for its speakers' programs, practical exercises, and conferences. Theme-oriented, foreign-language events at DLI also make use of the faculty from the Monterey Middlebury Institute of International Studies, where there are many foreign-language-speaking professors as well, many of them native speakers. In addition, students can also attend foreign-language events at the Middlebury Institute, where visiting lectures often give presentations in foreign languages. These points highlight the synergies of the Monterey area for educating FAOs in regional and language studies in NPS-DLI nexus.

(h) NPS has a large international military student population, which throughout the last decade has averaged over 200 international students from 40 to 50 countries at any given time. These students are enrolled in the same classes as their U.S. counterparts, they live in the same housing areas, and they socialize with U.S. students. There are over 65 graduate degrees and PhD curricula currently offered to international students, which provide a full range of educational options for international students, much of it tailored to the needs of the sponsor or international audience. Although not fully utilized, NPS also offers graduate level certificates available for foreign students on select subjects lasting about one academic quarter. NPS graduate education programs build international capacity across a wide range of disciplines and

enhance defense cooperation with partners across the globe. The presence of international students at NPS not only enhances the capabilities of partner nations by educating and developing critical thinking skills, but also benefits the US by exposing DoD students to personnel from partner nations and developing long-lasting relationships.

(i) Unlike the War Colleges, NPS's wide variety of educational disciplines offer a unique opportunity to target skillsets the U.S. wants to propagate in our Partners, Allies and Friends. Because the international students work side by side with their US student counterparts in specific academic disciplines, the relationships they form are extremely valuable in building lasting international partnerships. For example, if a foreign Navy LT studies Cybersecurity with U.S. students, not only is there a long term investment, but there is a long term partnership established in the critical area of cybersecurity. Also, International students tend to attend NPS earlier in their careers than other PME institutions. Consequently, these students may have 20-30 years of further service to their host countries, increasing the cost-benefit ratio for PME investment.

(j) Flexible year-round enrollment and modular curriculum structure can accommodate the operational tempo of our naval officers and ensure high on-time graduation rates. NPS has start dates four times a year and can provide graduate level education for FAOs in three different ways: 18-month thesis required regional degrees; one-year graduate level degrees when accompanied by language training, and a regional Certificate Program. The Certificate Program is ideal for new FAOs who already has graduate degree, but not in a regional studies discipline or for a FAO who is changing regions. The certificates are completed in one quarter which allows the student to be on TDY instead of PCS orders. And the students have support structures to ensure that they graduate. In addition, Joint PME Phase I is available at NPS as the Naval War College offers Joint PME phase one on the NPS campus. This enables our FAO students to complete their graduate education and PME requirement at the same time. The PME courses are included in the curriculum matrix.

(k) Additionally, following the bombing of USS COLE (DDG 67) in Aden, Yemen, in 2001, NPS developed a program to provide continuing education on historical perspectives, political-military contexts, and United States' regional objectives for Naval Forces deploying overseas. At the direction of the Chief of Naval Operations and Fleet Commanders, this Regional Security Education Program (RSEP) is delivered by teams of Subject Matter Experts, usually Ph.D.'s in the fields of National Security Affairs and Defense Analysis, who embark in deploying carrier and expeditionary strike groups, special missions groups such as hospital ships with medical teams involved in Pacific Partnership and Southern/African Partnership programs, as well as independently deploying ships and units. Ashore, RSEP teams deliver cogent regional expertise and perspectives for major naval exercise groups, SEAL Teams, Marine Corps Units and Naval Reserve units. At the request of Combatant Commanders in 2005, RSEP was expanded to include education on cultural awareness and military diplomacy focused on countries that deploying forces plan to interact with and visit. Under direction of the Secretary of Defense's program for Language, Regional Expertise and Culture (LREC) for each of the Services, RSEP became the primary education syllabus for the Navy, under OPNAV (N1) as

Navy's Language Authority, delivering regional expertise and cultural awareness education to thousands of Navy and Marine Corps personnel annually with ever-increasing demand from deploying and reserve forces.

(l) In summary, the NPS FAO education is relevant and aligned with the strategic priorities of the DON and DoD. The NSA curriculum is responsive to DON demand signals, which in recent years included offering curriculum on energy security and cyber security. As a result, the coursework is more adaptable to changing DON priorities through the biennial review process and formalized Educational Skills Requirements. Our faculty are selected, retained, and promoted based on their ability to produce defense relevant knowledge and they fund 25 percent of their pay by attracting defense related research and educational funding opportunities. Experienced civilian faculty leverage their strong service knowledge to tailor their education and research to military problem sets. And the students learn in a cohort that share similar concerns, backgrounds and career-paths with the added synergy of professional international military students. The scope of academic disciplines, flexibility, customization and variety of teaching options is not matched at any civilian or other PME program to meet U.S. military engagement requirements.

(3) What percent of the total student body are: Navy officers and enlisted; Marine officers and enlisted, Navy unrestricted line officers, restricted line officers, and staff? In your view, how are the naval services making best use of the education offered at Naval Postgraduate School?

(a) The composition of the student body differs significantly between the full-time resident program(s) and the part-time distance learning program(s). Summary percentages are:

1. Resident Education:

a. Naval: 41% Navy Officers and Enlisted and 16% Marine Corps Officers and Enlisted.

b. Non-Naval: 43% (principally USA, USAF and international officers)

c. Navy Composition: 36% Navy URL officers, 47% Navy RL officers and 16% Navy Staff Corps/LDO and 1% Enlisted.

2. Distance Learning Education

a. Naval: 31% Navy Officers and Enlisted and 3% Marine Corps Officers and Enlisted.

b. Non-Naval: 66% (principally DOD civilians, dominantly DON)

c. Navy Composition: 77% Navy URL officers, 12% Navy RL officers and 11% Navy Staff Corps/LDO.

(b) From the Navy's perspective, assessing the "best use of the education offered" has often been gaged using utilization rates – defined as a payback tour in a subspecialty-coded billet. The Navy has historically calculated utilization as "payback within two shore tours." More recently, attention has shifted to the "DOD Utilization" rate, determined as payback anytime within an officer's full career.

1. Recent summary statistics for DOD Utilization rates: *

a. URL: 81%

b. RL: 94%

c. Staff: 94%

(c) These patterns are well-known: Most all RL and Staff officers serve directly in subspecialty billets (often more than once) during their career. URL officers serve in a subspecialty billet at a lower rate, although the large majority do have a direct payback tour during their career.

(d) If subspecialty utilization is deemed most important, the Navy could benefit from enhanced tracking and distribution of subspecialty coded officers to ensure the all funded graduate education is not only leveraged in multiple future assignments, but cultivated and advanced through continuous experience and learning. Each Major Area Sponsor could work across community managers and detailers to maximize the return on investment of educated officers.

(e) However, we caution on the over-reliance on billet payback utilization data as a measure of the sole value of graduate education. Evolving fleet requirements and OPTEMPO can impact utilization opportunities and timing, especially in the URL communities. More importantly, there is a broader, less quantifiable impact of higher education, as it develops critical thinking skills, analytical reasoning capabilities, proficiencies in written and verbal communication, and broadens a student's Navy and Joint strategic perspective. These benefits have a payoff in all billets in which an officer may serve. Every tour is a payback tour.

(4) What is your balance between and among education, basic and practical research?

(a) The Naval Postgraduate School recognizes that high-quality graduate level education is predicated on combining traditional instruction with cutting-edge research, which may be at the basic or applied level. In addition to their coursework, all NPS graduate students complete a thesis or CAPSTONE project to meet the degree requirements as well as the education skill requirements specified by the curriculum sponsors in the Navy and Marine Corps.

The core mission of NPS defined above in question a. recognizes this inextricable link between education and research.

(b) To support this joint instructional and research mission, the NPS business model follows the standard practice of graduate universities. That is, faculty at NPS are expected to both teach and conduct research. As individuals, they are responsible for identifying and competing for resources within their respective disciplines. It is these faculty-generated projects that provide the opportunities for students to participate in research in their areas of interest. In addition, NPS faculty members are expected to direct their research efforts toward those topics that are most relevant to DOD, particularly as they mature in their careers.

(c) While the faculty research projects fill the spectrum between basic and applied research, the preponderance of research activities conducted by students at the master's level can be characterized as applied research. This leverages the operational experience of the unique NPS student body and their connections to their communities of practice. Students in the master's programs lack the time to engage in basic research and complete their theses in the limited time frame of their course work. Student course loads of 16-18 hours per quarter also limit their ability to engage in basic research. Most student's in master's level programs at NPS leverage the academic program to address concerns from their personal experiences, challenges facing their specific communities, or problems identified by faculty. By contrast, PhD students tend to conduct research at the basic level due to their requirements for original research and the additional time available in those programs.

(d) In addition to providing research opportunities for students, NPS faculty conduct research to build their own intellectual capital, improve the overall educational experience, and develop the underlying concepts to support future applied research. The majority of NPS research sponsors from across DOD focus on applied research. Additionally, within NPS administered programs such as the Naval Research Program (NRP) and the Consortium for Robotics and Unmanned Systems Education and Research (CRUSER), topic sponsors allocate funding to support mostly applied research. When working with sponsors such as the National Science Foundation, the Office of Naval Research, or DARPA, a larger percentage of the work is focused on basic research. By having faculty conduct basic research today, NPS is able to remain current across its diverse curricula while building capacity and relationships to support applied research in the future. Furthermore, the margin between basic research and applied research is narrowing because technological changes are accelerating.

(e) Quantum computing offers a compelling example of the close linkage between basic and applied research. Dr. Narducci, Dr. Luscombe, and Dr. Huffmire are working towards establishing a quantum computing research lab at NPS. They are updating their Quantum Computing course, which was last taught in 2010. Dr. Narducci is a physicist and an expert in the field of optics. Dr. Luscombe is also a physicist and an expert on the Ising model, an aspect of quantum physics. Dr. Huffmire is a computer scientist with expertise in computer architecture, hardware-oriented security/trust, and quantum information science. Dr. Luscombe and Dr. Huffmire co-taught the course in 2009 and 2010. Dr. Luscombe taught the physics fundamentals.

Subj: RESPONSE TO EDUCATION FOR SEAPOWER REQUESTED INFORMATION

Dr. Huffmire taught the computer science fundamentals. Dr. Luscombe explained several alternative technologies for the practical realization of quantum bits and logic gates. In 2010, the education and research related to quantum computing was considered basic research. In 2018, a NPS student programmed the IBM Quantum Computer that is connected to the Internet and is available for anyone to use for free. In 2010, quantum computing was considered basic research. By 2018, a master's student programmed a quantum computer leveraging the education provided by Dr. Luscombe and Dr. Huffmire. If Dr. Luscombe, Dr. Narducci and Dr. Huffmire had not been conducting basic research in 2010, the faculty would not have possessed the capacity to guide a student's applied research in 2018.

(f) In another example, Dr. Tim Chung pioneered swarms of unmanned aerial systems while on the faculty at NPS. The algorithms and underlying behaviors Dr Chung pioneered several years ago in his basic research built the foundation for swarm-on-swarm experiments executed by faculty and students at Camp Roberts in 2017. The original, basic research created a critical mass of faculty and students required to execute and assess swarms and counter swarms at the applied level. Dr. Chung is now at DARPA as a program manager. DARPA supports the basic research to move swarms from theory into actual applications. The faculty and students use opportunities such as the DARPA Swarm challenge to develop applied research to move the Navy and Marine Corps forward through adoption of the technology.

3. The point of contact for this response is CAPT Mike Ward, NPS Chief of Staff. He can be reached at (831) 656-2511 or john.ward@nps.edu.

RONALD A. ROUTE
Vice Admiral, U.S. Navy (Ret.)

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Appendix E-3: MCU/TECOM Responses

UNITED STATES MARINE CORPS
EDUCATION COMMAND
MARINE CORPS UNIVERSITY
2076 SOUTH STREET
QUANTICO, VIRGINIA 22134-5067

IN REPLY REFER TO:
5200
VPAA
9 Jul 18

From: Commanding General, Education Command/President, Marine Corps University
To: Commanding General, Training and Education Command

Subj: DEPARTMENT OF THE NAVY EDUCATION FOR SEAPOWER (E4S) STUDY

Encl: (1) SECNAV MEMORANDUM

1. **Background.** Marine Corps University's (MCU) responses to the general and specific questions contained in the enclosure are provided below. All MCU academic programs were involved in responding to this data call. Where appropriate, the specific responses provided by individual program leadership are included. These programs include: 1) Marine Corps War College (MCWAR); 2) School of Advanced Warfighting (SAW); 3) Marine Corps Command and Staff College (CSC); 4) Expeditionary Warfare School (EWS); 5) College of Distance Education and Training (CDET); 6) College of Enlisted Military Education (CEME); and 7) Center for Advanced Operational Culture Learning (CAOCL).

2. **What are the roles and responsibilities of your educational institution, and how do they contribute to establishing a permanent process of continuous learning?**

a. MCU is the Marine Corps' PME institution, and the President, MCU is the Marine Corps' PME advocate (also designated CG, Education Command). MCU/EDCOM develops and delivers Professional Military Education (PME) and training through resident and distance learning programs, while also preserving and presenting the history of the Marne Corps, in order to prepare leaders to meet current and future security challenges and inform the public of the service's role in national defense. Marine Corps PME is developed along two continua - one for enlisted Marines and one for officers. MCU's formal programs are designed to support those continua throughout a Marine's career.

b. A MCU education is a differentiating experience in three ways: (1) we emphasize our Corps' *ethos* (how we treat each other) and *values* (honor, courage, and commitment) that define <u>who we are</u> as Marines; (2) we expand how our students think and write about *naval expeditionary power projection* in a dynamic, complex, and multi-domain security environment, which is <u>where we will fight;</u> and (3) we develop in our students a deeper understanding of our philosophy of *maneuver warfare* as applied through a 21st century Marine Air Ground Task Force (MAGTF), which is <u>how we will fight</u>. A MCU education is unique because it blends the richness and continuing relevance of our Corps' and country's history and traditions with the perpetual renewal of ideas we get from our faculty and, most importantly, our students. By regenerating our intellectual capital, MCU is able to sustain a campaign of continuous learning.

3. **What is your vision regarding the future role of your educational institution**?

Our vision is for MCU to be the idea and innovation hub of the Marine Corps. Our *main effort* is to continually develop our students' critical thinking and decision-making skills and to refine the curriculum we deliver to our students. We will focus our energy along four interconnected lines of effort to: (1) deeply imprint our Corps' ethos and values into our students; (2) expand how we think and write about employing naval expeditionary power in the future operating environment; (3) personally and professionally develop leaders of character; and (4) improve our Corps' operational capability and warfighting effectiveness. Our just-completed academic year saw multiple initiatives in support of these lines of effort. These initiatives included the Belleau Wood Lecture Series to link the Marine Corps' history with its future, a new essay contest to stimulate student thinking beyond the classroom, and strengthening the Brute Krulak Center for Innovation and Creativity to promote student learning in emerging fields across the University. Moving forward, MCU will build upon these initiatives and develop new ones to promote educational rigor, relevance, and creativity. In so doing, MCU will become the idea and innovation hub of the Marine Corps.

4. **How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?**

a. HQ. This question applies primarily to MCU's "top level" JPME II accredited school (MCWAR), and to a lesser extent the advanced intermediate and intermediate programs (SAW and CSC). MCU assesses that graduates' ability to think critically at the strategic level are well demonstrated.

b. MCWAR. 100% of AY18 students agreed or strongly agreed that they have met our program outcome related to critical and creative thinking. The average grade on assignments evaluating critical and creative thinking is 92.

c. SAW. SAW develops lead planners and future commanders with the competence and intellect to solve complex problems, employ operational art, and design/execute campaigns. Graduates know how to study, think and write logically, maximize an operational planning team's potential, and communicate recommendations persuasively.

d. CSC. Command and Staff College develops critical thinkers, innovative and creative problem solvers, and ethical leaders. The College places great emphasis on understanding the strategic environment so as to enable more effective operational thinking and planning.

5. **How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?**

Curricula is updated annually, at a minimum. Our MCU-wide oversight of the curriculum review process is provided by the Vice President for Academic Affairs (VPAA). All program directors are required by MCU policy to conduct a Course Content Review Board (CCRB) at least annually. Program directors are expected to ensure that their curriculum remains current and relevant to service and (as applicable) joint requirements, and designed to meet approved program and student learning outcomes. Program mission statements, outcomes, student

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learning outcomes, overall curriculum design, and assessments are reviewed and approved at Curriculum Review Boards (CRB), coordinated by VPAA's office, at least biennially by the President, MCU. "Off-cycle" CRBs are conducted when needed to ensure programs and their curricula meet emerging requirements. Examples within the last two academic years include emphasis on re-invigorating maneuver warfare, greater emphasis on strategic competitors and naval expeditionary warfare, and enhanced focus on Information Environment Operations.

6. **In your critical view, how well do you prepare your students for future assignments?**

MCU is confident that its programs meet program outcomes and produce graduates who have met student learning outcomes to enhance critical thinking and creative problem-solving skills in order to improve military judgment and decision-making. Assessments continually indicate that graduates perform well in subsequent assignments. These assessments are based on informal student feedback/reach back to us while they are in their follow-on assignments, as well as formal alumni and supervisor surveys conducted after graduation. With that said, we can and will get better.

7. Based on your mission statement and list of required knowledge and learning, what is your critical assessment of how well you are achieving both? What are the strengths, weaknesses, and gaps of your institution in providing your graduates with these necessary skill sets?

MCU employs a systematic institutional effectiveness (IE) process to review mission accomplishment and identify opportunities for improvement. Each academic unit conducts a thorough review of direct (observed performance) and indirect (student and graduate survey) evidence of student learning and synthesizes findings and recommendations for improvement in an annual Director's Report. AY2016-2017 reports documented compelling evidence that student learning outcomes are being achieved; AY2017-2018 IE reviews are currently in progress. Across academic programs, students consistently meet or exceed performance thresholds and students and graduates provide overwhelmingly positive feedback about their self-perceived progress on MCU key learning areas and preparedness for subsequent assignments.

Strengths: The ~16,300 students who will sit in our classrooms and attend our seminars both onsite and online this year are MCU's *strategic center of gravity* – our source of strength; our faculty and staff is MCU's operational center of gravity. Taken together, we have strong faculty/student interaction; our small size allows for flexibility, and rapid integration of emerging issues. For example, this past academic year MCU moved quickly to add emphasis on *Information Environment Operations* and expanding our competitive space in the new era of great power competition.

Weaknesses: Institutionally, we are a liberal arts institution. We lack faculty with robust technical backgrounds, which makes keeping up with existing trends in the science and technology sectors challenging. While we are mitigating this through our partnership with the Marine Corps University Foundation (MCUF), which is able to hire professors as Chairs who can quickly inject these ideas into our curricula, our challenge is to evolve our curricula at the

pace of change. We also need to upgrade our IT and ET infrastructure, and its administrative support capacity, to create a more technologically robust learning environment.

Gaps: From a larger perspective, the DoN civilian hiring process fairs poorly in supporting MCU's GS requirements and were it were not for the flexibility in hiring faculty under Title 10, we would have a difficult time accomplishing our mission. The other significant gap is the lack of US Navy representation among the uniformed faculty and student body of MCU. With one of our pillars to be to expand how we think and write about naval power projection, the lack of strong representation among the uniformed faculty and students across MCU's schools is a significant gap.

8. **How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?**

a. Faculty quality is excellent. As noted above, our faculty represent MCU's operational center of gravity. The civilian faculty receive strong marks in teaching, meet all the administrative requirements as course directors, maintain serious publication schedules, serve their respective schools, and conduct outreach to the broader PME and national security communities. The military faculty bring a wealth of experience, leadership, and operational perspectives into the seminar room.

b. Civilian faculty are recruited through outlets such as USA Jobs as well as various academic online job websites. MCU has no problems attracting top quality candidates for Title X positions. School Directors also are successful in attracting outstanding USMC military faculty. At CSC, for example, most military faculty are post command O-5's, Senior Service College graduates, with significant planning experience. The single biggest challenge is the impact of frequent military faculty turnover. Too many are in place for only a year or two, vice a standard three-year tour. This makes initial faculty development extremely challenging. It is harder to recruit similarly qualified military faculty from other services. For example, MCWAR lacks an O-6 Navy faculty member/Navy Chair.

c. Standards. Civilian faculty are assessed in terms of the performance in five areas: teaching, course director, research and publication, service, and outreach. Military faculty performance is evaluated through the normal fitness report process. Standards are maintained by MCU-wide and school-specific faculty development programs that occur throughout the year.

9. **Do tenure, right to publish, and ability to research constitute major issues that need review? How is the DON-wide requirement of audit addressed in your curricula?**

Issues regarding tenure, right to publish, and ability to research have been the subject of significant review and study within MCU, DoN, DoD, and congressional inquiry. The issues largely concern the friction inherent in administering an academic institution dedicated to traditional notions of academic inquiry and expression but also subject to federal law, rules, regulations, and practices; they do not interfere with accomplishing MCU's mission. The biggest challenge for MCU faculty in conducting research, for example, is more that the primary teaching function consumes the vast majority of their time and energy. That said, various

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legislative proposals submitted this calendar year regarding hiring Title X faculty and applicability of copyright and ability to research would, if passed into law, provide even greater flexibility in creating an environment of scholarly inquiry.

10. **What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?**

Alumni and their supervisors are surveyed 18 months after graduation for additional insight into the impact and quality of the MCU experience. Alumni consistently indicate strong agreement that programs are achieving learning outcomes and preparing them for subsequent assignments. In the most recent alumni survey, the Class of 2016, 99% of respondents indicated they were prepared for subsequent assignments. Graduate recommendations were predominantly program-specific, suggesting less or more emphasis on particular lessons or assignments. Response rates range by cohort, averaging a 36% response rate over the last 3 years. Supervisor response is significantly lower, averaging 4.5% response. While reflective of the views of those who contribute and containing valuable practical insights into graduate performance, neither graduate nor supervisor survey response rates allow sufficient statistical confidence to make conclusions about the entire graduate population. Per the MCU Strategic Plan, the University is seeking to enhance its insights into the longer-term impact and relevance of educational programs to graduates through additional data-gathering approaches.

11. **Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW)?**

a. MCU exercises administrative oversight of the USMC Senior Service Representatives at DoN, other service, and joint institutions, and through them seeks to ensure that useful and required integration occurs. Recognizing that PME and STEM are different, but reinforcing disciplines, MCU has sought to increase interaction with Marines attending NPS via inclusion in efforts undertaken to enhance student creative problem solving skills. For example, MCU included two NPS student presentations in its first-ever Innovation Summit (April 2018), and plans to continue this practice in the future. More generally, MCU recognizes a need for better and closer interaction with other institutions and has incorporated into its 5-year Strategic Plan, approved in 2017, requirements to examine other institutions' "best practices" and seek additional opportunities to engage on common concerns. We are also actively further ways to increase collaboration between NPS and MCU, perhaps with combined student projects.

b. MCWAR. MCWAR coordinates with the Marine Corps Warfighting Lab (MCWL), The Fletcher School at Tufts, Center for Strategic and International Studies, and Emory Law School.

c. SAW. SAW coordinates closely with the MAGTF Staff Training Program (MSTP), MCWL, and other organizations as required to give our students a better picture of the Naval and amphibious integration during planning exercises and operational decision games.

d. CSC. The College has extensive outreach and contact with elements of the Marine Corps outside Marine Corps University, including significant connections with the MCWL, MSTP, many of the Deputy Commandants, and the operating forces. The College enjoys close association with National Intelligence University and the Asia Pacific Center for Security Studies. We also talk regularly with the Naval War College, the Army War College, and the Army's Command and General Staff College. In addition, the College has close relationships with Staff Colleges in Australia, France, and Norway. The College enjoys connections with the Darden School of Business at the University of Virginia, the Center for International Security Studies at Princeton, Emory Law School, and American University's School of International Service. Integration with other parts of the DoN educational enterprise, other than the Naval War College, are episodic and minimal.

e. EWS. Within the Marine Corps, EWS works closely with MSTP, Marine Corps Tactics and Operations Group (MCTOG), and the Marine Corps Logistics Operations Group (MCLOG) to ensure alignment with how we are teaching the Marine Corps Planning Process and our maneuver warfare doctrine. Additionally, each of our Occupational Field Expansion Course (OFEC) leads coordinates with the respective community advocate from Headquarters Marine Corps, as well as the community center of excellence (MCTOG, MCLOG, Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), etc.) to ensure our MOS specific training remains nested within the broader community priorities. Finally, for naval integration, EWS closely partners with EWTGLANT and Surface Mine Warfare Division - Amphibious Mine Warfare Division in support of the Naval Operations portion of our curriculum.

f. CAOCL. CAOCL supports U.S. Naval War College, the Foreign Affairs Officer program/Naval Post-Graduate school, Harvard extension school, FBI Academy, Joint Special Operations University, Uniformed Services University of Health Sciences, Marine Corps Training and Operations Group, Marine Corps Security Cooperation Group, and the Marine Corps Information Operations Center, Joint Staff J-39 Strategic Multi-layer Assessment, among others. MCU also helps ensure its integration into the broader Naval research enterprise and other research communities through participation in venues such as the Science and Technology Working Group (STWG). The STWG monitors and coordinates Naval research, from support to the Future Naval Capabilities process to facilitation of thrust areas and individual projects from research entities such as the Office of Naval Research. The STWG also coordinates with external research entities including DARPA, IARPA, the research organizations of other services, and FFRDCs.

12. **What is the role of your advisory board? Where is it most helpful, and how can its contribution be improved?**

MCU's Board of Visitors (BOV) serves in an advisory capacity to provide insight into best practices and to meet MCU's accreditation governance requirements. Comprised of a mix of retired senior military officers and higher education administrators, the BOV typically meets twice a year and provides extremely useful feedback to MCU leadership - both from the military perspective on professional development and from the academic perspective of rigor and standards. MCU's BOV was instrumental in helping MCU prepare for its ten year SACS reaffirmation of accreditation in 2015.

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13. **The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?**

a. HQ. Upon publication of the 2018 NDS, MCU immediately reviewed its programs to assess our emphasis on the elements therein, providing that initial assessment to the Commandant of the Marine Corps. MCU programs continue to address the NDS in their CCRBs in order to ensure its programs support that mandate.

b. MCWAR. MCWAR reviews national level guidance annually to ensure the curriculum reflects current priorities. This is codified in the faculty handbook, as well as being good common sense. Dr. Frank Hoffman briefed AY 18's class on the NDS and Nadia Schadlow spoke with our students on the NSS. The Joint Warfighting and War, Policy, and Strategy courses work to ensure NDS guidance is embodied through military case studies and war games; the National Security course does the same for the NSS.

c. SAW. As part of Operational Art, students examine 50 case studies from the Peloponnesian War to contemporary Afghanistan. These cases are used to explore and better understand operational art ("the strategy for the strategy"). The course uses history, but it is not a military history course. Rather, the history serves as a laboratory in which to explore military decision making in order to improve pattern recognition as well as develop insights on ways to resolve operational problems. When complemented with staff rides, the experience invariably enhances understanding of campaign design and execution and enables the graduates to plan for the employment of a force that is agile, more lethal and resilient.

d. CSC. The CSC curriculum nests well with the National Defense Strategy of 2018 as well as with the National Security Strategy of 2017. In 2016, CSC made curriculum changes to reflect changes in the global security environment and the increased likelihood of state-on-state conflict, be it four plus one or two plus three. 2017 saw CSC placing greater emphasis on information environment operations and JFEO than in the recent past. In addition, Pacific Challenge X, the current capstone exercise, is far more operational and kinetic than the exercise it replaced.

e. EWS. At the conclusion of AY18, the EWS faculty conducted a thorough review of the curriculum, the faculty reviewed the 2017 National Security Strategy of the United States of America, the Summary of the 2018 National Defense Strategy of the United States of America, and the Commandant of the Marine Corps' "Message to the Force 2018: Execute." Based on these findings and recommendations, modifications were made to the course to meet this mandate. Introduced in AY18, the "Future Operating Environment Course" is designed to be the most flexible and responsive course within the curriculum. Based on the Secretary and CMC's guidance, EWS updated all of our practical exercises with adversaries capable of contesting our operations across all five domains. These exercises are all free-play decision making exercises with students playing the friendly and opposing force roles.

14. **How are your student bodies changing overtime (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?**

a. HQ. Student assessment takes place within each program/cohort which are largely structured by rank. A clear trend is greater student familiarity with, and higher expectations regarding, technological support. We have also noticed a substantial decrease of US Navy Officers who teach and attend our resident schools.

b. This past academic year we had:

	USN Faculty / staff	USN Students	USN Quotas	Total students
HQ	0/1	NA	NA	NA
MCWAR	0/0	1	2	30
SAW	0/0	0	2	26
CSC	1/0	9	21	213
EWS	0/1	3	16	242.

c. SAW. A normal SAW class includes 26 students: 18 Marines, 1 sailor, 2 soldiers, 2 airmen, and 3 international officers. These numbers are only a template as there are no quotas for each category and the composition varies from year to year based on the strengths of the applicant pool. Similarly, there are no quotas for MOS mix across a class but we usually end up with a good mix of occupational specialties. The student selection rate is about 15% and most applicants have sterling records with superior performance in a variety of challenging positions plus impressive academic pedigrees. The focus on excellence has been a constant in the student selection process and the rigorous curriculum.

d. CSC. CSC's students are, on average, slightly more junior than in the 2010-2012 years. Thus, they have slightly less experience. But the operational experience they do possess is broader so they are less likely to view everything through the lens of Iraq or Afghanistan. If anything, they are more curious as they see the global security environment changing rapidly. Their writing and speaking skills at the beginning of the year differ little from 2010-2012 classes. CSC does believe that its students do see greater improvement in oral and written communications skills now than in previous years, due in large part to the University's Leadership Communications Skill Center's (LCSC) assistance and greater faculty concentration on the areas of rhetoric and writing.

e. EWS. Each class remains very different in terms of background and professional resume. Trend lines reflect an increased interest in future technology, particularly artificial intelligence, as well as a renewed interest in Marine Corps ethos, values, and warfighting philosophy.

f. CDET. CDET's student body encompasses the entire force; as it changes our student body changes.

g. CEME. As the rigor of the curricula has increased, our students have expressed their appreciation of it. Over the past decade, there is anecdotal evidence that more students have completed at least some college classes.

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15. **How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?**

a. HQ. When MCU receives funding, leadership has some flexibility spending within the budget lines and program codes. MCU's budget is sourced and decided upon by the Program Objective Memorandum (POM) process. Continuing Resolutions (CR) are a significant constraint. Additionally, the time it takes to award contracts has been a pivotal constraint.

b. CDET. CDET is funded through the Marine Corps Distance Learning (MCDL) program. This program has a separate MCPC from MCU and its own funding line. POM briefs are the main source of funding fluctuations. The recent addition of the Marine Corps Enterprise Integration Plan (MCEIP) process has strained the ability of TECOM programs to effectively compete for funding. A Training and Education advocate is needed within the MCEIP process in order to protect funding for critical programs like MCDL. Additionally to protect funding in the MCDL program PME programs should be designated as "Service Mandated" to protect them from cuts and stabilize the PME programs from POM or MCEIP fluctuations.

16. **What constraints have you experienced regarding the execution of your vision for the future? How can this Study best help you in that regard?**

Major constraints include IT restrictions and hiring practices. Regarding the former, tech waivers and prohibitions crimp the ability of the schools to integrate contemporary learning technologies and resources in the classroom. This is frustrating to both faculty and our increasingly tech-savvy student population. As for hiring practices, it remains difficult and time-consuming to attract top quality staff given regulations and review processes. It is not uncommon for key staff vacancies to remain unfilled for six months (or longer). The DoN could assist PME institutions by conducting a comprehensive review of IT restriction and hiring regulations, with an eye towards removing those that are overly restrictive.

17. **If you could make major changes to your institution and to the naval educational enterprise, what might they be?**

MCU students benefit greatly from the presence of sister service reps in the classroom and among the faculty. Unfortunately, USN students and faculty have been inadequately represented at MCU for many years. This shortcoming deprives our students of invaluable joint and maritime perspectives, and sends (at best) a very mixed message about how the DoN values education. At a minimum, every school should have one high-quality U.S. Naval Officer on its faculty, and one high-quality U.S. Naval Officer in each seminar room.

18. **Does the DoN have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how would you create one?**

Personnel assignments are the key to improving and sustaining DoN's culture of learning. The DoN must do a much better job assigning a sufficient number of top-quality students and faculty to MCU, as noted above. In addition, increased collaboration across the Naval enterprise schools

(NPS, NWC, MCU) will facilitate supporting and maintaining a common culture. If successful, this approach will greatly benefit the Navy-Marine Corps team.

19. **What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in residence, and in your opinion, their capacity for addressing complexity and added lethality? How would you deliver JPME differently?**

It is vital that Marines understand the capabilities and roles of the other services in order to ensure effective and efficient interoperability, to know which service and / or capability is likely to be most effective and efficient in a given operating environment, to credibly articulate and advocate Marine Corps capabilities where appropriate, and to have the wisdom and courage to recognize when other service capabilities should more appropriately be brought to bear. To that extent, JPME requirements enhance Marine Corps PME. That said, DoD and the services should actively guard against the potential for JPME to tend towards "homogenizing" the services. Service PME should produce master practitioners of warfare in their respective domains - land, air, space, cyber, and maritime; JPME should produce within them the ability to coordinate and conduct these operations jointly.

20. **How should critical thinking and strategic thinking best be taught? Where should it be taught? When?**

a. Critical thinking skills should be developed at all levels of education, from boot camp through CAPSTONE. Critical thinking is best taught in environments where students are free to express their ideas, challenge the ideas of others, and question their own assumptions. Socratic-led seminars and experiential learning are the best means to promote critical thinking.

b. Critical thinking is a prerequisite for strategic thinking, which requires an ability to think broadly about the impact of high level political-military decisions and their secondary and tertiary effects. Strategy is best introduced at CSC as a guide to what the operational art is supposed to accomplish. TLS programs rightly emphasize strategic thinking in their curricula.

21. **What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?**

MCU is not in a position to assess DoN's STEM priorities in any detail. The proper balance between strategic education, STEM, and the operational arts rightly varies from institution to institution, and from program to program. For its part, MCU is neither manned nor equipped to teach STEM courses. For the majority of PME students, the goal of STEM-related education is not to make the student into a scientist, but rather to enable them to be savvy consumers of scientific knowledge and expertise. Preliminary research in this area suggests that the knowledge necessary to make decisions regarding STEM proposals and claims is: (a) a gap among current personnel (as noted above) and (b) can be taught in conjunction with other topics, minimizing the need to add to existing curricular loads. Naval PME institutions should leverage existing knowledge and research in this area and develop modules and other curricular injects that faculty can use to boost students' STEM-related decision-making capabilities. We should

explore greater collaboration among NPS and MCU and NWC.

22. **For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?**

a. MCUF adds significant enhancement value to MCU's educational program, in particular by providing Academic Chairs - subject matter experts in functional and regional areas - who teach and mentor across all programs. MCUF also provides support for writing awards and research grants. MCUF is currently exploring how it might further support MCU through an established Alumni Association.

b. MCU also receives support from the Marine Corps Association & Foundation (MCAF), although its charter is to more broadly support professional development throughout the entire Marine Corps vice PME specific. MCAF supports essays contests at MCU, and this year sent several essay contest winners to Belleau Wood for the 100th Centennial celebration with the CMC. DoN would provide a great service to the schools if they provided a blanket legal justification for how the foundations can support faculty and student research and education.

23. **How do you deal with accreditation? Is it an advantage, or a constraint?**

Regional accreditation of MCU's master's degree programs is a significant advantage. Simply put, without accreditation there would be no point in having degree programs. Contextually, in order to create an educational environment conducive to the professional development desired, MCU must have the structure, research facilities, and faculty in place that lends itself to meeting accreditation requirements even if it did not offer master's degrees. While meeting accreditation requirements does require some additional time and resources, much of that is related to translating functions from military into academic terminology and contexts, and vice-versa (a simple example - accreditation requires having a "student complaint policy" which is very much the concept behind the naval tradition of "request mast"). On a positive note, accreditation serves as a forcing function to avoid complacency and confirmation bias by requiring MCU to periodically conduct extensive self-assessment in all functional areas.

24. **What is the selectivity (admission) rate for applicants to your institution?**

a. HQ. Generally not applicable to MCU, with the exception of SAW. Resident students are generally selected by an M&RA board process, and MCU's distance programs are designed to accommodate all Marines in meeting PME requirements.

b. SAW. SAW students are selected through a rigorous process, to include interviews. The acceptance rate varies per year, but averages about 15%.

c. CSC and EWS. All military students, except those from the Navy, are board-selected. MCU will coordinate with M&RA to identify board selection rates. Civilian students are selected by their agencies and proposed to the College for approval. Only once in the recent past has the College asked an agency to nominate a different student. International students are

coordinated through security assistance channels.

d. CDET. CDET accepts the entire force depending upon the program rank requirements.

e. CEME. Resident CEME Courses are required. All enlisted Marines are accepted.

25. **How many students failed any of your full-time courses last year?**

There have not been any resident OPME failures in the past several years. Distance and EPME programs have rare failures. At CEME, there were four academic failures in the last full academic year (out of a total of 7,400 students). Likewise for CDET, the number of students who failed is an exceptionally small percentage of students. The high quality of students, small student-faculty ratios, and remediation policy, significantly decrease the potential for failure. The very low failure rate is a strength of MCU's academic programs, and in no way reflects a lack of rigor.

26. **How many admitted students failed to graduate?**

Failure to graduate is a very rare occurrence. Last year, an international student at MCWAR failed to earn a master's degree due to a low TOEFL score; however, he did complete PME requirements. In the past 5 years, 2 international students received certificates of attendance in lieu of graduating due to plagiarism issues. Within CDET, a very low percentage have to drop out due to operational requirements. Additionally, a miniscule amount are dismissed from the programs due to integrity violations. Within CEME, a total of 60 students did not graduate (out of a total of 7,400 students). That 60 are broken down as: Academic Drops, 4; Misconduct, 15; Medical, 13; Administrative, 10; Unit Recall, 5; Emergency Leave / Family reasons, 5; Funding, 1; Improper enrollment, 6; and Apathy, 1.

27. **For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or pay grade?** Coordinating with M&RA for response.

28. **For the past five years, what percentage of your military faculty (by year) have ever been passed over for promotion to the next rank or pay grade?** Coordinating with M&RA for response.

29. **For the past five years, what percentage of your military faculty were considered (in any zone) by any administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of those officers were subsequently selected for command as a member of your faculty?** Coordinating with M&RA for response.

30. **What do you consider your "peer" institutions, and what do you think they are getting right?**

In theory, sister service PME institutions are MCU's peer institutions; however, since each service configures itself differently, it is a bit of apples to oranges comparison. Army University is more akin to MCU's HHQ, TECOM, which oversees education and training. Air University has a degree-granting "community college" for occupational training and experience. Naval War College is organized by departments which support PME courses. NPS provides technical education and degree programs requiring payback assignments. Notwithstanding these differences, MCU believes its peer institutions are doing an excellent job preparing its graduates for the exigencies of 21st century security challenges.

31. **What is your opinion of the quality of students entering your institutions? Trends? What could be done to improve?**

Overall, students are smart, experienced, and capable. Our top students could excel in the very best civilian institutions. Most are adequately, if not well prepared, for the academic rigors of the course. That said, students are selected to attend resident school based upon their overall abilities as officers and not on their academic acumen. Student writing remains a challenge. In response, MCU has recently placed increased emphasis on developing and refining writing skills in all of its students.

32. **How is research, testing, development, and evaluation for educational/learning systems funded for your institution? Who is your SYSCOM for learning?**

MarineNet is a funded ACAT III program of record that has its own funding line. MarineNet is a dual managed program: CDET provides requirements and MARCORSYSCOM provides acquisition and management functions. MarineNet is currently being rebuilt to support all training and education.

33. **If you had a 5-10 percent budget cut, what function would you cut?**

The budget for the educational activities identified in paragraph 1 are spread across three Marine Corps Program Codes (MCPC). Any reductions would be subject to institutional review, however, the following reductions reflect realistic cuts to capability.

A 5% reduction in the Professional Development MCPC would result in the elimination of the Strategy and Policy Course, Reserve Officers Course, reduce SEPME throughput by 50% and IT contracts by 25%.

A 10% reduction in the Professional Development MCPC would eliminate the Strategy and Policy Course, Reserve Officers Course, reduce SEPME throughput by 50% and IT contracts by 50%, reduce the Executive Education Program (GO/SES), and significantly reduce travel in support of the curriculum and faculty development.

A 5% reduction in the Marine Corps Distance Learning MCPC would result in the termination of the Staff Sergeants Seminar Program.

A 10% reduction in the Marine Corps Distance Learning MCPC would result in the termination of the Staff Sergeants Seminar Program and the Blended Seminar Program for EWS.

A 5% reduction in the Center for Advanced Operational Culture Learning (CAOCL) MCPC would result in significant reduction in support of operating force training requirements. The refresh rate for the Regional, Culture, and Language Familiarization (RCLF) Program would be extended resulting in the curricula not keeping pace with the operational environment. Additionally, CAOCL would not be able to provide Cultural Advisors for all deployed units.

A 10% reduction in the CAOCL MCPC would result in significant reduction to operating force training requirements. The RCLF Program would stagnate. PME support to MCU, ACE, and formal MOS schools would be reduced. Additionally, CAOCL would likely not be able to provide Cultural Advisors for any deployed units.

34. **If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?**

MCU would invest in war-gaming technology to add another element of feedback to exercises and to offer more repetitions for students to test and build tactical, operational, and strategic decision-making skills.

An additional 10% would buyback previous anticipated cuts to the MCDL program. Twelve Learning Resources Centers (LRCs) would be restored. LRCs provide access points for personnel without computers to conduct their phase I (online) PME pre-requisite courses. This buyback would also bring the MarineNet system back to baseline level of support and restore CDET's ability to create training and education courses required by the TECOM targeting board. An additional 20% in funding would provide the above and allow CDET the ability to fully fund the Content Management System (CMS) Licensing. The CMS consolidates LMSs across the Marine Corps and provide schoolhouses, units, and other entities their own education and training space online. The plus up would also allow CDET to provide an E-8 Seminar program and to expand the Continuing Education program.

The Enlisted College would expand the communications instruction contract to provide full support at all of the regional SNCO Academies.

MCU would benefit greatly by an increase in personnel structure of six additional billet identification codes in addition to a budget plus up. Specifically, an additional professor at CSC would ensure compliance with the PAJE required faculty to student ratio. An additional professor at SAW and MCWAR would allow greater faculty depth and allow professors to conduct professional development offsite (take sabbaticals) with minimal impact on the curriculum. Moreover, an additional administrative assistant at MCWAR, SAW, and CSC would reduce administrative requirements on faculty by 20-30%, allowing them to focus on curriculum development and delivery.

35. Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting?

a. HQ. As noted in program responses, a lack of US Navy officers, especially from communities linked to MAGTF and expeditionary operations, is a significant impediment USMC PME efforts.

b. MCWAR. MCWAR currently has 17% interagency and have no problem focusing on high-end maritime warfighting.

c. SAW. SAW has no interagency students and, more often than not, no Navy students. This lessens our ability to have varied perspectives on high-end maritime warfighting.

d. CSC. CSC has 16 Conference Groups (seminars), each of which should have at least one Navy student. This academic year there were 9 Navy students in a 213 person student body. CSC is already past the "tipping point" referenced in the question.

e. EWS. Currently the conference groups have a minimum of one Army and one International student, per group. The missing factor is the Navy students; their absence prevents us from truly enabling peer to peer learning, sharing perspectives and discussing high-end maritime warfighting. Having one quality Navy student per CG (a total of 16 USN students) would greatly improve our ability to discuss the maritime environment from a green and blue perspective.

36. What percentage of instruction is held at the classified level?

a. HQ. Relatively speaking, almost none.

b. MCWAR. Currently less than 5%, though we are in the process of requiring TS/SCI for students beginning in AY20, which will significantly enhance our ability to teach at the classified level. The cost will be (1) limitations on international students, and (2) sponsoring and maintaining TS/SCI for faculty.

c. SAW. Minimal.

d. CSC. Less than 5%. Some electives and advanced study (Gray Scholar) options are delivered in the classified realm, but these courses are limited to U.S. clearance holding students. Our 32 international officers are largely prohibited from participating.

e. EWS. Currently less than 1%. This a potential shortfall as addressed in an earlier comment.

f. CDET. 0%

g. CEME. 0%

37. **Do you think we need to create an entirely new higher education institution for the USN, and if so, what should it do that would be additive to the service?**

This question is premature. The first question should be, "What is lacking in DoN's current educational efforts?" Once that is answered, the question of whether current institutions can address perceived weaknesses should be addressed. If the question is intended to solicit views on establishing a "Naval U" under which the current institutions would operate, the answer is no. There seems to be no benefit – and significant costs – associated with this proposal.
As currently configured, and without a clear and distinct mission and purpose, such an organization would primarily add another layer of bureaucracy on top of existing structure.

38. **What percent of the total student body are: Marine officers and enlisted; Navy line officers and staff? In your view, how are the naval services making best use of the education offered there?**

a. HQ. MCU appreciates service manning challenges; that said, it requires and desires increased participation of U.S. Navy officers in order fully develop its educational programs from its perspective as a maritime service.

b. MCWAR. 40% of our student body is Marine. 1 of 30 is Navy. This is down from 3 of 30 6 years ago. We currently have space for 2 Navy students and would like to have both. We would also benefit greatly from having an O-6 Navy chair on faculty. The Navy is the only service that doesn't provide an O-6 Chair for our faculty. This significantly limits students' exposure to Navy expertise.

c. SAW. The majority of students are Marines. A normal SAW class includes 26 students: 18 Marines, 1 sailor, 2 soldiers, 2 airmen, and 3 international officers. The program would greatly benefit from more USN student participation.

d. CSC. Approximately 50% of CSC students are Marines. All of the other services are well represented in our conferences groups as are various civilian agencies with the exception of the Navy. Simply put, CSC would be a stronger institution if the Navy sent more and better students. SWOs are very much under represented. Each year, CSC has 32-33 international officers.

e. EWS. Approximately 74% of the student body is Marine. Navy makes up the smallest portion of the population at about 1%. Army students are 9%, and Air Force students account for 6% of the population. The international officers make up 9% of the population. EWS would benefit greatly by having more Navy Officers attend the course.

f. CDET. Focusing only on officer and enlisted PME programs combined to retrieve percentages, 60% of the student population are Marine Officers, 37% Marine Enlisted, and 1% Navy Officers and 2% other service and international students.

g. CEME. 99% of students are enlisted Marines. Less than 100 students are sister service or international students.

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39. **How is MCU connected to the career paths of Marine officers and enlisted? What part does it play in career advancement and placement?**

For enlisted Marines, completion of PME is required for promotion. For officers, PME completion by rank is not a prerequisite for promotion; however, meeting PME requirements makes one more competitive for promotion.

40. **What is the Marine Corps vision of continuous learning, and how does MCU play a part?**

The Marine Corps has long defined the relationship between senior and junior as "teacher" and "scholar," and promoted the concept of Marines as "life-long learners." To that end, in addition to formal schooling numerous agencies within the Marine Corps have equities in encouraging Marines to engage in unit and personal self-study, to seek additional civilian educational opportunities, and to seek and promote partnerships with civilian institutions to obtain credit for training and experience. MCU provides formal educational opportunities directly, and indirectly supports various efforts within the Marine Corps to coordinate and link base education centers, the tuition assistance program, and MOS advocates with civilian institutions. As previously mentioned, MCU also manages, via the Lejeune Leadership Institute (LLI), the CMC Professional Reading List (CPRL) to augment personal self-study.

41. **How is MCU connected to warfighting and advancing the operational art of war?**

a. HQ. Because MCU designs, develops, and delivers both enlisted and officer PME, its programs reach across the tactical, operational, and strategic levels of war, with curricula designed to address each in appropriate measure for the target level of education. In that sense, MCU is directly connected to the study of war, warfare, and advancing the operational art with the foci on the most important weapon - the warrior's mind. The tenets of maneuver warfare are emphasized at all levels of instruction.

b. MCWAR. At 13 credit hours, our 1/3 of MCWAR's curriculum focuses on these areas.

c. SAW. Operational Art is 1/3 of the curriculum.

d. CSC. This is the College's raison d'être. The curriculum is built around it.

e. EWS. The warfighting capabilities of a MAGTF operating at sea, from the sea, and ashore make up the majority of EWS's curriculum.

f. CDET. Warfighting capabilities and topics encompass a preponderance of CDET curricula. Operational art is taught at appropriate levels.

g. CEME. Warfighting is a central pillar in the enlisted curricula at every grade. Approximately 40 percent of the courseware is focused on warfighting.

h. CAOCL. CAOCL directly supports forward deployed units and provides pre-deployment training.

42. **How does MCU identify future strategists?**

MCU administers the CMC Strategist Program (currently in the pilot phase), by which two officers are screened and selected to attend PhD programs in disciplines related to strategic issues. Now in its second year (of six), the intent of the program is to create a cadre of strategic thinkers and leaders for service at senior levels of command and staff. The program allows two years for coursework, followed by one-two years assigned to MCU to complete the dissertation. Applicants are screened by MCU faculty to assess academic credentials and ability, then screened and selected by a board administered by M&RA.

W. J. BOWERS

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25 June 2018

From: Chief of Staff Training and Education Command

To: Commanding General Training and Education Command

Subj: EDUCATION FOR SEAPOWER (E4S) REQUESTED INFORMATION

1. Under Secretary of the Navy Modly has sent two memos requesting information as part of a "clean sheet" review of all phases of naval education. The question below is due NLT 25 June, while the other information requested can be provided any time before the 13 July meeting at NDU.

2. Under Secretary Modly's E4S Study Question: Please provide the total programmed budget for education in your respective service, including all costs of manpower (PCS moves, etc.) for the following: 1) for each Flagship educational institution, 2) OCS, 3) NROTC, 4) Federal Executive Fellows Program, 5) Capstone, 6) Pinnacle, 7) Other Flag-level educational programs. Please provide the same for actual executed dollars, by year and by institution/program.

Marine Corps Program (MCPC) Professional Development (660598)													
	TOTAL FOR PROGRAM	Labor	Non-Labor	SUPPORT SERVICES	Enlisted College	Command & Staff College	Expeditionary Warfare School	Marine Corps War College	School of Advanced Warfighting	Fellows	LLI	TBS	OCS
FY13 Programmed	$21,893,000	$11,606,000	$10,287,000	$11,789,384	$2,449,901	$3,112,970	$ 1,383,679	$1,113,711	$ 815,441	$788,374	$439,541	$3,140,000	$ 768,000
FY13 EXECUTED	$21,410,915	$11,272,468	$10,138,447	$11,529,781	$2,395,954	$3,044,422	$ 1,353,210	$1,089,187	$ 797,485	$771,014	$429,862	$3,138,000	$ 797,000
FY14 Programmed	$23,757,000	$11,649,000	$12,108,000	$13,095,218	$2,722,589	$3,395,644	$ 1,354,118	$1,086,298	$ 962,939	$781,635	$358,559	$4,500,000	$ 822,000
FY14 EXECUTED	$23,771,851	$12,200,116	$11,571,735	$13,103,404	$2,724,291	$3,397,767	$ 1,354,964	$1,086,977	$ 963,541	$782,124	$358,783	$4,470,000	$ 862,000
FY15 Programmed	$22,244,000	$12,690,000	$ 9,554,000	$11,407,812	$2,449,679	$3,722,191	$ 1,448,881	$1,110,549	$ 921,693	$707,270	$475,925	$4,130,000	$ 854,000
FY15 EXECUTED	$20,914,731	$12,318,563	$ 8,596,168	$10,726,098	$2,303,290	$3,499,758	$ 1,362,298	$1,044,184	$ 866,614	$665,005	$447,484	$4,134,000	$ 925,000
FY16 Programmed	$21,192,000	$12,163,000	$ 9,029,000	$11,638,100	$2,375,172	$3,031,634	$ 1,251,416	$1,029,721	$ 793,871	$687,603	$384,481	$4,860,000	$ 876,000
FY16 EXECUTED	$23,116,216	$14,051,927	$ 9,064,289	$12,694,830	$2,590,836	$3,306,904	$ 1,365,044	$1,123,219	$ 865,954	$750,037	$419,392	$4,866,000	$1,576,000
FY17 Programmed	$31,056,000	$17,468,000	$13,588,000	$17,755,263	$3,361,586	$3,981,937	$ 1,959,205	$1,436,150	$1,157,462	$736,993	$667,405	$ 435,000	$ 940,000
FY17 EXECUTED	$28,141,674	$14,808,893	$13,332,781	$16,089,091	$3,046,131	$3,608,268	$ 1,775,351	$1,301,380	$1,048,845	$667,833	$604,775	$4,330,000	$ 912,000
FY18 Programmed	$27,170,000	$15,377,000	$11,793,000	$15,583,927	$2,612,012	$3,915,654	$ 1,279,539	$1,535,527	$1,216,368	$523,693	$503,280	$4,350,000	$1,158,000
FY18 EXECUTED YTD	$18,684,604	$10,905,921	$ 7,778,683	$10,716,949	$1,796,261	$2,692,766	$ 879,929	$1,055,970	$ 836,487	$360,140	$346,102	$2,866,246	$ 862,422

Appendix E-4: USNA Response

DEPARTMENT OF THE NAVY
UNITED STATES NAVAL ACADEMY
121 BLAKE ROAD
ANNAPOLIS MARYLAND 21402-1300

1500
Ser 28/471
6 Jul 18

From: Superintendent, U.S. Naval Academy
To: Under Secretary of the Navy

Subj: EDUCATION FOR SEAPOWER (E4S) SCOPE AND REQUESTED INFORMATION

Ref: (a) UNSECNAV memo of 30 May 18

Encl: (1) USNA Response to Education for Seapower (E4S) Requested Information

1. Enclosure (1) is provided in response to information requested in reference (a).

W. E. CARTER, JR

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USNA Response to Education for Seapower Requested Information
in UNSECNAV Memorandum of 30 May 2018

- **What are the roles and responsibilities of your educational institution and how do they contribute to establishing a permanent process of continuous learning?**

The mission of USNA is to develop midshipmen morally, mentally, and physically and to imbue them with the highest ideals of duty, honor, and loyalty in order to graduate leaders who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship, and government. In executing this mission, USNA is charged with:

- Developing junior officers who possess leadership, character, a high sense of personal honor, integrity, accountability, and unqualified acceptance of responsibility and duty to self, service, and country.

- Providing newly commissioned officers who have been immersed in the history, traditions, and professional values of the Navy and Marine Corps and developed to be leaders of character, dedicated to a career of professional excellence in service to the Nation.

- Providing officers who will generate a core group of innovative leaders capable of thinking critically and who will exert positive peer influence to convey and sustain these traditions, attitudes, values, and beliefs essential to the long-term readiness and success of the Navy and Marine Corps.

- Producing a graduating class with academic backgrounds commensurate with the needs of the naval service, including a minimum of 65 percent of Navy-option midshipmen completing technical degree programs.

- Providing education and training in knowledge and skills needed to excel in the maritime environment.

- Delivering a strong core curriculum coupling a technical foundation with studies in the liberal arts, thereby ensuring graduates are prepared for service in any warfare specialty.

In executing the above responsibilities, USNA fosters an educational environment that supports and encourages midshipman learning and critical thinking; employing a variety of teaching methods that address a variety of midshipman learning styles. USNA strives to provide a stimulating environment that instills a passion for lifelong learning, imbuing midshipmen with the intellectual curiosity and analytical rigor needed to be in the forefront of technological advances and global understanding in a rapidly changing and diverse world.

- **What is your vision regarding the future role of your educational institution?**

To be the premier educational institution for developing naval officers from across the Nation to serve and lead in an increasingly interdependent and volatile world.

Enclosure (1)

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- **How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?**

USNA has an established set of seven graduate attributes, one of which is "Innovative," with a goal of creating critical thinkers and creative decision makers with a bias for action. This "Innovative" graduate attribute has nine core curricular outcomes, one of which is "Critically Reason" - sufficiently obtain, critically analyze, appropriately interpret, and use quantitative data and qualitative information to construct creative solutions to complex problems. Each academic program at USNA has established learning outcomes that are mapped to the graduate attributes. Further, each core course has mapped its learning outcomes to the nine core curricular outcomes. The learning outcomes are assessed at the department or program level as part of the regular annual assessment activities, and learning outcomes that provide insight into students and graduates critical thinking ability are examined as part of this process. The Associate Dean for Planning and Assessment (ADPA) administers this process.

Academic Year 2017 (AY17) was the first year that the Naval Academy collected and aggregated information from across its core courses to look at development across the core curriculum. Looking only at core courses in which critical reasoning was assessed last year, we see from the course topic or outcome that critical thinking is operationalized in varied ways depending on division, department, and course, as well as at different points in the academic program. Courses taken during the 4/C year tend to focus on identification and recognition, with some explanation and interpretation occurring. As students move to the 3/C and 2/C years the emphasis is shifted to use, application, and evaluation.

During AY17, critical reasoning was assessed in 17 core courses from across four divisions. The following chart is an honest appraisal of midshipman ability to critically reason across the core.

USNA Core Curriculum Outcome: Critical Reasoning			
Department	% Meet or Exceed (Unweighted)	Division	% Meet or Exceed (Unweighted)
Naval Architecture and Ocean Engineering	82.2%	Engineering and Weapons	79.5%
Systems Engineering	78.9%		
Political Science	88.9%	Humanities and Social Sciences	88.9%
Leadership, Ethics, and Law	88.5%	Leadership	88.5%
Mathematics	67.7%	Mathematics and Science	66.2%
Physics	59.9%		
Not all departments/courses in the core curriculum provided data to the critical reasoning outcome in AY17, the first year that USNA collected data in this format. Information on other outcomes, including the closely related "solve technical problems" and "apply principles of Naval science and the profession of arms," are available on request.			

Faculty conversations indicate that midshipmen are generally very successful in demonstrating their knowledge and comprehension by applying it in standard situations, but are more likely to struggle as they are challenged to use their foundational knowledge and critical thinking abilities to evaluate and determine a reasonable response in new contexts. This is to be expected in a rigorous undergraduate program. Midshipmen's critical thinking skills are further developed in majors' courses and a culminating capstone experience where midshipmen synthesize general and discipline-specific learning as part of a research or design project. From 4/C year through 1/C year, assessments of critical reasoning and problem solving show improvements and growth in these skills. Our graduates are well positioned to continue development of their critical thinking abilities. The foundational education introduced and reinforced in the core serves as a base for midshipmen so they can be successful in their chosen majors, future service assignments, and follow-on educational opportunities.

- **How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?**

Providing guidance for and approving changes to the academic program of the Naval Academy is a primary responsibility of the Academic Dean and Provost (AD&P). Curriculum review and renewal comes from both internal expertise and via periodic external reviews. A regular Academic Review Program involving external reviewers for each department and its curriculum has existed at USNA since the early 1990s to provide an opportunity for internal self-evaluation and external reviewers' evaluation, generating independent, non-binding feedback. Typically, each department or academic support area prepares a self-study document and hosts a panel of external reviewers (visiting committee) once within each five-year cycle. A typical visiting committee consists of three individuals chosen from a group nominated by the department, and approved by the AD&P, for their particular expertise and individual contributions to the discipline(s) under review. External experts typically include faculty from colleges and universities that emphasize undergraduate education. USNA has also included experts within the DoN, including VADM Tighe, former Deputy Chief of Naval Operations for Information Warfare (Electrical and Computer Engineering Programs); CAPT Erika Sauer, Naval Deputy to the National Oceanic and Atmospheric Administration (Oceanography Program); CAPT Ostendorff (Ret), formerly a Commissioner of the Nuclear Regulatory Commission (Mechanical, Nuclear, and General Engineering Programs); VADM Paul Sullivan, former NAVSEA Commander (Naval Architecture Program); RADM Lewis, Commander of the Space and Naval Warfare Systems Command (Systems Engineering Program); and RADM Steve Eastburg, USN (Ret), former Vice Commander of the Naval Air Systems Command (Aerospace Engineering Program). The external experts provide written recommendations and observations about the state of the Academy's program. This process is documented as part of the annual Manager's Internal Control (MIC) reporting process.

Additionally, USNA receives information about the needs of the Navy and the performance of our graduates from rotational officers, Permanent Military Professors (PMP), and via annual capstone critiques. Rotational officers arrive directly from fleet or program offices and typically teach at USNA for three years. Hence, these officers are no more than three years removed from the same operational workplace into which our midshipmen will be assigned upon graduation.

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Additionally, USNA receives information about the needs of the Navy and the performance of our graduates from rotational officers, Permanent Military Professors (PMP), and via annual capstone critiques. Rotational officers arrive directly from fleet or program offices and typically teach at USNA for three years. Hence, these officers are no more than three years removed from the same operational workplace into which our midshipmen will be assigned upon graduation.

Their regular turnover brings energy, enthusiasm, and recent experience to ensure that the curriculum remains up to date. PMPs are in a position to combine USNA institutional knowledge with experience from their operational communities and often extensive networks of contacts that allow the Academy to sustain a connection with Navy Systems Commands where they have previously been assigned. Finally, with the creation of an annual capstone day with nearly every 1/C midshipman (individually or as a member of a team) displaying a culminating project, USNA has been able to involve senior naval officers from the Fleet and regional technical commands as well as industry experts in critiques of student work and receive their broader suggestions for our programs.

On a continuous basis, departments teaching courses for academic credit are responsible for maintaining, developing and assessing their courses so that the courses serve the USNA mission, remain relevant, and meet the needs of the Naval Service and/or serve to provide breadth or depth in specific disciplines. Departments electing to make curriculum changes follow the process described in ACDEANINST 5420.20G. It is through the review process described in this instruction that changes to the academic program occur. For changes that have a significant effect on Naval Academy resources or the academic demands on midshipman time, the AD&P will seek concurrence of the Superintendent. Significant changes may include the establishment or disestablishment of departments, majors or minors.

- **In your critical view, how well do you prepare your students for future assignments?**

Through self-assessment of its academic, training and development programs, USNA graduates possess an excellent academic base and are well prepared for assignments in the Navy and Marine Corps. Given the wide range of service assignment options available to midshipmen and a challenging resource environment (time, funding, etc.), USNA concentrates on producing generalists with a solid technical foundation, and strives to produce mentally resilient and physically fit junior officers with an ethical foundation who are critical thinkers and creative decision makers with a bias for action.

While USNA sets its graduates up for success in a wide array of future assignments (including some service-specific training such as Powered Flight Program, Marine Corps Leatherneck Training, SEAL/EOD Training and Screeners, and 1/C Practicum Courses based on specific service assignment), it is no guarantee of success. In fact, other institutions may do a better job of preparing their graduates for more specific future assignment success. For example, the U.S. Merchant Marine Academy better prepares their graduates to be professional merchant mariners immediately upon graduation as their mission, and subsequently their curriculum, is specifically focused in that regard.

- **Based on your mission statement and list of required knowledge and learning, what is your critical assessment of how well you are achieving both? What are the strengths, weaknesses, and gaps of your institution in providing your graduates with these necessary skill sets?**

USNA executes its mission and the required knowledge and learning, as defined in the Officer Professional Core Competencies Manual, quite well. USNA graduates are prepared to succeed in the fleet.

USNA strengths include a very solid academic program that provides each graduate with a liberal arts education with a strong technical foundation. The expansion of project-based learning over the past decade has contributed to better critical thinking skills and problem solving abilities in graduates. USNA has an equally strong physical development program, providing programs of athletic competition and physical challenge that promote lifelong physical fitness and foster decisive leadership, teamwork, character, and a passion for "winning."

While not necessarily a weakness, developing leadership and moral excellence remain very challenging endeavors. USNA continues to strive to provide midshipmen with experiential leadership opportunities within a challenging resource environment.

In addition, despite a fully immersive 47-month program, tradeoffs are necessary to achieve all requisite skills…achieving excellence across the board for every USNA graduate is unachievable. As an example, USNA is charged with providing education and training in the knowledge and skills needed to excel in the maritime environment. USNA's Seamanship and Navigation program, through an academic program augmented by the use of simulators and Yard Patrol craft, develops graduates with basic maritime skill sets. Dedicating more focus (primarily time) in this area would undoubtedly lead to better mariners, but comes at a cost to other mission requirements.

- **How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?**

USNA assesses every faculty member annually in teaching, scholarship and service to the institution. To ensure equitable treatment of all faculty members, annual performance reviews provide honest feedback about performance, coupled with opportunities to improve performance and associated guidelines for doing so. These principles are at the heart of the evaluation process for all faculty members at any point in their careers, but they are especially important for the renewal/retention of early-stage probationary faculty. The performance review process is an important part of our shared responsibility to ensure that the individuals we retain, promote, and offer tenure meet the high standards needed to sustain the long-term quality and welfare of our academic programs and mission.

The standards against which each faculty member's performance is assessed are communicated in ACDEANNOTE 12452.A, and include:

- Excellence in Teaching. Including, but not limited to, establishing an environment that fosters student learning, demonstrated student learning and motivations to learn, modeling professionalism in behavior and interpersonal demeanor in the classroom,

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contributions to the assessment of student learning, tangible course and laboratory development, mentoring midshipmen in directed study and research courses, and serving as a Plebe advisor or as an academic advisor/mentor to midshipmen in a major or minor.

- Excellence in Research/Scholarship. Examples include, but are not limited to, peer-evaluated publications and presentations, authorship of books or book chapters, invitations to participate in or lead conference panels and workshops, and the acquisition of external research grant support.
- Excellence in Service. Examples include, but are not limited to, participating in significant curriculum development activities, serving on the Faculty Senate, contributing assessment and accreditation activities, and participating as a faculty representative for a major extracurricular activity or club or varsity sport.

The annual evaluation process is governed by ADCEANINST 12430.1, and review for promotion and tenure is governed by ACDEANINST 12335.1A, and coordinated by the Vice Academic Dean.

Faculty recruitment is evaluated each year at the end of the hiring cycle by the Vice Academic Dean. Key metrics examined are offer acceptance rate, changes from initial offer to accepted offer, and the number of searches landing the top candidate. These metrics indicate a slight decline in our ability to recruit and retain top candidates from high demand STEM fields such as cyber, statistics, science and engineering.

- **Do tenure, right to publish, and ability to research constitute major issues that need review?**

No, USNA has the authorities, processes and internal review structures necessary to support tenure, publication of scholarly work, and conduct research activities to properly execute its mission. Tenure, continued scholarly work, and the right to publish that scholarly work are intimately linked. One cannot receive tenure without significant scholarly accomplishments, evidenced by peer review and publication of the work. Candidates for promotion and tenure must demonstrate excellence in teaching and scholarship, as well as an aptitude for service. Candidates are recommended by their department chairs and evaluated by an academy-wide promotion and tenure committee, co-chaired by the Vice Academic Dean.

The Naval Academy's strategic plan, Leaders to Serve the Nation, makes clear that academic excellence is a necessary pillar in supporting USNA's vision of being a premier undergraduate educational institution. The plan clearly articulates a need to "employ appropriate teaching methods…provide an outstanding civilian and military faculty and…provide opportunities for faculty and staff to remain leaders in their respective disciplines and in the latest teaching methods." To support this aspect of the vision, USNA finds it is necessary to "attract, develop, and retain faculty…who exemplify the highest professional standards and who educate, enrich and inspire a talented and diverse Brigade." This objective is justified by the impact of the faculty on the development of the Brigade of Midshipmen and the faculty role in ensuring academic success. An associated institutional imperative is the recruitment, retention, and development of an outstanding faculty committed to the education and development of

midshipmen. To achieve this institutional goal, USNA competes with other top tier institutions for faculty talent. The absence of a tenure-track system would dramatically disadvantage the institution in recruitment and retention. All top tier undergraduate institutions employ a tenure-track appointment structure for their faculty. The pillar of academic excellence and the mission requirement to develop midshipmen should be at the center of any discussion regarding the ratio of part-time adjunct faculty to full-time career (tenure-track) faculty. Ample evidence exists on the impact on educational programs with a shift to non-tenure track faculty.

- **How is the DON-wide requirement to audit addressed in your curricula?**

With regard to instruction, USNA does not expressly teach the DON-wide requirement to audit in the Academy's curricula.

As to auditing USNA's curricula, each year, as part of the MIC process, the Associate Dean for Planning and Assessment examines the documents (internal self-study, non-binding external recommendations, MOU signed by internal parties, and status reports) that are part of the annual academic program review process. Please see the answer to the previously asked question regarding reviewing and updating curricula for a more thorough discussion on the process. USNA's practices are guided by the Department of Navy Managers' Internal Control Manual, SECNAV M-5200.35; Superintendent's Managers' Internal Control (MIC) Program Certification Statement to the Chief of Naval Operations, letter dated 28 May 2014; and Managers' Internal Control Program, USNAINST 5200.4C.

- **What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?**

In general, USNA graduates express high levels of satisfaction regarding the quality of the education they receive. They are complimentary of the mix of STEM and humanities in the core curriculum, and emphasize small class sizes, hands-on capstone projects, and engaged professors as highlights of the educational experience. Feedback from graduates two to seven years after graduation indicate that they believe critical thinking skills, problem solving abilities, public speaking and intellectual curiosity were often superior to graduates from other institutions. There were no consistently-made recommendations to change or improve the curriculum as whole. Within majors, suggestions for improvement are seriously considered, and where appropriate, implemented.

Academic departments use a variety of formats to obtain feedback from their majors students; including surveys, exit interviews, and focus groups. End-of-program evaluations average between 75% and 100% participation among majors; and midshipmen are not shy about expressing their opinions. While soliciting and using regular and systematic feedback from graduating midshipmen on course content and delivery is a USNA strength, we lack that same rigor when sampling our graduates on their views of the 47-month developmental experience. The majority of structured feedback is a result of required preparations for accreditation.

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- **Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war?**

Each summer, through the Midshipmen Summer Training Program, USNA sends ~3,300 midshipmen to fleet components and the Fleet Marine Force in order to expose midshipmen to their potential future careers. During 3/C summer, ~1,150 midshipmen participate in a 'grey hull' cruise where they embark on operational surface ships or submarines. Notional time on board is four weeks with the goal of providing each midshipman a minimum of ten days of underway experience and training time. The fleet works closely with USNA to identify ships and submarines across the globe that are able to accommodate midshipmen during the summer cruise training periods. Midshipmen are fully integrated into the crew's daily routine, primarily working with enlisted sailors to gain a better understanding of the sailors they will one day lead.

During 2/C summer, ~1,100 midshipmen participate in Professional Training for Midshipmen (PROTRAMID) on both the East and West Coasts in fleet concentration areas. This four-week training program consists of one week with each of the four largest unrestricted line communities: Surface, Submarine, Aviation and Marine Corps. Each warfare area conducts a weeklong training period with the midshipmen that is coordinated and run by the local fleet activity.

During 1/C summer, ~1,075 midshipmen participate in a 'Junior Officer' Fleet Cruise to affirm their desire to access into specific communities or help make a decision between competing interests. This cruise is again hosted by operational fleet units in nearly every DON community, including Surface, Submarine, Aviation, Marine Corps, SEAL, EOD, Intelligence, Corps of Engineers, Informational Warfare, and Medical Corps. Midshipmen are integrated into the wardrooms and operate as junior officers under the supervision of a junior officer "running mate." These cruises often deploy across the world with operational units that are executing real world tasking.

USNA also offers a second training experience for midshipmen each summer with operational USMC MAGTF units and military schools. Midshipmen have the opportunity to join a Marine element of a MAGTF and experience the Marine Corps before their first official Marine "Fleet Cruise" during their 1/C summer. Additionally, USNA sends midshipmen to fleet schools that are attended by officers and enlisted alike. Examples of these schools include Dive School, Airborne, Marine Mountain Warfare, RECON, Marine Martial Arts Instructor, Marine Security Forces, and Army Air Assault.

Outside of the operational fleet units, through the Academic Dean's Internship program, midshipmen execute internships at various government research agencies that support the Navy Warfare Development Centers. Some examples of DoD agencies that USNA works with for internships include various Navy Surface Warfare Commands, NAVSPECWARCOM, NAVAIR, Navy Test Wing Atlantic, OPNAV, Office of Naval Intelligence, Naval Research Lab, Defense Threat Reduction Agency, Uniformed Services University of the Health Sciences, and SPAWAR. These internships also integrate into various fleet components such as NSWC-Carderock, NSWC-Indian Head, NAWCWD-China Lake, and NAVAIR Pax River.

- **What is the role of your advisory board? Where is it most helpful, and how can its contributions be improved?**

The Naval Academy Board of Visitors (BOV) serves as USNA's advisory board. Established by Title X, the BOV is comprised of four members of the Senate, five members of the House of Representatives, and six persons designated by the President. The BOV is charged with inquiring into the state of morale and discipline, the curriculum, instruction, physical equipment, fiscal affairs, academic methods, and other matters relating to the Academy that the Board decides to consider.

The BOV provides valued oversight and recommendations regarding the Naval Academy to the President, Navy leadership, and USNA. The Board provides a written report to the President of the United States once per year. While that report summarizes the annual findings of the Board, it also expresses the Board's top-level concerns; in some years, those concerns and findings have led to positive action. Additionally, due to the fact that nine BOV members are also members of Congress, when an urgent issue arises, the members will often interact real-time with Navy and/or Congressional leadership to address their concerns. Finally, the Board regularly receives recommendations, concerns, and questions from Naval Academy alumni, parents of midshipmen, the media, and concerned citizens. As elected officials and Presidential appointees, the Board serves as a body to which the general populace can voice their concerns.

- **The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?**

Since its founding in 1845, USNA has focused on producing lethal, resilient, and agile junior officers for the fleet and Fleet Marine Force. From Plebe Summer through the entire 47-month experience - and with the understanding that at least 95% of USNA graduates will serve in the Unrestricted Line - midshipmen are challenged with a demanding and stressful developmental program. Oftentimes, midshipmen are tasked with more requirements than there is time to effectively achieve them all. They are forced to fail, and must subsequently develop the ability and demonstrate the fortitude to succeed.

USNA's developmental program is focused on producing graduates who are:

- Selfless – who value diversity and create an ethical command climate through their example of personal integrity and moral courage.
- Inspirational – mentally resilient and physically fit officers who inspire their team to accomplish the most challenging missions and are prepared to lead in combat.
- Proficient – technically and academically proficient professionals with a commitment to continual learning.
- Innovative – critical thinkers and creative decision makers with a bias for action.
- Articulate – effective communicators.
- Adaptable – who understand and appreciate global and cross-cultural dynamics.
- Professional – role models dedicated to the profession of arms, the traditions and values of the Naval Service, and the constitutional foundation of the United States.

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- **How are your student bodies changing over time (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?**

Demographically, over the last ten years the student body has changed from 20% female to 28%, and there has been an increase in students who identify as multi-racial. Average math and verbal SAT scores have increased by about 30 and 50 points, respectively, and course validations have also increased. These latter metrics and a significant decrease in academic attrition indicate that incoming classes are improving in their academic preparedness for college-level work.

Students today have always had the internet, and this has changed the way that they read and research. With easy access to digital and on-line resources, younger readers increasingly use search strategies to obtain information that doesn't always translate well to a paper format. In terms of research, there is a greater need to teach students how to evaluate the plethora of sources available to them. With the internet, email, and social media, information flows more quickly and there are more potential interruptions and distractions (both internal and external), increasing the need to practice prioritization, time management, and time-on-task on the part of midshipmen.

USNA has regularly administered The Freshman Survey (TFS), developed by the Higher Education Research Institute (HERI), during Plebe Summer. The TFS contains survey items that ask about incoming college students' background characteristics, high school experiences, attitudes, behaviors, and expectations for college. This information allows USNA to look for trends over time and compare USNA students to other public, four-year schools with information provided from HERI.

The self-perception of our student body in terms of ability, readiness, critical thinking, curiosity, and motivation has remained extremely stable over time:

*Rated self as **"above average"** or in the **"highest 10%"** compared to average person of same age*	**2008**	**2012**	**2016**
Academic ability	89.9	86.0	89.3
Creativity	47.5	46.5	42.7
Drive to achieve	93.2	93.3	93.8
Emotional health	71.5	71.5	67.5
Leadership ability	87.9	88.1	87.3
Mathematical ability	77.9	75.5	74.3
Writing ability	56.1	49.8	53.5
*During the past year, did you "**frequently**"*	**2008**	**2012**	**2016**
Support your opinions with a logical argument	72.9	76.2	75.8
Evaluate the quality or reliability of information you received	46.7	48.5	53.1

Take a risk because you feel you have more to gain	38.6	43.4	39.5
Seek alternative solutions to a problem	43.4	54.0	45.4
Explore topics on your own, even though it was not required...	36.1	40.3	37.3
Accept mistakes as part of the learning process	52.3	58.5	59.8
*Reasons noted as **"very important"** in influencing students decision to attend a particular college*	**2008**	**2012**	**2016**
This college has a very good academic reputation	86.2	86.9	90.1
This college's graduates gain admission to top grad/prof schools	41.9	40.8	46.4
This college's graduates get good jobs	85.7	87.1	86.0
*Objectives considered to be "**essential**" or "**very important**"*	**2008**	**2012**	**2016**
Becoming an authority in my field	71.4	76.2	71.2
Raising a family	78.3	77.6	79.5
Being very well off financially	60.8	69.3	74.3
Helping others who are in difficulty	63.5	73.9	77.5
Developing a meaningful philosophy of life	47.0	42.8	46.0
Improving my understanding of other countries and cultures	60.4	63.7	64.3

- **How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?**

DoD has experienced funding constraints in recent years that have led to very little budget flexibility, and in fact shortfalls for USNA. USNA's budget has remained virtually flat in nominal terms and declined in real terms (less buying power) from FY12 through FY19. While labor and material costs have increased, the total resources have remained relatively unchanged. As a result, USNA has been forced to both reduce the number of employees and significantly reduce material dollars. The OM,N shortfall in real terms is $13.4M for FY18. This has put ever-increasing pressure on mission execution.

During this time, USNA has maintained the same mission throughput (~1,000 graduates per year). Additionally, USNA has experienced mission growth in increasing the number of STEM graduates, introducing Cyber into the curriculum, and adding SAPR positions and other requirements – all absorbed within existing resources.

In order to meet these increased mission requirements with an effectively reduced real budget, USNA has cut academic support (library staffing and subscriptions, lab technicians, faculty professional development), nearly eliminated public support for midshipman international programs/experiences, and reduced support for midshipmen summer training. Additionally, USNA has reduced funding for admissions outreach and diversity programs, reduced support of varsity athletics, and significantly reduced information technology maintenance and recapitalization efforts. Staff training and travel have decreased as well.

USNA's Budget Submitting Office (BSO) has provided resources to USNA during execution year to help mitigate some of these shortfalls, but they are resource constrained as well. USNA's BSO provided $5M in support in the execution year for FY17 and $3M in FY18; both plus-ups used primarily to execute midshipmen summer training.

USNA has regularly submitted POM issues for additional resources. While positively supported and endorsed by the BSO, USNA's issues have not resulted in POM increases.

In FY20, Hopper Hall, the new Cyber Securities Studies building, will come on line with an associated increase in operating costs to USNA of approximately $6M annually. USNA has submitted POM-20 inputs for a baseline reset with an additional POM increase to support Hopper Hall.

- **What constraints have you experienced regarding the execution of your vision for the future? How can this Study best help you in that regard?**

Fiscal constraints are the primary limiting factor to executing the Naval Academy's vision for the future and achieving associated strategic imperatives; examples include, but are not limited to, the following:

- *Recruiting and admitting a talented and diverse Brigade of Midshipmen*. Steadily decreasing resources dedicated to USNA's admissions efforts (both money and manpower), while mitigated by philanthropic support, have contributed to a small, but steady decline in candidate applications over the last six years.
- *Graduating officers whose educational and experiential preparation meet the Navy and Marine Corps' current and future requirements*. Over the last ten years, USNA has made a dedicated effort to expand experiential development through project-based learning and experiential leadership development opportunities; though with limited appropriated support, this increase has been achieved primarily through philanthropic support that may not be sustainable in the future. USNA has similarly strived to increase opportunities for midshipmen to improve language skills, cultural awareness and regional experience (attributes increasingly important for the challenges of 21st century warfare) through a variety of international experiences. Declining fiscal resources since 2015 have necessitated a 50% reduction in these experiences, now exclusively funded through philanthropic support.
- *Attract, develop and retain faculty and staff who exemplify the highest professional standards*. The pay cap for faculty on the Administratively Determined (AD) pay

scale is making it increasingly difficult to hire and retain quality faculty in many of USNA's science and engineering disciplines, especially cyber security.

- *Establish and maintain state-of-the-art facilities that inspire and support the pursuit of academic, professional and athletic excellence*. As highlighted in the Naval Audit Service's June 2018 report on the Sufficiency of USNA Infrastructure, the Academy's current infrastructure and facility conditions impede USNA's ability to fully meet mission goals. Documented deficiencies include water leaks and intrusions; deteriorating facilities, structures, and piers; outdated facility layouts; and facility system components. While Sustainment, Restoration and Modernization (SRM) projects to address the deficiencies have been identified, a decrease in resources allocated to USNA SRM infrastructure projects (mitigated to a degree by partial reinstatement of the Flagship Agreement) could lead to long-term negative impacts for USNA.

The Education for Seapower Study could assist with these challenges by confirming that USNA's strategic imperatives to achieve our vision are in line with the Navy's vision for education and worthy of resourcing.

- **If you could make major changes to your institution and to the naval educational enterprise, what might they be?**

If possible, USNA would make the following major changes to improve mission effectiveness:

- *Create a USNA Contracting Office*. USNA could increase fiscal efficiency and operational effectiveness if authorized and properly resourced to stand-up a contracting office.
- *Create 2-year Operation and Maintenance funding for naval educational institutions*. Given the recent history of Continuing Resolutions, late-in-the-year budget approvals, and a lack of a contracting office, USNA is challenged to effectively execute unique education related procurements through the traditional Navy acquisition process with one-year money. Two-year funding, or the authority to apply a portion of USNA's OM,N to a second year would improve fiscal effectiveness.
- *Improve the perceived reputation of USNA military positions*. A tour at the Naval Academy, whether as faculty or staff (e.g. Company Officer), is often perceived as neutral at best by promotion or selection boards. As a result, USNA is challenged to attract the best military officers to develop midshipmen. USNA develops the "seed corn" of the Navy's officer corps and is the beginning of the "production process" for all service communities; like USMA and USAFA, a faculty or staff tour at the Naval Academy should be highly regarded if we think their contributions are important.
- *Implement a systemic feedback process from the fleet, Fleet Marine Force, and other DON entities regarding the strengths and weaknesses of the graduates that the Department's educational institutions produce.*

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- **Does the DON have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how would you create one?**

Students entering USNA do so with the recognition that the undergraduate educational program is among the best in the nation. The DON's support and commitment to USNA provide a strong foundation for the development of a culture of learning in the Navy, as the Academy provides about a third of the officer corps. In nearly all service communities, new officers receive additional education and training to ensure their competence in their specific profession. This along with the unwritten expectation that officers will pursue and receive graduate degrees to continue to advance in rank, helps propagate the culture of learning. The scaffolding exists to demonstrate the importance of continuing each officer's education to remain relevant and advance one's skill set.

While there is a culture of learning within the DON, it could be improved. Explicitly including a requirement for an advanced degree to be eligible for promotion to senior ranks, and building into the officer progression and career pipelines opportunities to obtain advanced degrees during shore-based tours would likely improve the culture. Additionally, consideration could be given to encouraging some of the most promising officers to return to the Academy to help develop future officers, without detriment to their promotion potential.

- **What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in residence, and in your opinion, their capacity for addressing the complexity and added lethality? How would you deliver JPME differently?**

USNA does not include JPME I or JPME II in its curricula. Midshipmen are exposed to some of the basic components of JPME, but it does not significantly impact the overall 47-month developmental program.

- **How should critical thinking and strategic thinking best be taught? Where should it be taught?**

USNA's regional accreditor, Middle States Commission on Higher Education, requires that "institutions that offer undergraduate education, [have] a general education program…[that] offers a curriculum designed so that students acquire and demonstrate essential skills including at least...critical analysis and reasoning..." In alignment with this requirement, critical reasoning is a USNA core learning outcome, "Critically reason: sufficiently obtain, critically analyze, appropriately interpret, and use quantitative data and qualitative information to construct creative solutions to complex problems" that is developed from the perspectives of multiple disciplines within in the majority of core courses. It is not viewed as one-and-done learning, but rather a skill that is developed across the learning environment (from English expository writing and rhetoric to technical problem-solving in STEM courses to leadership development activities).

At USNA, critical and strategic thinking learning outcomes vary by discipline; for example:

- English core (4/C): ...support an argument using evidence derived from analytical thinking

- History core (4/C and 3/C): ...analyze historical evidence as well as apply it to historical questions
- Chemistry core (4/C): ...conducting experiments, analyzing and critically interpreting the results obtained
- Physics core (3/C): Conceptualize fundamental key quantities and refine/modify their intuitions about their physical world . . . construct basic connections between quantities to breakdown/illustrate the main idea.
- Leadership, Ethics, and Law core (all years): Integrate, analyze, and evaluate acquired knowledge and experience, and effectively use it in the decision-making process.
- Seamanship and Navigation core (1/C): Generate a solution to a given warfare scenario within established doctrinal constraints.
- Engineering and Weapons Division core: Provide officers who can apply their knowledge of engineering fundamentals to understand and analyze Navy-relevant engineering systems.

Critical and strategic thinking should occur across a Naval career, building on existing skills, integrating new knowledge, and preparing officers to manage new and often rapidly evolving challenges and technology. The USNA core curriculum serves as a foundation for midshipmen that is reinforced and expanded on in their majors' courses and capstone projects in which midshipmen evaluate, synthesize, and apply general and discipline-specific learning to a culminating research or design project. Critical and strategic thinking can be further developed and refined in future academic undertakings, including programs at the Naval Postgraduate School and the Naval War College.

- **What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?**

The operational environment today is very dynamic, occupying many domains and spatial and temporal scales. Today, perhaps even more so than in the past, a firm foundation in mathematics, physical sciences, engineering principles, and knowledge of the human condition is paramount. Without a firm knowledge foundation in these areas, officers will not be equipped to understand emerging technologies and apply them to enhance lethality to our adversaries or employ technologies to improve force protection. USNA's core curriculum is designed to provide a robust foundation in these areas for every graduate and future officer.

At the undergraduate level at USNA, the core focuses on principles providing the knowledge base from which to excel in more advanced and specific graduate, technical, or professional studies. At USNA, operational and strategic case studies are used to provide operational insights and introduce strategic thinking, but primarily to demonstrate to midshipmen the presence of their core educational material embedded in the operational arts. In short, to demonstrate the application of the principles covered in the core curriculum, so midshipmen recognize their importance in future operations and training. USNA's mission is to prepare the midshipmen with the foundational skills and knowledge to be successful in any future learning.

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- **For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?**

The Naval Academy Foundation provides private support to achieve and maintain a broad range of mission-enhancing activities that support USNA and the Brigade of Midshipmen. Over the last several years, this "margin of excellence" support has averaged approximately $25-30 million per year, and has been used to support a wide range of initiatives, including, but not limited to:

- Academic Initiatives: including USNA's Center for Cyber Security Studies and the outfitting of USNA's new Cyber Building (Hopper Hall), project based learning, international programs, faculty recruitment and development, distinguished visiting professors, the USNA's Center for Academic Excellence.
- Admissions Initiatives: including outreach and recruitment efforts, and tutors at the Naval Academy Preparatory School (NAPS).
- Leadership & Ethical Development Initiatives: including experiential leadership opportunities, Distinguished Military Professors (DMP), and a host of activities coordinated by the Stockdale Center for Ethical Leadership.
- Athletic Initiatives: including facility support, capital improvements, athlete recruitment and coaching support.
- Quality of Life Initiatives for the Brigade of Midshipmen: including Club Sports, musical activities, and a host of Extra Curricula Activities.

The Foundation has been absolutely essential to USNA's success over the last decade, providing resources that have contributed significantly to the Academy's ability to attract the best and brightest students and then develop them morally, mentally and physically to be junior officers in the Navy and Marine Corps. Given USNA's fiscal challenges, any additional funds that the Foundation raises can and will be put to valued use to extend the Academy's margin of excellence.

- **How do you deal with accreditation? Is it an advantage, or a constraint?**

USNA is institutionally accredited through its regional accreditor, Middle States Commission on Higher Education (MSCHE), and every program that is eligible for professional accreditation is also accredited at the program/degree level, including Chemistry through the American Chemical Society (ACS) and ABET for all ten engineering degrees and the three computing degrees.

Regional accreditation fosters public confidence in USNA's programs; it is required for institutions to apply for and maintain professional accreditations (ABET and ACS) and NCAA membership. Additionally, a degree conferred from an accredited program is typically required for student entry into graduate programs. Professional accreditation is valuable for students desiring to continue their educations in engineering fields as it allows them to sit for the Fundamentals of Engineering (FE) exam and it also facilitates future employment within the federal service, as government engineering positions require degrees from institutions that have

ABET accreditation. Whereas, to not be accredited would likely be seen as a red flag not only to other higher education organizations, but to potential midshipmen and faculty and staff as well.

Accreditation, while not quick or easy, is an important process of systematic self-evaluation against externally recognized standards. For regional accreditation, accredited status means that USNA regularly examines its programs and seeks continuous improvement within the framework of our unique mission. Within the academic departments, there exists a culture of continuous examination of the rigor and coherence (and where possible improvement) of the curriculum, and of seeking ways to support all students admitted to the Academy. Additionally, the Faculty Senate Curriculum Committee and AD&P instructions are in place to ensure that changes to the curriculum are vetted to prevent unintended impacts elsewhere in the academic program. MSCHE accreditation, however, provides a regular and valuable opportunity to examine our program across departments and verify that our processes and structures are aligned with our goals. The Naval Academy community generally views having a unique mission, singular purpose, and single employer of graduates as strengths, but there are potential pitfalls. The Academy strives to ensure that the balance does not tip too far in terms of requiring a narrowly defined vocational/training experience rather than providing educational experiences focused on a strong technical core combined with a broad range of studies. USNA's intent is to ensure that midshipmen can apply their learning in both standard operating environments and new, complex conditions that they will encounter during their Naval careers. Regional accreditation that respects and focuses on alignment of our educational activities and mission, provides an additional level of accountability and helpful external feedback from the wider higher education community.

In terms of managing the requirements of MSCHE accreditation, in most years there is a small amount of annual external reporting (Annual Institutional Profiles) that is coordinated by USNA's Office of Institutional Research, which includes data pulls and confirming information with relevant departments. It should be noted that MSCHE has been responsive to calls for reducing the time and energy needed to compile accreditation materials. For AY2017-18 annual reporting, MSCHE will be introducing a new system that will reduce the amount of information collected and automatically populate tables for demographics, student outcomes and financial viability with existing Integrated Postsecondary Education Data System (IPEDS) information provided to the National Center for Education Statistics (NCES). The mid-term review process will be based on these materials rather than the potentially extensive reports previously required. Periodic reporting, typically progress reports, requires focused attention from a handful of individuals to document activities in specifically designated areas and are infrequent. This leaves the octennial self-study and site visit, next occurring for USNA in 2024-25. This visit, now scheduled every eight years, requires planning and is typically headed by co-chairs from the Office of the AD&P who in turn develop teams to document how the Naval Academy meets each of the MSCHE standards. Teams are constituted from across the Naval Academy (officers and civilians; faculty and staff; academics, athletics, admissions, and others). Much of the work will already be completed via the Naval Academy's regular assessment, curricular review, and program review activities. However, the self-study process itself is valuable to not only closely examine our practices and ensure that they align with our mission, and consider and explain our activities for external scrutiny, but as an opportunity to reduce siloes and build community across the institution.

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Similarly, through self-scrutiny, continuous improvement, and external review, professional accreditations (such as ABET) signify that the accredited programs meet standards of educational breadth and depth for the discipline; that the facilities, faculty, and support structures provide a strong learning experience; and that graduates of the program can demonstrate appropriate skills and knowledge. Academic programs may already possess ongoing teaching processes related to evaluating teaching effectiveness and student learning, however, professional accreditation requires documentation of processes sufficient to pass muster with external audiences. In the Engineering and Weapons Division, ABET accreditation goes back over 40 years and within the last 15 years, the process has become more formalized due to the evolution of the ABET criteria and the introduction of USNA's assessment program. After a short adjustment period, assessment has been integrated into the academic process to the benefit of the curriculum and midshipman learning.

- **What is the selectivity (admission) rate for applicants to your institution?**

With an annual average of 17,000 applicants over the last ten years, USNA has selected approximately 1,400 students for an average incoming class of about 1,200 students. At 8.2% of the applicant pool, the admission rate to USNA is comparable with other top/Ivy League schools and is the most selective of the three large service academies. USNA's yield rate (the percentage students who subsequently accept their offer of appointment) has averaged above 86% over the last ten years (88% the last two years) and is the highest in the country.

Selectivity may also be expressed in terms of the numbers of offers made to fully qualified applicants. USNA fully qualified applicants are those applicants who have (a) been determined to be qualified by the Admissions Board, (b) met medical standards for admission, (c) passed a physical fitness test, and (d) obtained a nomination from an official source. USNA's efforts over the last ten years have steadily increased the pool of fully qualified applicants and afforded increased selectivity in the admissions process. For the Class of 2012, USNA made offers to 69% of Fully Qualified applicants, whereas for the Class of 2021, the "Fully Qualified Selectivity Rate" decreased to 44%.

- **How many students failed any of your full-time courses last year?**

199 midshipmen (4.4% of the Brigade) failed a semester-long course during the 2017-2018 academic year.

- **How many admitted students failed to graduate?**

For the Class of 2018, 144 midshipmen (12.0% of the Class) failed to graduate. This failure rate was in line with the three-year average of 11.2% attrition, with total attrition for each Class attributable to the following causes: voluntary (5.7%), conduct/honor (2.1%), academic (1.5%), medical (1.3%), and physical mission (0.6%).

- **For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or paygrade?**

N/A for USNA; midshipmen do not promote while at the Academy.

- **For the past five years, what percentage of your military faculty (by year) have ever been passed over for promotion to the next rank of paygrade?**

The information available to USNA only allowed determining promotion success/failure during the time military faculty/staff were assigned to USNA; not whether they had been passed over for promotion prior to or after their time at USNA. While at USNA, USN promotions results over the past five years, by officer category, were as follows:

USNA Aggregate	FY14 (78)	FY15 (90)	FY16 (100)	FY17 (105)	FY18 (122)	Grand Total (495)
% Selected	29%	14%	24%	19%	9%	18%
% Non-Selected	71%	86%	76%	81%	91%	82%
BATTALION OFFICER	FY14 (2 eligible)	FY15 (1 eligible)	FY16 (1 eligible)	FY17 (2 eligible)	FY18 (2 eligible)	Grand Total (8)
% Selected	100%	100%	0%	50%	100%	75%
% Non-Selected	0%	0%	100%	50%	0%	25%
COMPANY OFFICER	FY14 (1 eligible)	FY15 (2 eligible)	FY16 (1 eligible)	FY17 (2 eligible)	FY18 (1 eligible)	Grand Total (7)
% Selected	0%	0%	0%	0%	0%	0%
% Non-Selected	100%	100%	100%	100%	100%	100%
MILITARY FACULTY	FY14 (54 eligible)	FY15 (62 eligible)	FY16 (67 eligible)	FY17 (80 eligible)	FY18 (91 eligible)	Grand Total (354)
% Selected	22%	11%	19%	14%	5%	14%
% Non-Selected	78%	89%	81%	86%	95%	86%
MILITARY STAFF	FY14 (21 eligible)	FY15 (25 eligible)	FY16 (31 eligible)	FY17 (21 eligible)	FY18 (28 eligible)	Grand Total (126)
% Selected	43%	20%	35%	38%	14%	29%
% Non-Selected	57%	80%	65%	62%	86%	71%

- **For the past five years, what percentage of your military faculty were considered (in any zone) by any administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of those officers were subsequently selected for command as a member of your faculty?**

USNA does not have the information available to accurately respond to this question set, though the general perception is that a tour at USNA is at best neutral for promotion in most service communities.

- **What do you consider your "peer" institutions, and what do you think they are getting right?**

USNA's nearest peer institutions are the U.S. Military Academy and the U.S. Air Force Academy. Some areas where they are "getting it right:"

  - Service valuing a military faculty/staff tour at the institution (USMA/USAFA)

- Library and associated fiscal support (USMA)
- Use of project-based learning throughout their curriculum (USAFA)
- Service assignment/talent management process (USMA)
- Cadet professional development assessment and feedback (USMA)
- Intentional activities abroad to develop foreign language proficiency, understanding of regions and appreciation for other cultures (USMA/USAFA)

USNA uses a more expansive peer group of academic institutions when analyzing admissions, performance, and resourcing metrics associated with the Integrated Postsecondary Education Data System (IPEDS). This group of 48 institutions was selected based on average SAT of entrants, admissions selectivity, graduation rates, percentage of STEM graduates, total number of STEM graduates, and athlete graduation rates. They include:

Brown University		Harvard University		Stevens Institute of Technology
Bucknell University		Harvey Mudd College		U.S. Air Force Academy
California Institute of Technology		Johns Hopkins University		U.S. Coast Guard Academy
California Polytechnic State Univ.		Lafayette College		U.S. Military Academy
Carnegie Mellon University		Lehigh University		University of California-Berkeley
Case Western Reserve University		Massachusetts Institute of Tech.		Univ. of California-San Diego
Clarkson University		Milwaukee School of Engineering		University of Michigan
Colorado School of Mines		Northwestern University		University of Notre Dame
Columbia University		Pomona College		University of Pennsylvania
Cooper Union		Princeton University		University of Rochester
Cornell University		Purdue University		University of Virginia
Dartmouth College		Rensselaer Polytechnic Institute		Vanderbilt University
Duke University		Rice University		Villinova University
Franklin W. Olin College of Eng.		Rochester Institute of Technology		Virginia Polytechnic Institute
Georgetown University		Rose-Hulman Institue of Tech.		Worcester Polytechnic Institute
Georgia Institute of Technology		Stanford University		Yale University

- **What is your opinion of the quality of the students entering your institution? Trends? What could be done to improve?**

Key indicators suggest a steady improvement in the quality of our incoming students over the past ten years. Although various factors could have been considered in assessing student quality, four factors that seem to have the most relevance to student quality, as follows:

- Standardized Achievement Test (SAT) scores. Entering students' SAT scores have steadily risen over the past 10 years, with the average Verbal SAT scores improving by 50 points and average Math SAT scores improving by 30 points.
- Successful Validation of Core Courses. In the summer prior to their 4/C academic year, incoming students are able to "validate" core courses, usually by taking exams to test their knowledge of the subject area of the particular course they wish to validate. Over the past ten years, the number of core courses successfully validated by incoming freshman has significantly increased. The Class of 2013 validated a total of 938 courses, while the Class of 2021 validated 1,395 courses, a 49% increase.

- Academic Boards. Midshipmen are required to adhere to established minimum standards of proficiency. When they fail to do so, they are referred to academic boards for deficiencies in Academics, Physical Education, or insufficient aptitude. Within each of these categories, there are various markers used to identify a deficiency, such as a course failure (Academic deficiency) or failure of physical readiness in any semester (Physical Education deficiency). Over the past ten years, the number of midshipmen referred to academic boards has declined by 45%, an indication that our incoming students today are likely better prepared than their predecessors were prior to matriculation.
- Graduation Rates. Another key indicator of student quality is the ability of midshipmen to successfully complete USNA's rigorous program. Over the past ten years, average graduation rates have exceeded 86%, with the most recent three graduating classes (2016-2018) having the highest three graduation rates in USNA's history (avg. 88.8%). Additionally, every racial, ethnic and gender demographic experienced improved graduation rates over the last ten years.

Although existing data indicates that student quality is on an upward trajectory, USNA remains committed in its efforts to attract the best qualified young men and women willing to accept the challenges of naval service, with a focus on building a cohesive Brigade of Midshipmen that reflects the needs of the naval service and the diversity of the men and women they will lead. As such, USNA is consistently working to increase the quality of the applicant pool and optimize outreach efforts through a multi-faceted approach. Those efforts include, but are not limited to, further developing and marketing summer and influencer programs, visiting schools in key markets, improving management of contact and engagement with existing candidates, and improving overall brand management.

This past year, USNA employed a marketing firm to assist in increasing brand awareness of Summer STEM and Naval Academy Summer Seminar, USNA's capstone outreach programs. The Academy piloted a mini-influencer program, hosting key community leaders on the Yard and exposing them to the features and benefits of USNA such that they can spread that information exponentially within their communities. In executing these strategies, continued emphasis has been placed on those congressional districts and communities that are historically underrepresented at USNA.

How USNA assesses candidate quality continues to be reviewed and updated. For example, while examining College Entrance Examination scores is easy as they provide a common reference point nationwide, USNA also considers other factors such as grades, quality of curriculum and local socio-economic factors when assessing individuals to better assess each candidates potential.

While academic preparation and physical fitness can be assessed through objective measures, assessing moral fitness has proven to be more challenging. USNA strives to make character assessments based on subjective evaluations of school and military officials, letters of recommendations, personal statements, police record checks and other inputs. Use of personal videos and expanded evaluation of social media could be used, but would require additional resources that are presently not available to the Admissions Board.

- **How is research, testing, development, and evaluation for education/learning systems funded for your institution? Who is your SYSCOM for learning?**

At USNA, required sophisticated instruments for research and engineering testing and development are identified through the institutions internal Abbreviated Systems Decision Paper (ASDP) process, which leads to a request for OM,N or OP,N funds. This equipment is used in project based learning activities for midshipmen and faculty-led midshipmen research. Increasingly, state of the art instrumentation and systems are being resourced with external grant and gift funding as the appropriated funding available for the material budget for the Academy has declined dramatically. Enterprise-wide learning equipment, classroom technology, and enterprise software are also purchased through the institutions ASDP process with OM,N or OP,N funds. Currently, the Naval Academy does not receive any direct RDT&E funding to support the research and development activities of midshipmen and faculty.

The requirements for equipment, instrumentation, and software systems necessary to execute the varied academic programs are developed by the departments and coordinated by the Associate Dean for Finance and Military Affairs, and approved by the AD&P. These requirements are combined with the enterprise information technology requirements, prioritized, and passed to the CFO for inclusion in funding and POM requests. The Academy is not aware of an external SYSCOM for learning that advocates for our mission needs. The ASDP requirements process and a comprehensive Lifecycle Management Program ensures all academic IT requirements are reviewed and validated annually. These processes provide a methodology for ensuring that IT investments support USNA's mission. Every effort is made to align these processes with the DoD budget and POM cycle, but USNA's budget has remained relatively flat over the past decade while costs have steadily increased.

- **If you had a 5-10% percent budget cut, what function would you cut?**

USNA has already experienced significant reductions of resources in real terms. A further reduction of such a magnitude would force USNA to either significantly reduce the number of midshipmen graduates or eliminate a substantial training program. Of note, any reduction of midshipmen throughput would likely have to be phased in over a number of years. If Brigade size were held constant, to achieve such large savings would require eliminating a major program. Programs that have been considered in the past to achieve a 10% resource reduction include closing the Naval Academy Prep School in Newport, RI and/or eliminating a major training component of Seamanship & Navigation such as sailing and/or Yard Patrol craft. While these issues have been previously raised, they have been considered critical to USNA's mission by Navy leadership.

- **If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?**

With a 10-20 percent OM,N plus up, USNA would restore high-risk reductions that have been recently implemented. Most importantly, USNA would restore funding to deteriorating information technology infrastructure that is currently at risk and restore support for summer training aboard Yard Patrol Craft and summer cruises aboard naval assets. Additionally, USNA

would restore international experiences for midshipmen, admissions outreach, diversity outreach, and support for varsity sports, club sports and intramural sports (a critical mission component that has been significantly reduced). Finally, USNA would use a budget plus-up to fund operational and maintenance support for the new Hopper Hall Cyber Building which is on track for an FY20 completion.

- **Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting?**

  In general, USNA's curriculum does not focus on high-end maritime warfighting.

- **What percentage of instruction is held at the classified level?**

  Annually, the Brigade of Midshipmen as a whole receives about 2,500,000 hours of classroom and laboratory instruction. Approximately 10,000 hours are held at the classified level, or about 0.4% of the program. With the completion of Hopper Hall and operation of the SCIF, there will be an increase in the hours of instruction at the classified level.

- **Do you think we need to create an entirely new higher education institution for the USN, and if so, what should it do that would be additive to the service?**

  DON would benefit from the following:

  - An overarching vision regarding the need, focus and value of education within the Department.
  - An entity with the capacity to ensure that the higher education institutions are properly resourced and aligned to execute the vision.
  - Systematic feedback (and recommendations) from the fleet, Fleet Marine Force, and other DON entities regarding the strengths and weaknesses of the graduates that the Department's education institutions produce.

  An entirely new higher education institution may not be required to achieve these goals, but some organizational changes are probably needed to better achieve the above objectives.

- **What balance are you striking between bachelor degree completion and preparation for immediate duty in the Fleet/Fleet Marine Force as competent warfighters?**

  Midshipmen's time is one of the most limiting resources at USNA. As a result, USNA is constantly trying to strike the right balance across the myriad of moral, mental, and physical mission requirements, while still allowing time for reflection and quality of life initiatives. At USNA, bachelor degree completion and preparation for the fleet are not mutually exclusive. USNA's academic curriculum includes leadership, ethics, seamanship, and navigation coursework and practical application exercises that are easily identifiable as preparation for immediate duty in the fleet/Fleet Marine Force as competent warfighters. Additionally, the critical thinking, problem solving, and communication skills developed in the traditionally academic disciplines are key contributors to warfighter competency.

The average USNA midshipman completes approximately 140-145 credit hours for their bachelor's degree, compared to approximately 125 for an average university. In order to achieve all desired USNA developmental requirements, we believe we are at the upper limit with respect to academic course loading, and adding additional courses would require removing other courses (similar to what was done when cyber was introduced into the core curriculum). Within the 140+ credit hour curriculum, we have attempted to strike the right balance. This has required limiting the core curriculum, limiting the coursework required for majors, and limiting the professional development courses…all while there are many advocates and many good reasons for expanding each of these developmental areas. As but one example, USNA could make valued use of doubling the credit hours devoted to seamanship and navigation, but there is simply not enough room in the academic schedule.

More focused and often more specialized preparation for immediate duty in the fleet/Fleet Marine Force is prioritized during summer training periods. This includes, but is not limited to, Fleet ship, submarine and aviation cruises; Leatherneck (USMC), SEAL and EOD cruises; participation in USNA's Powered Flight Program; and Cyber summer internships/immersions.

- **Given changes in the backgrounds of incoming students, how is your curricula changing to keep up with social and cultural changes (technology, networking, etc.)?**

The Naval Academy's curricula continually change in response to evolving student backgrounds, pedagogical advancements, and stakeholder requirements. A knowledge-engineered computing environment centered on a flexible, scalable, and migratable technology infrastructure supported by mature business processes facilitates change.

The curricula has changed to take advantage of advances in technology, including most importantly the delivery of the curricula. Today's curricula emphasizes Science, Technology, Engineering and Math (STEM); Project Based Learning (PBL); and Languages and Regional Cultures (LREC) programs. These programs require contemporarily relevant content and instruction tailored to the individualized needs of our students. Incorporation of the latest pedagogical technologies and techniques enhances knowledge transfer and student outcomes.

The institution's networks – wired, wireless, and cellular – anchor and unify the Naval Academy's technology infrastructure. Design, development, maintenance and migration of these networks accommodate emerging curricula and user needs. Robust anytime, anywhere access to intranet, Internet, cloud and collaborative computing resources from a diverse range of fixed and mobile computing devices provides flexible, on-demand instant connectivity world-wide, aligned with individualized needs and circumstances.

Today's curricula promote critical thinking skills across varied student learning styles by leveraging voice, video and data content in a variety of classroom, laboratory and experiential educational contexts. Active instruction blended with virtual learning satisfies students' demonstration, collaboration, and reflection needs regardless of, but responsive to, their differing backgrounds. Quality-of-life technology compliments academic programs by providing commercial television content, computer gaming access, and personal smart device connectivity.

The Naval Academy will continue to align and utilize technology in support of student success from differing backgrounds. The institution remains engaged with peers, consortia, and others to ensure the currency, relevance and conveyance of its curricula in a changing world.

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Appendix E-5: NSTC Response

General Questions for all institutions (UNSECNAV Memo of May 2018):

1. What are the roles and responsibilities of your educational institution, and how do they contribute to establishing a permanent process of continuous learning?

The NSTC mission is to develop future naval warfighters. The Naval Reserve Officers Training Corps (NROTC) and Officer Candidate School (OCS) provide education and training to morally, mentally and physically develop future naval leaders of character and competence. NROTC and OCS provide critical foundational skills that set conditions for future success, and imbue their future naval officers with the need and desire to continue learning. NROTC is a program hosted at 77 of the nation's top colleges and universities across the nation. At the unit level, NROTC focuses on undergraduate education to both facilitate matriculation to a bachelor's degree and provide training in critical thinking, Naval Science and Leadership. Our partner universities are spread across the United States and focus on their own mission statements, this allows NROTC to bring diversity of thought and experience to the Navy. Exposure of wardrooms to the officers developed in NROTC helps our Service view the world from various perspectives giving it an overall greater strength.

OCS officer candidates arrive at training already having completed a bachelor's degree and also contribute to diversity of thought and experience in the Navy. As the primary Navy accession source, Naval Service Training Command, as an institution, indoctrinates all new members in the Navy Core Values, standards of behavior and professionalism, customs and courtesies. The knowledge, skills and attributes initially instilled are the foundation for all follow on education and training. All members depart accession-level training with the understanding they have begun a journey, but more learning and training are required to become proficient in their careers.

2. What is your vision regarding the future role of your educational institution?

The NSTC vision is an empowered organization committed to delivering unrivaled accessions training to produce agile, adaptable, lethal Naval warfighters capable of meeting current and future Fleet requirements. As an accessions training and education command, we are returning to warfighting basics and focused on developing Sailors of character and competence who possess integrity, accountability, initiative, and toughness in order to remain the world's preeminent fighting force. Our training and education process builds the foundation of naval service, producing physically fit warfighters proficient at basic damage control, firefighting, watch standing, force protection, and seamanship. Major recent efforts in this area are Midshipmen Indoctrination, Sea Trials and improvements in NROTC Instructor preparation.

3. How well do you inculcate the ability for critical strategic assessment and thinking on the part of your students and graduates?

NROTC and OCS focus more on warfighting fundamentals and tactics than operational level of war and strategy. We produce Unrestricted Line Officers, so training is aligned to prepare students for service in USMC, and the Navy's aviation, surface, submarines and SPECWAR/SPECOPS pipelines. Strategic assessment requires a level of knowledge, context

and experience about the Navy and its operations before that assessment could be considered valid. Accession training is limited in its ability to provide the knowledge and experience required for this skill set. Additionally, the return on investment to inculcate this skill would not be as beneficial as spending resources to increase basic seamanship and military proficiency.

4. How often do you review and update curricula in order to respond to the changing environment, demands, and requirements, and who oversees the implementation of these reviews?

The Professional Core Competencies (PCCs) are revised every four years with Fleet input and are co-signed by Commander, NSTC and the Superintendent of USNA. NROTC and OCS curricula receive a formal, cyclical review every three years. Formal reviews may be held early to address major policy or other changes that require significant updates to the curriculum. These reviews are coordinated by NSTC instructional staff with inputs from subject matter experts that include Naval Postgraduate School, Naval Observatory, USNA, Surface Warfare Officer School, Warfare Development Centers and affiliated universities (for accreditation). Ongoing self-assessments using course coordinators are also conducted in partnership with the warfare schoolhouses like Surface Warfare Officer School (SWOS) and Submarine Officer Basic Course (SOBC) to ensure Naval Science curricula are aligned as closely as possible with current Fleet practices.

5. In your critical view, how well do you prepare your students for future assignments?

For officer accessions, the yardstick is the experience and program at the USNA. Recent self-assessments of both NROTC and OCS found preparation of students in demonstrable skills to require improvement. As a result, significant changes were made to summer cruise training, and Conning Officer Virtual Environment (COVE) units have been installed at OCS and are being installed at all NROTC units. In order to address the differences in practical training opportunities between widely dispersed NROTC units, training “leveling” experiences were piloted this summer. New Student Indoctrination (NSI) for new NROTC midshipmen will be conducted at RTC Great Lakes, prior to arrival at their university. It is designed to provide new midshipmen with common basic militarization and familiarization with critical evolutions such as firefighting, damage control and small arms handling. Sea Trials was piloted this summer at Newport and Jacksonville. It is designed to provide further militarization, team building, hands-on leadership experiences, mental toughness training, essential navigation and mariner skills, and basic, recorded qualifications in firefighting, damage control and small arms. OCS revised a significant amount of curricula, added hands-on “reps and sets” training, and increased watch standing training for officer candidates. The changes were made to bring NROTC and OCS training in line with the requirements of the Officer Professional Core Competencies (PCC) Manual, with the goal of ensuring NROTC graduates and OCS officer candidates have the core skills necessary to succeed in follow-on training and initial Fleet assignments.

6. Based on your mission statement and list of required knowledge and learning, what is your critical assessment of how well you are achieving both? What are the strengths, weaknesses, and gaps of your institution in providing your graduates with these necessary skill sets?

The NSTC mission is to develop future Naval warfighters. Required knowledge and learning are outlined in the Officer PCC Manual. In most areas, we are achieving our objectives, but self-assessments performed within the past year did highlight some areas where we were not meeting requirements. NROTC success varies from unit to unit depending on many factors. The most significant factors include the selectivity and academic rigor of individual host universities and distance from Fleet concentration areas. Additionally, NROTC midshipmen were not getting the same firefighting and damage control training available to OCS officer candidates. For OCS, tactile and simulator training had been cut due to past funding reductions, and non-critical training topics added (Power Point) that took time away from instilling warfighting and mariner skills.

Our greatest strength is the diversity of our graduates. Students come from all walks of life, majoring in many different fields, in widely varying academic environments. These many different outlooks and perspectives provide different viewpoints and ideas on how to solve problems.

Because of the location of many of our NROTC units, and the space allocated to us, we cannot house large, dedicated training modules that would allow students hands on practice with the concepts they are learning which would allow them to move from remembering and understanding to applying, analyzing and evaluating. We created the two pilot programs (Indoc and Sea Trials) in NROTC to address those identified shortfalls. For OCS, we completed a thorough review of the curriculum, and then revised it to place the proper emphasis on warfighting skills, mental and physical toughness, and mariner skills. Five COVE units (shiphandling simulators) were installed, with 10 more on the way. OCS partnered with SWOS Newport to ensure the shiphandling training provided aligns with Fleet needs.

Another weakness is the inability to optimize our NROTC units, current NDAA language prohibits us from shutting down under performing units and redistributing those resources to the more productive units make the program more effective from both a training and cost standpoint.

7. How do you assess the quality of your faculty, as well as your ability to recruit faculty and maintain standards? What are those standards?

NROTC is the only NSTC program with designated faculty; officers are “recruited” via the standard detailing process. Additionally, each host institution has different requirements that potential NROTC instructors must meet to be accepted at that institution, including minimum cumulative GPA and/or letters of recommendation and interviews. Once assigned as a naval instructor (NI), the new instructors must pass a Teaching In the University Environment course facilitated by the NSTC Officer Development department. That course is being overhauled to improve the quality and standardization of instructors. The Instructor Prep Course introduced in summer 2018 is a pass-fail requirement. It replaces the older New Instructor Seminar. The new

Teaching in the University Environment course is 45 contact hour event designed to be equivalent to a 3-credit hour Master's Degree level course in college instruction. NROTC instructors vary in quality based on community. Surface, Submarine and Marine Corps NIs have a history of promotion and continued service beyond NROTC duty. The Aviation community does not view NROTC duty as a production billet, thus is not valued in the community.

8. Do tenure, right to publish, and ability to research constitute major issues that need review? N/A.

9. How is the DON-wide requirement of audit addressed in your curriculum?

DON audits are not addressed in accessions-level curriculum.

10. What are the views of your graduates as to the quality of the education received, and where change and improvements are needed? What kind of sampling is achieved in these surveys?

Graduates are not currently surveyed.

11. Describe your integration with the other parts of the DON educational enterprise, the Navy's Fleet components, and Fleet Marine Force, as well as other non-DoD academic institutions. What is your integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW)?

We work closely with USNA to ensure we maximize and leverage the best of all three officer accession programs. During summer training, NSTC and USNA coordinate with Fleet and FMF support elements to provide vital exposure fleet training experiences to midshipmen. Integration with Fleet Warfare Development Centers and nodes that educate officers and enlisted personnel on the operational level of war (OLW) happen during curriculum review. These reviews are coordinated by NSTC instructional staff with inputs from subject matter experts that include Naval Postgraduate School, Naval Observatory, USNA, Surface Warfare Officer School, Warfare Development Centers for the Warfighting Development Centers.

12. What is the role of your advisory board? Where is it most helpful, and how can its contribution be improved?

NSTC does not have an advisory board since it is not an academic institution. However, subject matter experts drive revision of the PCCs, curricula, and Instructor Prep Course.

13. The 2018 National Defense Strategy calls for a force that is more lethal, resilient, and agile. How are you contributing to this mandate, or making changes to do so?

The Sea Trials Pilot gave the midshipmen an opportunity to train, develop the bond of being a team and attain Navy qualifications. This program placed a new emphasis on basic skills to fight the ship including piloting, water survival, firefighting, damage control and small arms. It included the concept of warrior toughness to deal with stress, while maintaining a safe training

environment. Like Marine Corps OCS, it is also the first time NROTC Navy option MIDNs have been given an extended period of time for this type of dedicated training. The capstone event of this course is a graded "battlestations" scenario-based daylong event which tests all of the above concepts.

This summer the NROTC program is running its first ever coordinated indoctrination program modeled off of USNA's Plebe summer and OCS indoc. Previously there has not been a standard militarization experience for NROTC MIDNs this program is designed to level the field so we can begin training more lethal, resilient and agile officers.

OCS revised a significant amount of curricula, added hands-on "reps and sets" training, and increased watch standing training for officer candidates, placing the proper emphasis on warfighting skills, mental and physical toughness, and mariner skills. Five COVE units (shiphandling simulators) were installed, with 10 more on the way. OCS partnered with SWOS Newport to ensure the shiphandling training provided aligns with Fleet needs. OCS also added a culminating "battlestations" scenario-driven, team-based, day-long event that places stress on the officer candidates and requires them to utilize their new knowledge and skills.

14. How are your student bodies changing over time (trends) in terms of background, curiosity, experience, intellectual capacity, aspirations, and basic skills?

Overall, SAT scores for scholarship selectees are up over the last ten years from 1213 to 1413. However, they are also less focused with shorter attention spans, have higher expectations, and a need to feel appreciated (Black, James, *Recruiting Gen Z Students*, a study completed for The Language Flagship, 2018). Anecdotal evidence from the selection and placement branch in the Officer Development Directorate indicates a decline over the past 15 years in such basic skills as spelling and punctuation, writing in complete sentences and the ability to write a coherent expository essay.

15. How much authority do you have in budget flexibility and working with your resource sponsors? How is your budget sourced and decided upon, and how might that process be improved? What pivotal constraints have you experienced?

After dedicating the preponderance of the NROTC budget to scholarship funding, NROTC retains reasonable flexibility with its remaining budget. Likewise, the Navy's OCS program is balanced and fully resourced. The MPTE Enterprise is the resource sponsor for NROTC and Navy's OCS program and provides sufficient funding and manning, based upon the Officer Accession Demand Plan (ADP).

There are no process improvements required.

16. What constraints have you experienced regarding the execution of your vision for the future? How can this study best help you in that regard?

NSTC is constrained in its ability to manage program footprint. It is currently illegal under the NDAA to close NROTC units. We need flexibility in closing units that are not producing and

opportunities to open units at schools to meet program production requirements. This leads to inefficiencies in the program.

OCS is constrained by facilities for billeting officer candidates and providing indoor training during inclement weather.

17. If you could make major changes to your institutions and to the naval educational enterprise, what might they be?

The ability to open and close NROTC units would be the most important change to meet commissioning requirements with a constrained budget while maintaining a large (and growing) footprint. There have been several major changes and pilots since mid-2017. If all three of the pilots for this summer perform as expected, the organization needs approximately $3M more in the short term to scale up New Student Indoctrination and Sea Trials to provide training for all NROTC students to improve lethality, resiliency, and agility.

In conjunction with these training programs, we would accelerate the acquisition of training simulators for ship driving the COVE units as soon as possible to the all the units and OTC. It would also greatly enhance training to have a full bridge simulator at OTC and Great Lakes similar to the one at USNA for OCS and NROTC use.

18. Does the DON have a consistent culture of learning, and if so, how can we improve it, and if not, why, and how would you create one?

Yes. Continuous training, especially with the regular turnover of personnel, is the focus of operational forces and a significant amount of shore based activities i.e. Afloat Training Groups, Aviation Production Commands, Wings, Groups and Fleets who all have a man, train and equip mission. NSTC accessions-level training provides critical foundational skills that set the conditions for future success and imbue future naval officers with the need and desire to continue learning.

19. What is the impact of JPME (both Phases I and II) upon your curricula, your students' opportunity for education while in residence, and in your opinion, their capacity for addressing complexity and added lethality? How would you deliver JPME differently?

While NROTC and OCS do not focus on JPME, we do have a mandate to teach joint concepts as part of the Professional Core Competencies. Even those requirements are a challenge and distract from training basic naval foundational principles as we are still indoctrinating our officer accessions into the Naval Service. Focus on joint operations prior to a knowledge base and experience with Naval operations has very limited value. Introducing complimentary mission sets our sister services have would be a better use of the limited time we have with our midshipmen and candidates.

20. How should critical thinking and strategic thinking best be taught? Where should it be taught? When?

OCS and the NROTC program facilitate foundational critical thinking through the leadership and ethics course, as well as the critical thinking learned by the midshipmen and officer candidates during completion of their Bachelor's Degree. NSTC has a roll to play in the introduction of strategy through the Naval history course. However, more focused education in critical thinking skills/pitfalls and applying/synthesizing strategy to war planning should exist outside accession training and after Fleet experience. Strategic thinking for Naval Operations requires a basic understanding and experience in Naval Operations. After the first three to four years of fleet experience, strategic thinking can be introduced to the officer corps. If the desire is to start as early as possible in a Naval career, all required training and education for the O-3 level and senior should have strategic thinking as part of the program.

21. What should be our priorities for STEM education and its uses for greater lethality, at the undergraduate and graduate levels? The proper balance between strategic education, STEM, and the operational arts?

Navy should sustain its priority and preference for undergraduate STEM academic majors among its officer accessions to meet the technically intensive junior officer Fleet performance requirements within the Surface Warfare, Aviation and Submarine communities. NSTC defers to other officer development expertise beyond accession training to address graduate STEM requirements.

NROTC Navy-Option must continue to emphasize STEM academic majors among its officer accessions.

Although not currently needed, now would be an ideal time to return authority for mandating of STEM majors to the Chief of Naval Personnel to allow for flexibility in the future if needed.

22. For those with supporting foundations, how do these add value to your institution, and can these organizations be of greater assistance?

NSTC does not have supporting foundations.

23. How do you deal with accreditation? Is it an advantage, or a constraint?

All NROTC affiliated universities are regionally accredited. NROTC curriculum accreditation is dealt with school-by- school, using the process and requirements as any other course on the host institution's course catalogue. Accreditation is an advantage to our students as it reduces the number of additional electives required to graduate.

24. What is the selectivity (admission) rate for applicants to your institution?

33% of applicants for NROTC scholarships are selected out of approximately 5,000 completed, qualified applications. This question is not applicable to OCS. Navy Recruiting Command recruits prospective officer candidates that meet or exceed minimum standards to meet a specified monthly/annual goal.

25. How many students failed any of your full-time courses last year?

In FY17, 52 midshipmen out of approximately 6,200 scholarship and non-scholarship students program-wide attrited for academic reasons. All NROTC scholarships are full tuition and these losses are made up for by one, two, and three-year side loaded scholarships. For every loss that NROTC takes from a specific year group, it is replaced with a fully qualified previously non-scholarship college program student in order to graduate the required number of officers each year.

26. How many admitted students failed to graduate?

Approximately 40% of the scholarship students who begin as freshman fail to complete the four-year NROTC Program, a 60% graduation rate. The closest comparable statistic from Department of Education data is the 6-year graduation rate for first-time, full-time undergraduate students who began seeking a bachelor's degree at a 4-year degree-granting institution. The latest available data were 2009. The 6-year graduation rate for this cohort was 59 percent. "That is, 59 percent had completed a bachelor's degree by 2015 at the same institution where they started in 2009" (U.S. Department of Education, National Center for Education Statistics. (2017). *The Condition of Education 2017* (NCES 2017-144), Undergraduate Retention and Graduation Rates). So the 4-year NROTC graduation rate compares favorably with the 6-year national graduation rate. In addition to time-to-matriculate, another major difference was percentage of STEM majors in the cohort. For NROTC, 91% begin college in a STEM discipline and four years later, 73% graduate in a STEM discipline. Nationwide, 28% begin in STEM disciplines, and six years later only 13% graduate in a STEM discipline (STEM Attrition: College Students' Paths Into and Out of STEM Fields, https://nces.ed.gov/pubs2014/2014001rev.pdf).
Note: We define 'failed to graduate' as failing to complete the NROTC Program and commission. This includes students who no longer desire to affiliate with the program, that cannot maintain program standards (academic and non-academic), and who become medically disqualified. Many continue to matriculate and ultimately graduate. The New Student Indoctrination program for rising freshmen (being piloted in 2018) is designed to mitigate program attrition by moving non-academic attrition to the left of scholarship start and reducing academic attrition through mental toughness training. As previously stated, losses are mitigated through side-load scholarships at the three and two year points of every cohort. The Non-scholarship cohort, matriculating in parallel, is tapped for those with the best academic and aptitude scores and offered a contract to commission.

OCS officer candidates arrive having already completed a bachelor's degree. In FY17, OCS experienced an overall attrition rate of 8%, to include drops on request (quitting training) and those found not physically qualified to train.

27. For the past five years, what percentage (by year) of your students (after admittance, or while in attendance) have ever been passed over for promotion to the next rank or paygrade? N/A

28. For the past five years, what percentage of your military faculty (by year) have ever been passed over for promotion to the next rank or paygrade?

Based upon the limitations of the Officer Assignment and Information System, a quantifiable answer to this question is not possible. The following provides a qualitative answer to this question:

1. CAPTs promoting to Admiral – No CAPT over the past five years has promoted to Admiral while commanding a ROTC unit.

2. CDRs promoting to CAPT – CDRs who have not completed Commander Command have not promoted to CAPT while assigned as ROTC executive officers over the past five years.

3. LCDRs promoting to CDR – Based upon career timing and billet requirements, in zone LCDRs are not typically assigned to ROTC.

4. LTs promoting to LCDR – Results vary by community.

a) Surface Warfare – Surface Warfare Officers assigned to shore duty as LTs, including those assigned as ROTC instructors, are not in zone for LCDR promotion due to career timing. Officers assigned undergo a rigorous talent management screening process and are already screened for department head afloat. Their statutory promotion to LCDR will be based upon performance afloat.

b) Submarines – Submarine Officers assigned to shore duty as LTs, including those that are assigned as ROTC instructors, are not in zone for LCDR promotion due to career timing. However, all ROTC instructors undergo a rigorous talent-management screening prior to assignment to ensure their record supports these highly visible billets. This screening directly ensures viability for administrative selection as submarine department head. Additionally, submarine officers assigned as ROTC instructors are given a favorable recommendation by their Commodore and Commanding Officer which also correlates to a department head selection recommendation in fitness reports. As a result, ROTC instructors have a 100% selection rate to submarine department head. Their statutory promotion to LCDR however is based on service as submarine department head at sea.

c) Aviation – LTs in zone for LCDR are assigned to ROTC units. However, assignment to a ROTC tour precludes service in afloat or aviation production billets valued by the Naval Aviation Enterprise. Selection to department head is challenging and selection to LCDR is unlikely for officers assigned to ROTC.

29. For the past five years, what percentage of your military faculty were considered (in any zone) by an administrative command screen (major sea, major shore, operational, special mission, or their equivalent) board? What percentage of these officers were subsequently selected for command as a member of your faculty?

Based upon the limitations of the Officer Assignment and Information System, a quantifiable answer to this question is not possible. The following provides a qualitative answer to this question:

1. CAPT – Most officers assigned to command ROTC units have already served in major command.

2. CDR – Commanders assigned to ROTC units as Executive Officers are typically non-due course officers in their final assignment. They do not screen for follow-on command.

3. LCDR – LCDRs are not typically assigned to ROTC units.

4. LT – Results vary by community.

a) Surface Warfare – Surface Warfare Officers assigned as ROTC instructors are screened for department head afloat, and undergo a rigorous screening process through PERS-41's talent management process. These officers next administrative screening is determined based upon their service as a department head afloat.

b) Submarines – Submarine Officers assigned as ROTC instructors are heavily screened by PERS-42's talent management process to ensure their record supports administrative selection for submarine department head. These officers have a 100% selection rate to department head.

c) Aviation – Aviation officers assigned as ROTC instructors sacrifice service in afloat or aviation production billets valued by the Naval Aviation Enterprise. Selection to department head is challenging and selection to LCDR is unlikely for officers assigned to these units.

30. What do you consider your "peer" institutions, and what do you think they are getting right?

NROTC and OCS standard for training comparison is USNA, but not really a "peer institution" as the model is completely different.

31. What is your opinion of the quality of students entering your institutions? Trends? What could be done to improve?

Overall, intellect is trending up, while basic academic skills and attention span are trending down (see answer 14). While a majority of incoming students have been varsity athletes in high school, we are now seeing students who cannot complete a mile run on the initial inventory physical fitness test (PFT) when they arrive at OCS or an NROTC unit. This trend could be halted by requiring scholarship applicants and OCS applicants to complete a Navy PFT overseen by a recruiter. The physical aspect of the NROTC New Student Indoctrination will also mitigate this trend. Once in the program, NROTC midshipman physical scores trend up year-after-year as physical strength and endurance improve. In addition, mental, or warrior toughness training has been implemented in the Sea Trials Pilot and has already received very positive feedback. This training leverages what is being piloted at bootcamp, which focuses on harmony of the mind, body, and soul to create a toughness. Students are taught mindfulness techniques, character building, how to deal with stress, and other coping skills that are then put to the test.

32. How is research, testing, development, and evaluation for educational/learning systems funded for your institution? Who is your SYSCOM for learning?

NROTC and OCS education research, development and evaluation is managed by NSTC, with funding obtained through the normal Planning, Programming, Budgeting and Execution process. NSTC's Resource Sponsor is OPNAV N1/Chief of Naval Personnel. NSTC falls under BSO 22/Bureau of Naval Personnel.

33. If you had a 5-10 percent budget cut, what function would you cut?

Reduce number of NROTC units based on performance. This would require an increase in capacity of Officer Candidates produced at OCS, which is currently close to maximum so there would have to be infrastructure improvements; otherwise if you take a cut you cut officer production pure and simple.

34. If you received a 10-20 percent budget plus up, what would you buy, and how would that make a difference in your mission?

- Enhancements to Battle Stations 21 to include bridge simulator training and construction of Firefighting and Wet Training facilities at Great Lakes to support a standardized Sea Trials over the summer for rising 2/C midshipmen.
- Establish NROTC Preparation School (if such an institution were created, it would need to provide a bridging program for high school students that are not ready for college). This would be similar to Naval Academy Prep School for USNA, but it would be for NROTC and focused on minority candidates coming from troubled high school systems. We have real difficulty in matching quality of African American candidates' test scores to those of all other groups. This bridging program might need to be 2-years in length to make up the gap for some candidates with focus on 10th-12th grade math and science skills such as pre-calculus and physics.)
- Place senior enlisted personnel at the NROTC units.
- Increase in Human Resources Assistant GS paygrade.
- Fund more staff training and personnel to conduct it at all levels.
- Small arms proficiency, vice simply qualification, (meaning actual training and sustainment of baseline skills).

- At OCS, the current budget is not large, so a 10-20% plus-up would likely be directed at increasing and improving technical training (hands-on and simulation). The greatest need is for improved facilities to billet additional officer candidates and train indoors during inclement weather. These two needs are a part of NSTC's GSIP-21 submission: refurbishment of King Hall for $25M and the construction of the P-480 drill hall at $49.5M.

35. Where is the tipping point in Navy vs. Joint vs. Interagency student makeup in a seminar when the class can no longer focus on high-end maritime warfighting? N/A

36. What percentage of instruction is held at the classified level?

Classified instruction is provided through the summer cruise experiences, and midshipmen are required to have security clearances for summer cruise. While summer cruise is critical to midshipmen development, all the standard curriculum for naval science at the universities is unclassified.

None of the OCS training is held at the classified level.

37. Do you think we need to create an entirely new higher education institution for the USN, and if so, what should it do that would be additive to the service?

No, not for undergraduate or graduate level.

Specific Questions:
For the Naval Academy, ROTC, and OCS:

1. What balance are you striking between bachelor degree completion and preparation for immediate duty in the Fleet/Fleet Marine Force as competent warfighters?

NROTC: Completing the bachelor degree and meeting the commissioning requirements has been the primary focus. There is a new focus on more Fleet/FMF preparation. Sea Trials pilot (including the Fleet qualifications), focus on Marine Option midshipmen embedding with Marine units and Amphibious cruises, introduction of summer cruise qualification cards (similar to PQS that midshipmen will experience as commissioned officers), academic term professional exams, and funded plans to install Conning Officer Virtual Environments (over 2018-2019) are all recent initiatives.

OCS: Total focus in 12 short weeks is preparation for immediate duty in the Fleet or follow-on designator-specific training pipelines (OCS is programmed for 13 weeks beginning in FY20 to incorporate additional cyber education and provide additional training time on the newly installed Conning Officer Virtual Education (COVE) navigation training systems. All OCS officer candidates must already have a bachelor's degree to enter the program.

2. Given changes in the background of incoming students, how is your curricula changing to keep up with social and cultural changes (technology, networking, etc.)?

Our curricula changes to meet service needs. For example, practical celestial navigation was reintroduced in 2016 and Cyber Warfare topics were folded into the operations and weapons curricula in 2017.

In 2015, USNA and NSTC completed a comprehensive, Fleet-wide review of the Professional Core Competencies, which drive required curricula for all three officer accession programs. This document is currently under quadrennial review for signature in 2019. By maintaining a quadrennial review of the basis for Naval Officer competencies, we are able to address and incorporate operational, social and culture changes across officer accessions.

NROTC does annual reviews of curricula for all Naval Science courses. In addition, there are major reviews including meetings with subject matter experts outside NROTC every three years for courses (rotational with 2 or 3 courses per year). In addition, these changes are driven by our

Assistant Professors (O-3s) coming from operational tours. This process helps to keep our curricula relevant.

In order to address basic skills, writing requirements have been increased in Naval Science curricula and mandatory tutoring for calculus and calculus-based physics has been paid for at all units since 2012.

Administration Question (UNSECNAV Memo of 8 June 2018):

1. What are the qualifications for an officer or senior enlisted to serve as a ROTC instructor?

There is currently no senior Navy enlisted presence in the NROTC units. Each unit has a Marine Corps Drill Instructor qualified E-6/7/8 as Midshipman Battalion Advisor and Assistant Marine Officer Instructor (AMOI). Each unit had a Navy Chief Petty Officer billet, all but three of which were CIV-SUB'd in 2005. The three remaining Logistics Specialist billets are LS community-supported for Fleet concentration area shore rotation. The qualifications for an officer NROTC instructor vary by designator and university, but minimums can be summarized as:

CO/Professor of Naval Science: URL designator, O-6, post operational command, Master's degree, Undergraduate GPA>3.0, no D or F grades on transcript, attend the "Teaching in the University Environment Executive Course".

XO/Assistant Professor of Naval Science: URL designator, O-5, post operational XO, Master's degree, Undergraduate GPA>3.0, no D or F grades on transcript, attend the "Teaching in the University Environment Executive Course".

Naval Science Instructor: URL designator, O-3, post operational division officer, Undergraduate GPA>3.0, no D or F grades on transcript, pass the 45-contact hour "Teaching in the University Environment Course".
All except the AMOI: Must be vetted and approved to teach at the university hosting the NROTC Unit.
OCS officer instructors must pass a high-risk training screening (screening for medical, mental health, financial, etc. issues) prior to assignment, but otherwise they are selected via the normal detailing process.

Appendix F: The Nature and Character of War in the Cognitive Age

By: General John Allen, USMC (Ret.)

The United States Navy and Marine Corps face a set of complex challenges in the 21st century which require not only technological and mechanical skills to overcome, but also a recognition of the vital importance of developing understanding and knowledge, and the ability to think and reason through overwhelming quantities data and diverse, complex, and concurrent problems. America's sea services face the challenges of the Cognitive Age. In order to address and compete in this new era, naval professionals will require a constant and ongoing process of education and professional development.

> "All things be ready if our minds be so.
> — Henry V, Shakespeare"

This development must embrace an understanding of the dynamic tension and equilibrium in the relationship between the nature of war and the character of war, or simply the relationship of human with machine. Inevitably, this understanding will result in a dialogue that must constantly assess the fundamental aspects of the character of war. In essence, the changing character of war is often focused on the rapid advancement of the technical/mechanical dimension of war. But simply understanding or manipulating this element of conflict is insufficient in the Cognitive Age, and true strategic predominance requires us also to also consider the nature of war, the profoundly human dimension of conflict. This assessment, our era's strategic conversation and education, must seek on-going clarity about the fundamental, inextricable reciprocal relationship between the character of war and its nature, and the differences essential equilibrium which must exist between the two elements of conflict. Central to this discourse is a constant assessment of whether, and how much, they are changing, and whether they are in balance … equilibrium. This last aspect is utterly vital in the Cognitive Age, and in the kinds of war which will characterize this new era. Indeed, understanding this relationship may well define success or failure, victory or defeat.

The Nature and Character of War

The nature of war is essentially the human dimension of war. This is the constancy of the human being in the loop, as not only an ethical actor but also a decision maker, a strategist, and often as an objective or center of gravity themselves. The humanistic nature of war is dominated by anthropological or sociological factors that cannot be separated from the act of war itself. Knowledge, will, resilience, decisiveness, courage, morality, fatigue, and fear will always define the human role in war, and will always be present in its execution. Of the human constants, nearly all can be shaped through education and training to maximize the human advantages in war, and minimize the human vulnerabilities. In that sense, education and training are vital exogenous factors, completely within our capacity to control, that have decisive influence on the nature of war. But an effective system of education must recognize both the inherent aspects of the human dimension of war and how the constantly changing character of war influences it. Not only must the two be in a dynamic equilibrium, the means of assessing the relationship must also be continuous.

The character of war represents the material or technological dimension of war. Throughout history, as technology has changed and advanced the qualitative mechanization, and now the digitization, of war, including the lethality of weapons and ordnance. The challenge for the human participants has been to recognize the potential advantages of these changes

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and breakthroughs, then to blend them fully into the doctrinal and strategic, operational, and tactical dimensions of war in order to achieve maximum advantage. Sadly, the record of failure in this regard has often brought catastrophe to one or both sides in conflict, carrying with it a butcher's bill that has actually changed the entire course of societies.

In the Cognitive Age, technological and digital change are now moving at breathtaking speeds both in terms of the velocity of change and the sheer capacities of systems, networked platforms, computing power, and biotechnology, and artificial intelligence (AI). These changes, while elements of the character of war, are profoundly impacting the human factors in war, the nature of war. Future success in this era will require us to maintain a nearly moment to moment understanding of the balance in this relationship. the equilibrium of the character and nature of war. It is utterly essential, and systems of education must constantly embrace, anticipate, and react to the fundamental question of this relationship.

Past Experience to Guide the Present Challenge

At this point, it is worth exploring a few examples of occasions where the nature and character of war went out of equilibrium, and the relationship between technological change and human understanding had profound implications for the outcomes of conflict.

The Prussian military transportation system in the latter part of the 19th Century, based on strategic rail and well organized theater logistics afforded the Prussians the capacity for rapid strategic and operational level movement and sustainment of large formations at speeds heretofore unthinkable at the theater level. The Prussian leadership saw the advantages of this technological/mechanical change and capitalized on it to the detriment of the French.

Like the development of the rifled musket decades before, rapid firing, small caliber weapons changed profoundly the relationship between the offense and defense. Failing grasp this change, in the First World War commanders continued frontal assaults against entrenched machinegun formations supported by concentrations of massed heavy artillery. Unable to "unlearn" the spirit of the offense, the French and British lost hundreds of thousands of troops assaulting German positions. In the first day alone of the Battle of the Somme, the British lost more than 60,000 dead. In the battle that turned the First World War, the Battle of Passchendaele, 500,000 would die during its hundred days. Later in the war, the mechanical-technological breakthrough of the tank carried promise for the Allies, but because the commanders employing tanks did not understand the fundamental advantage of this the innovation, and its use en masse as an independent maneuver force, its advantage was never realized as the decisive means to break the defensive stalemate on the Western Front.

The rise of the Dreadnaught in the Royal Navy and the all-big-gun battleship in fleets worldwide profoundly changed naval warfare, not just because of the technological dimensions of these new units but because the British believed that they had intellectually solved the dilemma of how these ships would integrate into a modern fleet. Yet during the First World War, the battle off Jutland was indecisive and instead another piece of technology, the submarine, nearly won the war for Imperial Germany. It was only once American naval support helped the Royal Navy think through the new threat, and develop the system of convoys and anti-submarine warfare doctrine, that a balanced understanding of how the change in character, epitomized by the U-boat, required an understanding of its relationship to the nature of the war.

During the interwar years, the Germans committed themselves to achieving the capacity to maneuver, they would never again permit the trench environment of the First World War. German officers, educated in a profoundly influential system saw the inherent technological connectivity and maneuver viability of the fast-moving armored vehicle/formation in coordination with the artillery and close air support, eventually with real time coordination provided by new, smaller wireless radios. This was a totally new integration of technology, which could not have happened if key, well-educated officers had not seen the advantage. The speed of these integrated formations would generate what we have come to know as the Blitzkrieg of the Second World War. This, in turn, revealed that French literally "old school" leadership forces were incapable of intellectually grasping what was happening during the onslaught of the Panzer units. Yet at

the High Command level of the German Wehrmacht, the senior leaders had not recognized the need for industrial "retooling" necessary change to turn out the numbers of these formations needed. With the highly advanced Panzer units wreaking havoc on French and British forces, much of the German infantry were still walking to war with their supplies and artillery following in horse drawn wagons. This profoundly illustrated their own disconnect in understanding the relationship between the nature and character of war.

Navies in the interwar era developed advanced educational programs at staff colleges and war colleges to study and understand how advances in technology, like naval aviation, were impacting conflict. This included the Americans, the Japanese, and the British. Naval leadership across the seven seas saw early along the value of mating the innovation of the aircraft to the naval platform, the aircraft carrier. While the Americans experimented with the Fleet Problems, and the Japanese developed the Kido Butai, the British were the first to employ the new thinking. The Battle of Taranto in November of 1940 saw British Swordfish biplanes armed with torpedoes, flying from the carrier HMS Illustrious, attack and devastate the Italian fleet. While dismissed at the time by some in the Royal Navy, the Japanese appreciated the carrier based strike on the Italian fleet in Taranto and it presaged the devastating attack on the US Pacific fleet in Pearl Harbor more than a year later. At the time, inside the US Navy, the debate was raging about the relative efficacy of the battleship versus the aircraft carrier. Pearl Harbor ended that debate, and for a moment, redressed the imbalance in the nature and character of war.

The Present Challenge, Looking Toward the Future

The United States is at another major technological inflection point. One challenge of the Cognitive Age will be the capacity to fully embrace the enormity of the cyber domain and the potentially decisive or catastrophic outcomes of operations waged in this environment. Another part of today's changing character of war is the emergence of AI, and the multifaceted intersection of smart systems with smart weapons with autonomy. This includes the advent of increasingly powerful Artificial Narrow Intelligence (ANI) which may indeed have vital effects on the human nature of war as increasingly sophisticated, increasingly smart programs and algorithms make decisions, perhaps even life and death decisions, heretofore reserved solely for the human commander. [See Frank Hoffman's recent and fascinating writings on the very beginnings of the blurring of the nature and character of war.]

The rise of the artificially intelligent unmanned aerial vehicle, unmanned submersible vehicles, and unmanned surface systems which are autonomous and which may also carry autonomous lethal weapons, create technical opportunities that require thorough study and understanding as we continue forward. Indeed, we face the potential for there being several degrees of separation between the role of the human and AI driven autonomous outcomes in combat. How we deal with this blurring will define our ethics and morals … and essentially define who we are as a people … in the Cognitive Age. The impact of cyber operations on the coordination of operational units and the functionality of platforms, weapons, and equipment raises similar questions. Disturbingly, at this juncture, the human understanding of the possibilities of these domains and systems, and how they will effect command and control or the strategic elements of warfare, appear to lag the speed of technological development.

All of these technological developments decidedly change the character of war, but the more profound problem is the human element is lagging. But in many cases, there is a second problem, a more profound one, in that the human element is lagging the process. It is not a question of whether these technologies can be designed or built, in many cases they already are. Instead, the vital questions are how they should be used and the changes in thinking needed to maximize their effectiveness within our military forces. As with the poor understanding of the larger effect of the rifled musket, the impact of modern transportation, or the introduction of rapid-firing small caliber machine-guns, we risk a failure to understand the full potential of the technological developments that are emerging so quickly, and the resulting failure to adapt that change to the moment, or to the future. As in the past, this has the potential to result in catastrophic consequences.

The nature and the character of war will always exist in a relationship and hopefully in an equilibrium where human thinking creates the greatest opportunity for employing a technological advantage. This will require our naval leaders, at all levels, to be able to think and reason through the diverse and complex tactical, operational, and strategic problem elements of both peace and war. As opposed to prior eras, when leaders made key decisions from limited information, the Cognitive Age will require our leaders to deal instead with massive amounts of data requiring rapid decision at speeds heretofore unknown. This will require education and learning to develop the frameworks and the processes to assess data, analyze its implications, and make decisions. To maintain the balance in our understanding of the character and the nature of war, and the balance between the responsibilities of peace and of conflict, we must educate our force for today's challenges and teach them not "what" to think, but instead "how" to think.

The Bridging Solution

In the Cognitive Age, the equilibrium between the nature and character of war is so important that, as the Department of the Navy contemplates a naval education enterprise, serious consideration must be given to how that enterprise embraces the necessity of placing education at the juncture of the this carefully calibrated and continuously nurtured equilibrium. This enterprise must be charged with three broad missions, all of them of equal precedence: First, conduct research on the human dimension of war and teach our future naval leaders to understand about the interaction between the nature and character of war, and how to think about it and think through it. This is teaching how to think, how to pursue their own career-long study of the military profession, and how to learn. To inform this work, the enterprise must consider neural research on cognition, ways of learning, methods in critical thinking, and the spectrum of decision making as well as research on the human physiological dimensions of war such as mind-body interface, physical fitness, sleep deprivation, etc. Second, the enterprise must conduct a constant scan of the horizon for developments in formative and emerging technologies that will influence the character of war and stay get ahead of their assessment and questions of strategic integration. Finally, survey and evaluate developments in pedagogical methods and technologies of learning, and embrace a wide assortment of disciplinary lenses, which provide promising and varied approaches to continue to study, understand, and balance the nature and character of war.

At the beginning of this essay, I quoted from Shakespeare's Henry the V. In the final moments before the Battle of Agincourt, the French enjoyed a clear technological superiority of heavy cavalry and a ten to one numerical superiority. King Henry's beleaguered English army was smaller, exhausted, and much less well equipped. Indeed, one of Henry's lieutenants would declare the English were to experience "fearful odds." But King Henry knew his officers, and he knew his men, and while they were inferior in several of critical measures of the character of war, the little band of Englishmen were strong in the human dimension. In the final moments before the French descended upon them, in Shakespeare's telling "Harry" offered a single final exhortation to his leaders: All things be ready if our minds be so. In the Cognitive Age, even with technology galloping forward at a dizzying speed, all things will be ready for war "… if our minds be so." Thus, the naval education enterprise.

Appendix G: Executive Board Member Biographies

Chairman, Education for Seapower

The Honorable Thomas B. Modly of Ohio was sworn in as the 33rd Under Secretary of the Navy Dec. 4, 2017.

Mr. Modly was most recently the Managing Director in Price Waterhouse Cooper's National Security Practice and the Global Government Defense Network Leader for the firm which he joined in 2007. During that time, he also served as a member of the non-profit Business Executives for National Security.

Mr. Modly previously served as the Deputy Under Secretary of Defense for Financial Management from 2004 to 2007. In the 10 years prior, he served as Co-Founder and Vice President, Corporate Development of Iconixx from 1998 to 2002; Vice President of Oxford Associates from 1996 to 1998; and Director Corporate Development of UNC Incorporated from 1992-1996.

Mr. Modly graduated from the U.S. Naval Academy in 1983 with a Bachelor of Science, with distinction, in Political Science. Upon graduation he joined the United States Navy and proudly served as an UH-1N pilot until 1990, when he departed active duty for business school and the private sector. While serving in the Navy, Mr. Modly attended Georgetown University where he earned a Master of Arts in Government/International Relations in 1983. He also attended Harvard Business School from 1990 to 1992 where he earned a Master's in Business Administration with Honors in Business, Government and Strategy.

Co-Chairman, Education for Seapower

Admiral William Moran graduated with a Bachelor of Science from the United States Naval Academy in 1981 and a master's degree from the National War College in 2006.

As a flag officer, he has served as commander, Patrol and Reconnaissance Group; director, Air Warfare (N98) on the staff of the Chief of Naval Operations; and most recently as the 57th Chief of Naval Personnel.

His operational tours spanned both coasts, commanding Patrol Squadron (VP) 46 and Patrol and Reconnaissance Wing 2. He served as an instructor pilot in two tours with VP-30 and as a staff member for Commander, Carrier Group 6 aboard USS Forrestal (CVA 59).

Ashore, he served as Executive Assistant to the Chief of Naval Operations; Executive Assistant to Commander, U.S. Pacific Command; deputy director, Navy Staff; and assistant Washington placement officer and assistant flag officer detailer in the Bureau of Naval Personnel.

Moran assumed duties as the Navy's 39th Vice Chief of Naval Operations, May 31, 2016. He is a senior naval advisor to the Secretary of the Navy and the Chief of Naval Operations.

He is entitled to wear the Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit (five awards) and other various personal, unit and service awards.

Co-Chairman, Education for Seapower

General Gary L. Thomas is currently serving as the Assistant Commandant of the Marine Corps. A native of Austin, Texas, he graduated from the University of Texas and was commissioned in 1984. He previously served as the Deputy Commandant for Programs and Resources.

General Thomas is a Naval Aviator and has served in several F/A-18 squadrons. He commanded VMFA-323 during Operation IRAQI FREEDOM while embarked aboard the USS CONSTELLATION (CV-64). He also commanded Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), and he served as the Commanding General, 2d Marine Aircraft Wing (Forward) in Afghanistan as well as the Commanding General, 2d Marine Aircraft Wing in Cherry Point, North Carolina.

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He has also served as Assistant Wing Commander of 2d Marine Aircraft Wing, the Assistant Deputy Commandant for Aviation, and as the Marine Corps Deputy Director of Operations. His joint assignments include service in the Joint Staff Strategic Plans Directorate (J-5) and in the Force Structure, Resources, Assessment Directorate (J-8).

General Thomas is a graduate of the Weapons and Tactics Instructor Course, the Navy Fighter Weapons School, Air Command and Staff College, and the National War College. He holds a M.S. in National Security Strategy from National Defense University.

Admiral Michael G. Mullen, USN (Retired) is considered one of the most influential Chairman of the Joint Chiefs of Staff in history, Admiral Mike Mullen takes a fresh approach to the most important geopolitical issues of the 21st century, including America's position in the world and how economic health directly impacts our National Security. Admiral Mullen believes our national debt is our greatest security threat.

Mullen, who spent four years as Chairman—the top military advisor to Presidents George W. Bush and Barack Obama--is a broad-minded, intellectually curious leader widely recognized as an "honest broker" by policymakers, Members of Congress and senior military officers. He brought bold and original thinking to the work of strengthening the U.S. military and advocating for those who serve.

Admiral Mullen oversaw the end of the combat mission in Iraq and the development of a new military strategy for Afghanistan, while promoting international partnerships, new technologies and new counter-terrorism tactics culminating in the killing of Osama bin Laden.

A 1968 graduate from the U.S. Naval Academy in Annapolis, Mullen sought challenging positions including command at every level to develop his leadership skills during his naval career. He rose to be Chief of Naval Operations prior to assuming duties as Chairman, Joint Chiefs of Staff. In an unprecedented in-depth feature article, FAST COMPANY called Mullen "not just a new model for military officers-and a new kind of business titan-but also a case study in 21st – century leadership.

Since retiring from the Navy, Mullen has joined the boards of General Motors, Sprint, and the Bloomberg Family Foundation. He teaches at the Woodrow Wilson School of International and Public Affairs at Princeton University. He is also known for his efforts on behalf of service members, veterans, and their families. He is renowned for his role in dismantling "don't ask, don't tell" and allowing gay service members to serve openly.

Today he shares with audiences his deep experience in leading change in complex organizations, his assessment of geopolitical relationships, diversity implementation, crisis management, economic policy, risk management and the growing and existential threat of cyber.

General John R. Allen, USMC (Retired) assumed the presidency of the Brookings Institution in November 2017, having most recently served as chair of security and strategy and a distinguished fellow in the Foreign Policy Program at Brookings. Allen is a retired U.S. Marine Corps four-star general and former commander of the NATO International Security Assistance Force (ISAF) and U.S. Forces in Afghanistan.

Allen served in two senior diplomatic roles following his retirement from the Marine Corps. First, for 15 months as senior advisor to the secretary of defense on Middle East Security, during which he led the security dialogue for the Israeli/Palestinian peace process. President Barack Obama then appointed Allen as special presidential envoy to the Global Coalition to Counter ISIL, a position he held for 15 months. Allen's diplomatic efforts grew the coalition to 65 members, effectively halting the expansion of ISIL. In recognition of this work, he was presented the Department of State Distinguished Honor Award by Secretary John Kerry and the Director of National Intelligence Distinguished Public Service Award by Director James Clapper.

During his nearly four-decade military career, Allen served in a variety of command and staff positions in the Marine Corps and the Joint Force. He commanded 150,000 U.S. and NATO forces in Afghanistan from July 2011 to February

2013. Allen is the first Marine to command a theater of war. During his tenure as ISAF commander, he recovered the 33,000 U.S. surge forces, moved the Afghan National Security Forces into the lead for combat operations, and pivoted NATO forces from being a conventional combat force into an advisory command.

Allen's first tour as a general officer was as the principal director of Asia-Pacific policy in the Office of the Secretary of Defense, a position he held for nearly three years. In this assignment, he was involved extensively with policy initiatives involving China, Taiwan, Mongolia, and Southeast Asia. Allen also participated in the Six Party Talks on the denuclearization of the Korean Peninsula and played a major role in organizing the relief effort during the South Asian tsunami from 2004 to 2005.

Beyond his operational and diplomatic credentials, Allen has led professional military educational programs, including as director of the Marine Infantry Officer Program and commanding officer of the Marine Corps Basic School. He twice served at the United States Naval Academy, first as a military instructor, where he was named instructor of the year in 1990, and later as commandant of midshipmen; the first Marine Corps officer to hold this position. Allen was the Marine Corps fellow to the Center for Strategic and International Studies and the first Marine officer to serve as a term member of the Council on Foreign Relations, where today he is a permanent member.

Among his other affiliations, Allen is a senior fellow at the Merrill Center of the Johns Hopkins School of Advanced International Studies and a senior fellow at the Johns Hopkins Applied Physics Laboratory. He is an "Ancien" of the NATO Defense College in Rome, and a frequent lecturer there.

Allen is the recipient of numerous U.S. and foreign awards.

He holds a Bachelor of Science in operations analysis from the U.S. Naval Academy, a Master of Arts in national security studies from Georgetown University, a Master of Science in strategic intelligence from the Defense Intelligence College, and a Master of Science in national security strategy from the National Defense University.

General Glenn M. Walters, USMC (Retired) graduated from The Citadel with a degree in Electrical Engineering. Upon completion of the Officers Basic Course in November 1979, he was assigned to 3rd Battalion, 2nd Marines as a Platoon Commander in Weapons Company. He subsequently attended flight training in Pensacola, Florida and was designated a Naval Aviator in March 1981. General Walters commanded HMT-303 and VMX-22. General Walters' first General Officer assignment was as the Deputy Director J-8, DDRA. He then assumed command of the 2nd Marine Aircraft Wing (Forward), followed by command of 2nd Marine Aircraft Wing. General Walters then served as Deputy Commandant for Programs and Resources, followed by his selection as the 34th Assistant Commandant of the Marine Corps. General Walters retired in October 2018, and immediately assumed the role of President of The Citadel. He is a graduate of the United States Naval Test Pilot School.

Ambassador Barbara M. Barrett's appreciation for governmental leadership began in 1972 as an intern at the Arizona State Legislature where she observed then-Senate Majority Leader Sandra Day O'Connor. Ambassador Barrett's government efforts focused on transportation issues at the city, county and state levels. Before she was thirty, she served as an executive of two Fortune 500 transportation companies.

In the 1980s, Ambassador Barrett served as Vice Chairman of the United States Civil Aeronautics Board, partner in a large Phoenix law firm and Deputy Administrator of the Federal Aviation Administration. Engaged in the community, she was president of the Arizona World Affairs Council, Arizona World Trade Association and the Economic Club of Phoenix. Ambassador Barrett was the national Chairman of the U.S. Secretary of Commerce's Export Conference in Washington, D.C.

In the 1990s, Ambassador Barrett was President and CEO of the American Management Association, the world's largest provider of management education, leadership training and business publishing. She was Valley Bank of Arizona's founding Chairman, and she taught leadership as an Institute of Politics Fellow at Harvard's John F. Kennedy School of

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Government. She was a member of the Defense Advisory Committee on Women in the Services and was a Republican candidate for Governor of Arizona.

In 2000, as President of the International Women's Forum, Ambassador Barrett led a delegation of some leading women of the world to six cities in the People's Republic of China, and assisted in establishing or revitalizing chapters in Russia, South Africa, Jordan, Ireland, Chile, Argentina and Ecuador. Ambassador Barrett was Chairman of the US Advisory Commission on Public Diplomacy and Senior Advisor to the U.S. Mission to the United Nations where she addressed the U.N. General Assembly. She served in leadership roles at Freedom House, the Center for International Private Enterprise, the National Legal Center and the Global Center for Dispute Resolution Research.

Immediately prior to her service as Ambassador, she was President and CEO of Triple Creek Guest Ranch in Darby, Montana. Ambassador Barrett served on the corporate boards of Raytheon and Exponent, Inc., and was a trustee of the Aerospace Corporation, Mayo Clinic and Thunderbird School of Global Management.

She worked closely with her colleagues on the U.S.–Afghan Women's Council and with Thunderbird School of Global Management on Project Artemis, a Thunderbird program that trains and mentors Afghan women entrepreneurs. She was a member of the Horatio Alger Association Board, Defense Business Board, Smithsonian National Board and the Senior Advisory Board at Harvard's Institute of Politics.

Ambassador Barrett earned her bachelor, master and law degrees at Arizona State University. Honorary doctorates have been conferred upon her by ASU, Embry-Riddle Aeronautical University, Thunderbird School of Global Management and the University of South Carolina. Ambassador Barrett has been recognized with the Horatio Alger Award, Woodrow Wilson Award for Corporate Citizenship and the Sandra Day O'Connor Excellence Award from the American Bar Association.

Vice Admiral Ann E. Rondeau, USN (Retired) was appointed by the College of DuPage Board of Trustees to serve as the College's sixth president starting July 1, 2016. She is a past president of the National Defense University, a consortium of five colleges and nine research centers in Washington, DC. In 1985, she was selected and served as a White House fellow in the Reagan Administration.

Dr. Rondeau retired from the U.S. Navy as a three-star admiral in 2012. She is the second woman to have achieved this rank in the Navy. She then served as a partner and later an independent consultant with the IBM Watson Group. Dr. Rondeau has extensive leadership experience in significant military and educational roles, including Deputy Commander of the U.S. Transportation Command in Illinois, Pentagon Director/Chief of Staff for the U.S. Navy Staff, Commander of the Navy Personnel Development Command in Virginia, Commander of the Naval Service Training Command at Great Lakes, Ill., Pacific Fleet Staff Chief of Staff in Hawaii, Commanding Officer of Naval Support Activity in Tennessee and other staff and commanding responsibilities with policy, support and student service.

Dr. Rondeau holds a B.A. from Eisenhower College (NY), an M.A. from Georgetown University (DC) and an Ed.D. from the College of Education at Northern Illinois University in DeKalb. Dr. Rondeau holds an honorary Doctorate in Public Service from Carthage College (Kenosha, WI) as well as an honorary Doctorate in Humane Letters from Rosalind Franklin University of Medicine and Science (Chicago, IL).

She is a proud member of the Arizona State University Flag Officer Advisory Council, the National Museum of the American Sailor Foundation Board of Directors, the Naval Postgraduate School Board of Advisors, the Military Advisory Board (under the aegis of Center for Naval Analysis), the Dwight D. Eisenhower Memorial Commission, the Chicago Regional Growth Corporation Board, Choose DuPage Board of Directors, and the Council for Higher Education Accreditation.

In 2018, VADM Rondeau was selected by the Secretary of the Navy to serve as the President of the Naval Postgraduate School.

Dr. Harlan K. Ullman divides his time between the worlds of business and policy. He is chairman of two companies: CNIGuard Ltd, a high technology infrastructure protection firm based in London and The Killowen Group that advises leaders of business and government at the highest levels. He also sits on several boards of public and private corporations. His analyses and assessments of national and international events and issues are highly sought.

He has actively advised American Secretaries of State and Defense, NATO strategic commanders (including serving on the Senior Advisory Board of Supreme Allied Commander Europe for thirteen years) and NATO secretaries general as well as members of Congress and the most senior leaders of a number of foreign governments and is recognized as one of the nation's thought leaders in strategic and innovative thinking both in the public and private sectors arguing for a "brains based approach" to ensure sound strategic thinking.

He has been deeply involved in the formulation of U.S strategy during the Cold War and beyond and was the creator of the original doctrine "shock and awe," a far more different version than the sound bites used in Operation Iraqi Freedom in 2003.

A distinguished graduate of the U.S. Naval Academy, Dr. Ullman holds a PhD from the Fletcher School of Law and Diplomacy administered by Tufts and Harvard University in International Politics and Finance.

A career naval officer, he has served at sea in command and ashore in senior assignments of responsibility including two happy years with the Royal Navy afloat. As a Swift boat skipper, he led over 150 combat patrols and operations in Vietnam for which he was decorated and was a professor at the National War College where he directed the course of study in military strategy for three years before returning to sea in command.

He has been appointed the first Distinguished Senior Fellow and Distinguished Visiting Professor at the U.S. Naval War College in Newport, Rhode Island. His latest book is *Anatomy of Failure---Why America Loses Wars It Starts* (November 2017).

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Appendix H: External Reviews

From: Admiral Thad W. Allen, USCG retired
To: Under Secretary of the Navy Tom Modly

Mr. Secretary,

Thank you for the opportunity to comment on the draft E4S report. Congratulations on this achievement and the leadership role Secretary Spencer and you played in taking a "round turn" on Navy, Marine Corps Education.

My comments will be brief as I support the thrust of the report and the recommendations. I would like to reinforce several issues and concepts presented in the report as they are worthy of broader discussion.

First, in relation to lifelong learning all military services face the same challenge. As the external environment has been driven by rapidly accelerating technological change with the associated social and cultural changes, career members of the military have been disassociated from their peers and cohort. The day of lifelong work in a single firm is vanishing. Our civilian counterparts are now forced to reinvent themselves several times, if not more, during a lifetime. Each change requires the acquisition of new skills, repackaging of the individual in relation to market demand, and adaptation to technology. Where this hasn't occurred, we see the loss of jobs to more efficient labor markets. I have feared that we risk being systemically deskilled against our civilian counterparts if we don't force this needed reinvention of our members to keep pace. We need to understand digital citizenship and its role in the "cognitive age." The cultural impacts of technology (AI, AR, ML) have created the sociological equivalent of climate change we must adapt. It is also critical to the retention of our best and brightest.

Second, and related to the first point, we are further constrained by legal and regulatory frameworks in our ability to acquire, ingest, and deploy technology. We have always been in a stern chase with our civilian counterparts in acquisition by risk averse oversight and regulation. Given the rapid acceleration of technology as noted in the report, that stern chase is widening rather than closing. Much basic research and the means of production to address our current challenges lie outside of government. We need innovative, agile, forward thinking leaders who can navigate a new path in acquisition, technology, and logistics. So, beyond the warfighting and lethality requirements, we have to reinvent support to the warfighter and mission support in general. Many of these programs beg the same clean sheet review as education but the intellectual capital must be acquired to improve programs such as financial management, life cycle maintenance and supply chain.

Third, you don't make policy until you spend money. The recommendations to unify the resourcing of education are important as are the selection and assignment policies that give them effect. I strongly support the recommendation to make this a program of record and bring it into the POM process.

Fourth, maintain your focus on the enlisted workforce. All services need reconcile the competing ways to acquire intellectual capital and optimize the evolving use education, training, and certification.

Finally, as a former Coast Guard Commandant who benefitted from a common Navy, Marine Corps, and Coast Guard Maritime Strategy and concepts like National Fleet, I recommend a Navy/Marine Corps - Coast Guard dialogue to identify areas of common interest, potential synergies, and lessons learned.

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Dr. James G. Bellingham

Director, Center for Marine Robotics, Woods Hole Oceanographic Institution James G. Bellingham is a pioneer in the development of autonomous marine robots. He is the founding Director of the Center of Marine Robotics at the Woods Hole Oceanographic Institution (WHOI), founded the Autonomous Underwater Vehicles Laboratory at MIT (1988), and co-founded Bluefin Robotics (1997). Jim was Director of Engineering and Chief Technologist at the Monterey Bay Aquarium Research Institute (MBARI) before coming to Woods Hole. He has participated and led numerous research expeditions including to the Arctic and Antarctic. Jim received an S.B., S.M., and Ph.D. in Physics from the Massachusetts Institute of Technology.

Response:

Please find my comments:

It is an interesting report, and I learned quite a bit about the DoN educational enterprise. It certainly helps provide Naval education is a part of a larger - and very vibrant - US ecosystem of universities, colleges, etc.. Many officers are educated through that larger system, for example as undergraduates (ROTC) and graduate students.

The educational enterprise should take advantage of this larger ecosystem as there is a fair degree of specialization in area of excellence that cannot be duplicated in the smaller naval educational system. Further, as the report makes clear, the educational process builds more than just knowledge, it builds networks. By participating in the broader educational system, naval officers have an opportunity to build a community of peers that extend to other domains of industry, government, etc.

There are aspects of education that are unique to the DoN, or which are poorly addressed by the larger educational enterprise. Here are some topics I think ought to be called out.

. Management of science and technology programs - we train folks for the administrative aspects of the S&T enterprise, however we do not have educational programs that teach how to manage/nurture/not kill the actual process of innovation. Most academic work on innovation focuses on small companies, the DoN needs to know how to be successful in a large organization framework.

. Organizational innovation - technology innovation is closely coupled to disruption of organizational practices (e.g. Innovators Dilemma). If you lock down opportunities for organizational change/renewal/destruction I would argue that you are closing yourself off to the much of the really
high-impact benefits. That is effectively what happens in large organizations. Are there ways to institutionalize

. History of science, technology, society, and the military.

. Data analytics. The report talks about the need for naval officers to take classes like "....physics necessary to understand gunnery and the mathematics necessary for celestial navigation". What are the modern equivalents?

As is discussed in our NRL review, mobility of people (e.g. ability to leave and come back) is increasingly a hallmark of the great US research & educational institutions. The report touches on this, but my impression is that it is mostly a mobility inside of the Navy discussion. For the DoN educational system to be successful, I think that it needs to achieve a similar sort of porosity.

Classification and education work against each other. A major challenge facing us is to be able to engage with and draw ideas from the larger educational system, while not exposing information or compromising people. I don't think we have a framework that lets us do this today.

Finally, how should the educational enterprise be coupled to the research enterprise? In the really large institutions of learning they are intimately connected. Should that also be the case in the DoN?

Jim

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The Honorable Denis A. Bovin

Senior Advisor, Evercore Partners: Denis Bovin is Senior Advisor at Evercore Partners, a leading global Investment Banking and Strategic Advisory Firm. He is also Chairman of the MIT Investment Management Company, which oversees the investment of MIT's approximately $20 billion endowment and related funds, and a member of the MIT Executive Committee and its Board of Trustees. *Defense Daily* named Denis as one of the world's 40 Most Influential People in global defense, aerospace, and national security and *Defense News* named him one of the 100 Most Influential People in U.S. Defense. Mr. Bovin is a 2018 recipient of the Ellis Island Medal of Honor, which is presented to citizens who have distinguished themselves while embracing America's ideals of patriotism, tolerance, brotherhood, and diversity, and have also shared their knowledge, courage, compassion, talents and generosity with those less fortunate.

Response:

TO: The Honorable Thomas B. Modly, UNDER SECRETARY OF THE NAVY

FROM: Denis A. Bovin

SUBJECT: Comments on the E4S Pre-decisional Draft

As you requested, I am pleased to give you some thoughts on the E4S draft you distributed.

A fundamental rethinking of the best and most effective approaches to delivering a lasting educational experience is currently being undertaken in the academic world, in industry and in the public sector. I strongly commend DON and the E4S Executive Board for its efforts to review and make recommendations on how to upgrade and modernize Naval education to meet the challenges of tomorrow.

Education was historically organized by individuals coming together in a classroom to listen to and learn from a teacher and then return home to do homework, which required thinking about and applying the lesson. Today it is much more likely that graduate and undergraduate students are required to learn the lesson on line and then come to a classroom to discuss, challenge and think about the lesson they studied. As this restructuring of the educational experience is occurring, it would be appropriate for its fundamental tenets also to be applied as part of the E4S restructuring. The quality of current on line courses, complete with discussion groups, feedback for individual students and the opportunity for individual students to ask questions offers an excellent template for the DON.

In addition to the excellent points made in the proposed mission statement for Naval education, I would add three other aspirational goals.

First, as part of a lifelong continuing education, our Naval and Marine servicemen and women should study and understand our rivals, competitors and adversaries. This "competitive analysis" should be particularly important for our officer corps.

Second, and self-evident, lifelong learning for all members of the Naval service should ensure that they maintain current state of the art domain knowledge in their specialized areas. With the pace of technology quickening, lessons learned even a few years ago, may need to be updated.

Third, our leading universities strive to teach students to be innovative. They are taught to survey the problems set, apply critical thinking and experience and not be constrained by previous solutions. This too should be incorporated into any new restructuring of Naval education.

Finally, Admiral Ernest King's comments as shown on page 49 of the draft that "the great value of a graduate education is mental training and learning methods of analysis and ways of solving problems which can be applied to not only technical subjects, but also to strategy or tactics or logistics or any other professional field. Education teaches officers how to think…" should be moved to a position of greater prominence in the front of the E4S report, as it summarizes the actual and aspirational goals we are all seeking.

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VADM William C. Bowes, USN (Ret)

Independent Consultant and Board Member: VADM Bowes served 33 years in the Navy in numerous operational and acquisition assignments. As a Vice Admiral he served as the Commander of the Naval Air Systems Command, the Principal Deputy Assistant Secretary of the Navy for Research, Development and Acquisition (RDA), and the Acting Assistant Secretary of the Navy for RDA. As a civilian he served as an executive in the aerospace industry and later served as a director on a number of public and private company boards. He currently consults on operational safety and mission success for a space company.

Response:

From: Bill Bowes, VADM USN (Ret) 29 Nov 2018
To: Mr. Thomas B. Modly, Under Secretary of the Navy
Subj: Comments on Education for Seapower Study draft

1. I cannot give enough positive comments on the entire E4S study and its recommendations. This study gives a road map to tackle a problem that has existed for years without formal recognition until this study was established. The implementation will be difficult without significant changes to what have become the required career paths for promotion in the US Navy, but a successful future for our Navy requires that it be done.
2. Some recommended changes and additions:
    a. Add to proposed strategy: *Naval Education Enterprise must produce leaders of character, integrity knowledge and intelligence*
    b. As science and technology have become more important today than ever before for the future of naval warfare there is a greater need for naval officers with an understanding of those technologies that hold the greatest promise for cutting edge advances in the knowledge that could be applied to naval warfare. Recommend the following addition:
        i. Send a greater number of officer to our nation's highest rated universities (where the majority of applicable basic research is conducted) for MS and PhDs in the sciences that hold greatest promise for naval warfare
    c. Under Recommendations for Policy: To develop a naval education strategy add: the requirement to utilize a panel with membership that includes the presidents of each of the naval education institutions, supplemented by members of the E4S, to assist in drafting the comprehensive naval education strategy.

3. Though beyond the E4S study I offer the following comment: Dual-hatting the current Commander, Naval Air Warfare Center – Training Systems Division (NAWC TSD) in Orlando, Florida, to serve as the naval education enterprise acquisition arm is an excellent plan. However, NAWC TSD is a subordinate command of the Naval Air Systems Command. Although the NAWC TSD commander could fulfill the duties as the study describes for PEO-L, the commander ideally should report to a Naval Systems Command, which the DON does not have since eliminating the Naval Material Command. Reestablishing a four star command to which all systems commands report with responsibility for all Navy RDT&E would return a four star with this responsibility to the Navy's four star decision table.

The Honorable Brad R. Carson

The Honorable Brad Carson served as the Senior Advisor and the Principal Deputy to the Under Secretary of Defense for Personnel and Readiness. Previously, he served as the Under Secretary, Chief Management Officer, and General Counsel of the Department of the Army, has held a variety of public and private positions, and practiced commercial law. Elected to the U. S. House of Representatives in 2000, Mr. Carson served in the Congress from 2001-2005, representing the 2nd District of Oklahoma. From December 2008 until December 2009, he served on active duty as a Navy intelligence officer, deploying to Iraq in support of Operation IRAQI FREEDOM. Mr. Carson received a bachelor's and master's degree in Politics, Philosophy and Economics from the University of Oxford, where he was a Rhodes Scholar. He also holds a J.D. from the University of Oklahoma.

Response:

A Few Observations On The E4S Study

• The report is extremely well-written and stands apart from most government documents.

• I very much like the strategic vision – with its invocation of the "Cognitive Age" – that is articulated on pages 7 and 19 of the report.

• The recommendations are sound and actually quite visionary. I'm especially intrigued by the Naval Community College.

• The recommendations for organizational restructuring are not glamorous, but they are essential if a revolution in military education is to occur.

• I do concur with Dr. Lerner's modest suggestion that it would be wise to add an educational expert to, at least, the Board of Advisors.

• I wholeheartedly support the requirement that learning achievements be added to the officer fitness reports.

• My only critique, offered half-heartedly, is that the excellent analysis of the Navy's need to rethink its educational enterprise is not completely matched by a lengthy discussion of solutions, which are rather hastily presented.

Prepared by Brad R. Carson

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Arizona State University

December 3, 2018

Thank you for the opportunity to review and provide comments on a draft version of *Education for Seapower*. The report is encouraging and highlights the potential for a new, knowledge-intensive and empowered future for the Navy and the Nation. I am pleased to see recommendation for organizational reforms, the establishment of entirely new organizations and new ways to think about the relationship between knowledge, human capital and our Nation's security. I have no doubt that adherence to these recommendations will lead to a more prosperous future. I have organized my comments according to four interrelated points.

First, the report recognizes that personnel are the core assets of a strong navy. By many accounts, the U.S. Navy is a human capital development organization. In the modern era, through this report, the Navy can begin to see itself as a technology-enabled complex human learning system. This will be critical as we look to a new future of new threats, new global power dynamics and new paradigms for sea warfare.

Second, the report recognizes the realities of a now dynamic and changing world. Today's naval warfighters operate in complex sociological and technological battlefields. Technological change is now happening at a faster rate than ever before. Corresponding social changes are complex and difficult to predict. With this background, the Navy is required not only to develop new warfighter capacities, but also new institutional arrangements to understand change and facilitate adaptation.

Third, I am pleased to see that the need for continuous learning is recognized. It is no longer the case that trade or skill-based knowledge can be transferred from one generation of worker to the next. Most of today's warfighters will have to contend with conditions or threats that did not exist in previous generations. New threats are emerging daily. The imperative for continuous learning cannot be overstated.

Fourth, I am pleased to see that partnerships are valued. The United States Navy and its learning institutions are situated in the midst of the world's foremost higher education system. There is a long-standing, mutually beneficial relationship between American higher education and the Navy. For generations the Navy has supported research and education programs at American universities and for generations these universities have produced research, technologies and human resources for the Navy to maintain global supremacy.

In looking to the future, I urge the Department of the Navy to be open to new forms of institutional collaboration. Only a small number of universities, including Arizona State University, are developing new learning models and new designs to facilitate perpetual adaptation. I encourage the Navy to rethink the role of partnerships and the contribution of legacy partners. For example, some higher education partnerships are managed according to

traditional “contract” models. I worry that managing knowledge partnerships through traditional vendor models can exclude some of our Nation’s most innovative and capable learning partners.

In addition to providing my feedback, I want to also submit some background information about Arizona State University and the changes that have taken place here over the past 15 years. These details provide some context and insights into the merits and limits of my own perspective.

Arizona State University during the past fifteen years has undertaken a comprehensive organizational redesign which has sought to combine the objectives of broad accessibility to world-class academic excellence as well as social impact. Through these ambitions we have sought to establish what we term a *New American University*, or a university defined not by whom we exclude but whom we include and how they succeed.

The new model demonstrates that research excellence and broad accessibility are complimentary. The university is committed to offering admission to all academically qualified Arizona residents regardless of financial need. In so doing, ASU seeks to advance socioeconomic mobility as well as prepare students for competitiveness in the global knowledge economy. ASU has succeeded in advancing both the academic rigor and diversity of our student body, which increasingly includes more and more students from socioeconomically disadvantaged and underrepresented backgrounds, including a significant share of first-generation college applicants. Through research learning and pedagogical innovation, students become adaptive master learners across a range of transdisciplinary fields, prepared for the continuously changing workforce of the knowledge-based economy.

Enrollment has risen from 55,491 undergraduate, graduate, and professional students in fall semester 2002 to more than 112,000 in 2018. Of this number, approximately 35,000 are enrolled through ASU Online. Total minority enrollment from fall 2002 through fall 2017 soared 229 percent, from 11,487 to 34,699, the latter constituting 36.5 percent of total enrollment. While the first-time, full-time freshman class has increased in size by 81 percent since 2002, enrollment of students of color has significantly outpaced this growth. Students from historically underrepresented ethnic backgrounds made up 44.9 percent of the fall 2017 first-time freshman class, which represents a 264 percent increase in minority enrollment in the entering freshman class since 2002. Overall, minority undergraduate enrollment has increased 240 percent during this period. The number of African American students grew 191.4 percent, from 1,768 to 5,152; the number of Asian students grew from 2,535 to 5,928, a 133.8 percent increase; and the number of Hispanic students grew from 6,018 to 21,120, a 250.9 percent increase.

ASU demonstrates that diversity is a correlate of academic excellence. ASU is among the top ten public universities in its enrollment of National Merit Scholars, enrolling more than Stanford, MIT, Duke, Brown, or the University of California, Berkeley. ASU is also among the top three producers of Fulbright Scholars in the nation, tied with Princeton and Rutgers and coming in behind only Harvard and the University of Michigan, and leads nationally in Native American and Hispanic graduates in multiple fields.

Comparisons between ASU and other major research universities in terms of admissions standards must be appreciated within the context of our commitment to accessibility. ASU admits all Arizona students who have the ability of doing university level work, which at this point means enrollment of freshman classes numbering roughly 12,300 that correlate with the

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socioeconomic and ethnic diversity of our region. When compared with institutions that handpick small freshman classes, our persistence and graduation rates are thus a function of our expanded accessibility. ASU nevertheless remains above the national average in terms of freshman retention and graduation rates among four-year public universities, at 85 percent and 63 percent respectively. Moreover, a significant cohort of each entering freshman class matches the academic qualifications of students admitted to the Ivy League and the nation's top liberal arts colleges.

The performance of our research enterprise continues to expand as well. As a consequence of an ambitious expansion of the research enterprise, research-related expenditures over the period FY 2002 to FY 2018 have grown by more than a factor of four—without significant growth in the size of the faculty—reaching a record of more than $600 million in FY 2018, up from $123 million in FY 2002. According to the most recent data from the National Science Foundation (2017 HERD survey), ASU ranks eighth of 747 universities without medical schools in terms of total research expenditures—ahead of Virginia Tech, Princeton, and Carnegie Mellon. Over the past ten years, ASU has been the fastest growing research university in the nation among all institutions with research enterprises exceeding $100 million.

By establishing new criteria to measure success, we have chosen to redefine the terms of our competition with institutions that have matured over the course of centuries. I believe the experiment has succeeded in demonstrating that an institution can evolve to compete with the world's leading universities academically, yet remain broadly inclusive even while advancing a cutting-edge research enterprise dedicated to the public interest.

ASU is not alone among learning institutions that aspire to be adaptive to modern National priorities. In pursuing the vision set forth in *Education for Seapower*, the Department of the Navy has the potential to achieve massive scale transformational outcomes greater than the ones I have outlined here for the case of ASU.

I welcome the opportunity to be of continued service to this initiative.

Sincerely,

Michael M. Crow
President

Graduate School of Education and Human Development
The George Washington University

December 3, 2018

Comments and Questions on Department of the Navy Education for Seapower (E4S) Study (Draft, November 2018)

The report highlights a new strategic vision as a result of re-orienting education.

"The Naval Education Enterprise must produce leaders of character, integrity, and intelligence steeped not only in the art of war, the profession of arms, and the history and traditions of the Naval service, but also in a broader understanding of the technical and strategic complexities of the Cognitive Age, vital to assuring success in war, peace, and grey zone conflict; officer and enlisted leaders of every rank who think critically, communicate clearly, and are imbued with a bias for decisive and ethical action."

- While an emphasis on ethics is certainly critical, in order to become effective leaders in a rapidly changing environment, the idea of *developing responsible leaders is important*. Beyond simple ethics, it broadens the leader-follower relationship to become more inclusive, and also focuses on relational and moral aspects. Responsible leadership offers a positive view of people, processes and organizations to enhance organizational outcomes.

- Strengthen and/or include *leadership development components* within the curriculum. This would ensure that Navy officers also develop leaders around themselves for better succession planning, and for creating a learning culture as proposed in the report.

- While intellectual and cognitive components of one's development are appropriately emphasized in the report, attention to *affective and behavioral components* is needed to foster a healthier work life Navy culture.

- The report is short on details for *how to operationalize the plan*. For example: what are developmental milestones and timelines? What is the recommended budget? What expertise is required for the CLO or NLS to succeed and how will the Navy acquire and deploy this expertise? The research shows that enterprise level change as well as efforts to realign education and occupational requirements are typically under-resourced and as result often fail. More recognition of this significant challenge presented here could enhance the report.

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- The call for the integration and coordination of curriculum and faculty research and teaching across the new system is important and promises to be a significant challenge, especially given that the mission and design of each institution is to support technical and procedural needs of individual specialties. *Cross-disciplinary scholarship* (research and teaching) would be of value. Our experience in developing and implementing collaborative programs across traditional disciplinary and intellectual silos would be of possible relevance.

- More attention to the recommendations for how to *inculcate a value for formal education* into the culture of the Navy could enhance the report. Experience in the US labor movement regarding the blend of formal and informal education may be relevant and worthy of closer attention. For example, we know from research that senior officers (supervisors) who were prepared for command through a series of leadership (work) assignments, and not by advanced education, are unlikely to value formal education for junior officers (young workers). The recommendations in the report (e.g.,requiring senior officers to include reference to educational achievement in performance reports and revisions to selection and promotional requirements) do not reflect an adequate understanding of the resistance these leader career experiences create to the implementation of an expanded program or the effects of attitudes of the workforce towards education.

- In addition to the top-down strategies to ensure leaders steer their subordinates to higher education recommended here, more emphasis on *strategies to encourage the self-directed participation* among the junior and mid-career personnel. For example, embedding requirements for advanced education for promotion and highly regarded officer assignments, or making career and educational counselors, including peer educational counselors, widely available have proven to be effective strategies in encouraging participation in formal education.

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Dr. Newt Gingrich

Dr. Newt Gingrich was the first Republican Speaker of the House of Representatives in 40 years with the Republican wave of 1994. Most of the legislative items in his well-publicized "Contract with America" were passed by the House and many became law. He has authored several books, and stayed involved in politics, serving as a political commentator and consultant for various think tanks. Dr. Gingrich received a B.A. from Emory University and completed his graduate course work at Tulane University, receiving an M.A. in 1968 and a Ph.D. in modern European history in 1971.

National Security Imperatives

Newt Gingrich
December 10, 2018

The Revolution in National Security will require a dramatic rethinking of professional military education (PME), the Department of Defense, the operations of the State Department, intelligence community, Treasury Department, Homeland Security, and other departments, and finally the operating systems of the White House.

Note that this is more than a revolution in military affairs (to use the old Soviet language); this is a revolution in the entire nature and process of national security.

This Revolution in National Security is so big and so complex that it is being observed piecemeal by different agencies and departments, but no one has put together a comprehensive analysis, developed a strategy for coping with the challenges, or initiated a doctrine for success in this emerging new world.

Since there is no comprehensive analysis, strategy, or doctrine, all current PME (and for that matter, parallel professional education programs in other areas) are essentially inadequate, obsolete, and in some ways, profoundly misleading.

A. The 10 major components of the Revolution in National Security are:

1. With China, we face the rise of a genuine peer competitor on a global basis, with far greater economic, scientific, and technological potential than the Soviet Union ever possessed. Where we could once construct a grand siege against the Soviet Union, and count on free societies out-innovating and out-producing the totalitarian system until it collapsed (the essential premise of NSC-68 in 1950), we do not have the same possibility in dealing with China.
2. In addition to scale, we will have to confront the reality that the Chinese system is radically different than our own, and their thought processes, strategies, and systems are unlike anything that we have competed with, or been threatened by. Up until now, we have been mirror imaging the Chinese as though they were an emerging, "normal" state. In fact, Chinese civilization competes in different ways, using different strategies, and has different patterns than anything that we have ever faced. We will be confronted with a requirement to "change or die" as a civilization, and it is not clear that we can change fast enough or thoroughly enough.
3. The Chinese system of societal engagement will force us to rethink what we mean by national security, and will force the development of new doctrines, new institutions, and new patterns. The Chinese system of permanent competition is far more complex and long-lasting than the Russian model of hybrid warfare. We will be in a permanent state of societal competition with China, and it will force a profound rethinking of our doctrines and our assumptions. When Sun Tzu wrote that the greatest of all generals win bloodless victories (the Art of War 500 BC), he was describing a type of

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competition in which every day is a pre-war day using deception, bribery, corruption and diplomacy to maximize the relative advantage of the aggressor, until they can win a sudden, unexpected war either by the bloodless collapse of their opponent, or by a decisive, surprise, overwhelming, and brief military attack.

4. We will continue to be confronted by a decaying, but still dangerous, Russia with very professional patterns emerging from the Soviet Era. The recent bomber flights to Venezuela, combined with the naval attack against Ukraine, and the continued power projection into Syria, are reminders that Russia cannot be ignored even if it is less important in the long run compared to China. Russia is still a dangerous adversary and our national security strategy must take this into account.
5. There are a number of medium-sized powers that, with the advent of nuclear and cyber capabilities, will have the destructive power and the potential danger previously posed only by major powers. North Korea, Iran, and Pakistan are all countries with the potential to engage in very destructive activity. These are secondary powers with great power lethality. Other countries will be joining them with cyber, nuclear, and other capabilities that will require substantial American investment in containing, deterring, or defeating them while doing so at minimum risk to the American people and the American homeland.
6. Islamic radicalism will be a growing threat in both its state (Iran, maybe others) and non-state form, and will require unique strategies that are outside of our normal patterns.
7. Failed states and the growing threat of very wealthy, very organized international crime organizations (what George Tenet called the Grey World) will continue to threaten the patterns of civilized rule of law, and will represent threats that we have had very limited success in dealing with.
8. The cyber revolution is only beginning, and in its artificial intelligence developments it will revolutionize everything (think of the combined impact of the internal combustion engine and the radio on warfare in the early 20th century). One aspect of the cyber revolution will be that all wars will potentially involve disruptions in the American homeland, and all wars may become global engagements by the very nature of the internet and cyber systems. This will require developing a genuine global command post capable of realtime worldwide engagements.
9. Space will continue to grow in importance in three ways: space to Earth, near space versus near space, and beyond Earth space engagements. Today, the overwhelming importance of space is in transmitting information to Earth. The Chinese anti-satellite test in 2007 was a reminder that anti-space activities are a real possibility and could significantly degrade American capabilities if successful. Today, the primary threats against space assets are from Earth. In the near future, there will be space-based assets threatening space-based support systems. Within a decade, there will be assets beyond Earth that will need to be protected and will have sufficient value that they will induce others to potentially threaten them.
10. Military planning has to be based on capabilities rather than intentions. Therefore American national security planning has to assume the potential for an anti-American coalition that could simultaneously coalesce against the United States, to end what has been a 70-year dominance by the American system. While this coalition war is unlikely, it is far from impossible. Therefore, prudent planning would include war games against such a coalition, and investments to guarantee we could defeat the anti-American coalition. If they know that we can beat them, the odds are very high that the attack will never come. If they think that they could beat us, the potential for an assault on the United States goes up dramatically.

The combination of these ten different patterns will make national security vastly more complicated, and strategic planning much more challenging than anything we have ever dealt with before (with the possible exception of World War II).

We will have to develop new doctrines, strategies, and structures to meet the challenges ahead.

B. Initial suggestions for rethinking our national security systems:

1. We need a “Chinese opfor” at the grand national strategy level, with operational and tactical teams beneath it. We simply have no center generating realistic war games using Chinese models, that also has a willingness to be aggressive both at the grand national strategy level, and at the theater and tactical level. Our war games have not evolved to meet the new threat because we have no real understanding of, or consensus about, the new threat.
2. A brief look at Chinese historic patterns of societal competition will make clear that we need a societal engagement system that is vastly beyond the “all of government” model and is beyond the current Defense Department model. Zones such as the emergence and implementation of 5G technology (where the Chinese societal approach may give them global dominance in the next five years), the real threat of EMP in the civilian economy, the collapse of education at the K-12 level, and the importance of dominating strategic manufacturing and resources, are examples of societal competition that the Chinese take seriously and that we have not even begun to understand.
3. We have to develop a model for real time global warfare, in which a local skirmish could rapidly spread into a cyber assault on the American homeland, and conflict in one region could rapidly spread into conflict in multiple regions.
4. Beyond traditional PME we need a powerful, real-time, lessons learned system. It took far too long to adjust to the combat realities of Iraq after the initial victory. We have to assume the Chinese and potentially other opponents are working diligently to surprise us in ways that, by definition, we will not have prepared for. We have to recognize those surprises, analyze them, develop a response, and disseminate the effective response in the shortest possible time. That requires a very different system than the current PME.
5. In the military world we have to be thinking of joint, multi-domain activities, so that any PME reforms that are service-centered are probably obsolete and misleading. There has to be a common doctrine for how the integrated multi-domain joint system would work. We are a very long way from this today.
6. The new doctrines have to be taught starting with basic training. This is a new model with inherently more complex thinking and behaviors that have to be inculcated from the beginning and then built upon. Similarly, other professional education systems need to make this model and this doctrine part of their education process from the very beginning.

The changes are so great and the threats so powerful that America literally has to change or die.

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Dr. Mark Hagerott, CAPT, USN (Ret)

Mark Hagerott, CAPT, USN (Ret) is the chancellor of the North Dakota University System, a multiple campus university system, holds joint academic appointments (nontenure) in both humanities and engineering schools, and is a New America Cybersecurity fellow. North Dakota is home to one of the largest and earliest Federal Aviation Administration (FAA) certified test centers for unmanned air systems, part of an integrated university-based research program that includes two major U.S. Air Force bases in the state.

In 2014–15 he served as the panel co-lead for battlespace awareness in the Defense Science Board Summer Study of Autonomy. Prior to his move to the Dakotas he served as the Deputy Director and Distinguished Professor of Cyber Operations and Policy at the Center for Cyber Studies at the U.S. Naval Academy.

Previously, Hagerott spent many years in the Navy as a nuclear engineer and ship commander, and also served as a White House fellow and held posts in strategy and programs in the Pentagon. Hagerott has received numerous awards for his work and is widely published in various news outlets.

He is a graduate of the United States Naval Academy and holds an MA in Economics and Politics from Oxford University where he was a Rhodes Scholar. Hagerott also earned a PhD in Science and Technology Studies from the University of Maryland.

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1. Elevating education as a warfare capability, on par with the technologies and platforms we will use throughout the spectrum of conflict, is long overdue and critical for the new "Cognitive Age" the E4S board correctly describes for the future. The organizations that win the next wars will be the ones that learn the fastest and best – just as history teaches, over and over again.

2. The old debate of "generalist vs. technologist" is not as valuable as a tool of analysis as it once was; the overarching need for critical thinking skills and application of technology to strategic education is increasingly compelling, thanks to the arguments made by this report and many others who have written on the subject.

3. A lifelong passion for learning, and achieving academic excellence while pursuing it, should be rewarded on an equal basis with other elements of performance when choosing our next generation of leaders. Education helps to reveal talents of our people, and there is no better laboratory, other than combat, to help prepare leaders to learn.

4. Imperative for Integration/Alignment: As warfare is evolving, the case for improved institutional capacity to provide occasional direction to, and/or Integration of effort, even if individual institutions resist. The "Chief Learning Officer" facilitates these occasional insertions of direction from above, whereas a CNO or SECNAV afforded only the periodic integration by the AERB (advanced education review board??) does not have the time or patience to drive change should individual institutions resist. (Why might individual institutions resist change, even if individual superintendents or campus presidents want to be responsive? As institutions have evolved over time, they inevitably establish increasingly empowered internal stakeholders, alumni groups, tenured faculty, and platform advocates (e.g., at USNA, the platform communities lay claim to academic billets, e.g., nuclear submariners/engineers fill the Division Two Director at USNA; the USMC tradition of filling Division Three director; alumni groups impart a trajectory at all institutions thru the potential distorting effect of directing philanthropy; the sports complex are more powerful than ever before, with some coaches making million dollar salaries, and their supporters able to lobby for tens of millions of dollars of appropriated funds for the Wesley Brown athletic center, which was initially reserved for varsity athletes

and off limits to midshipmen and officers (I saw the 'off limits' sign with my own eyes). Moreover, the chief academic officers of all three (NWC, USNA, NPS), are typically civilian, and may reasonably expect to have career aspirations beyond the US Navy/Marine Corps... If they would receive a 'faculty no confidence' vote in response to reforms, their career in academia is in peril. However, if directed by COMPETENT AUTHORITY from above, a Chief Learning Officer or Chancellor of the Navy, reformers are thus provided more 'top cover' from such faculty pressure).

5. The imperative of reinvesting in education of human beings: As we reflect on the trajectory of warfare/technology, the human factor may be the only, truly, decisive factor which a country can control. As weapons become more digital and informational, they may become more commodified and more quickly diffuse across borders, which has ALWAYS been what technology and information has done historically, but now even faster. Thus, loyalty and persistence advantage, will shift MORE to the human factor of an educated, adaptive officer and enlisted force. (Note: This insight might appear counter intuitive as advanced technology appears to be DESKILLING humans, and reducing the value of humans. However, upon deeper reflection, I believe the reader will come to see the strategic decisiveness of the more effective/adaptive education system... In the long run).

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DEPARTMENT OF DEFENSE
NATIONAL DEFENSE UNIVERSITY
WASHINGTON DC 20319-5066

3 Dec. 2018

MEMORANDUM

Subj: EDUCATION FOR SEAPOWER (E4S) DRAFT REPORT

1. This study offers numerous valuable insights, bold conclusions and concrete recommendations that cover the breadth of the educational enterprise. My own focus is narrower given my interest/location inside the DoD/Joint Staff, a prejudice I acknowledge up front. These are my own personal comments, based on my own Joint and Navy PME experiences and my four decades in OSD and the Department of the Navy. They should not to be construed as representing the views of the Secretary of Defense or the National Defense University.

2. I have six general comments and a general comment on the changing character of warfare:

Structure. I struggled with the study's design and structure. The study did not begin with a sufficiently grounded statement of the critical problem (s), follow up with analysis and data, and proceed consistently to distinctive recommendations. Hence there is something of a scatter-shot array of various problems and solutions struggling for clarity in the presentation of the data and the interviews. I think the great insights of the distinguished members of the panel are lost. A clearer problem statement early in the study and a matrix that cross walks the key issues and key recommendations is strongly urged.

Coherency. I think the study asserts that components are performing well, despite the Secretary's personal observation. The survey data can be a part of that argument but it's not clear the SecDef or CJCS would agree with that. The study orients on enterprise wide guidance, policy and program direction. I was not convinced that this was a problem to be solved or that the proposed enterprise architecture would resolve key challenges in naval culture and educational quality. In fact, the costs would come at the expense of education. The report's assertion and reliance upon the other Service examples lacks any assessment of progress or improved educational outcomes related to oversight, central direction, and greater integration. Moreover, the lack of recommendations, aside from Board precepts, to alter strong cultural inclinations inside the Navy needs to be addressed. In general, I think the coverage of topics and the specificity of the recommendations is very good, but the clarity and compelling logic of the report is lacking.

Service Orientation. The study was executed in accordance with its implementing guidance, but I found it narrow and Service-centric, which is understandable. This limits its audience and message to the larger Defense and Joint warfare community that the Naval Services interact with, and the world that I live within in the Beltway. It also introduces numerous problems throughout the study vis a vis the emergent thrust in Joint PME derived from the National Military Strategy and the associated Capstone Concept for Joint Operations (centered around globally integrated operations (GIO) and Joint warfare). This is an observation that has no recommendation since I presume the naval ethos is self-evident and

expressly desired by the panel. But this is not consistent with the changing character of war, as defined by the Joint warfare community, and it may undercut the utility of some portions of the study if external support or consistency with new changes in officer PME policy are announced.

Study Design and Data Collection. Really liked the historical foundation in the document, for which the literature review is outstanding. But the review was much thinner on current debates about strategic education and war winning (Watts and Krepinevich, Hoffman 2015, Scales, Robinson, Murray, Lacey, Thornhill, Andres, Hoffman 2018). Found the conflation of curriculum and faculty in the survey to be unhelpful. Given the various training and educational (and acculturation when it comes to JPME) challenges posed by the NDS/NMS and Cognitive Warfare in the 21st Century, it would be more useful to separate the design and delivery of curricula from the composition/attraction/ development/retention of both military and civilian faculty. I think this is quite evident in the lack of relevant inputs to questions and the subsequent recommendations that resolve fundamental shortcomings in the quality/delivery of instruction (aside from great recommendations on experiential activities and wargaming) and quality faculty (military and civilian).

Focus and Relevancy. I think the study avoids (and in one case misquotes) key issues raised by the Secretary of Defense in both the published NDS and in more informal guidance. The critical elements deal with Master's accreditation and warfighting. There are presumptions in that assessment that are unchallenged in the report. What is the value of a Master's degree at ILS and TLS? What is the cost of these programs relative to the value, and what are the second and third order consequences of external accreditation and degree granting authority? I favor what we are doing, but the thrust of this study avoids that issue but adds a great deal of managerial oversight (new governance layers, new reporting requirements (futures studies in particular is redundant), and new program oversight processes). Another issue raised by SecDef, more relevant to ILS and TLS, deals with relative weighting of strategy and regional studies over warfare/operations. The SD implies more of a shift towards operational art and away from strategy or regional studies. Sprinkling "lethality" into the report does not address the Secretary's challenge, although the recommendations to stress wargaming is both appropriate and consistent with the NDS. While my experience at Newport may be dated, the current warfighting/operations component of both the Naval War College and Marine War College (but not Command and Staff or SAW) would not satisfy the Secretary's intent.

PME as a Strategic Asset. Furthermore, one area also not captured is an expressed desire by the Secretary to increase the number of foreign students to our schools, something that the Naval War College excels at, in my view. We should acknowledge our international programs, and also justify our leveraging of foreign PME programs especially with the NATO Defence College and in Asia. I think the Department of the Navy should directly look at the SecDef's challenge, and not miss an opportunity to defend its current program of instruction where Newport may be an exemplar of best practices.

2. The exploration of future warfare challenges has been a research focus of mine for the past two decades within the Naval and Joint Warfighting community, so I very much appreciated the study's conception of a cognitive edge in warfare. The concept should be introduced in a

paragraph in the study to lock it is and explain its significance. There was an element of dissonance in the body of the study between enhancing human cognition and relying upon AI/machine learning. The latter could be interpreted as undercutting the human component in warfare and hence the value of education. The panel should clarify its use and meaning of cognition, and its implications for education with greater clarity if it's going to be central to the proposed vision statement for the Naval Services.

Very respectfully,

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3 December 2018

Dear Secretary Modly,

Thank you for the opportunity to review the E4S report. It has many commendable features, and I applaud you for commissioning it. I focus here, of course, on ways it could be improved. I do so not to detract from its importance but rather because the report has the potential to help build an even stronger and smarter Navy.

I organized my comments into five major points followed by a list of specific notes.

1) Tasked with "a comprehensive study of learning throughout the Department of the Navy" (page 1), the committee has responded primarily by recommending the creation of a Naval University and assigning the job of fixing Naval education to the president of that university (page 62, #1). While readers of the report shouldn't have expected a rewrite of every single syllabus, it is unclear to me whether the present report meets the full intent of the study. I do not come away from the report with knowledge about how learning takes place across the Navy, what the quality of instruction is, what gaps exist within the curriculum, what exactly is being learned, and what the costs/benefits are of educating officers within Navy institutions compared to selectively educating them within civilian institutions that inherently have greater depth and breadth. Moreover, the range of solutions presented seem overly focused on organizational/governance solutions (page 299). I wonder whether an emphasis on form will be sufficient. The report reads at times as if it is attempting to avert a strategic failure of Maginot-esq proportions, and yet the main solution is an additional layer of bureaucracy to align the efforts of the existing schools. If it is primarily a coordination problem, it is not clear to me why the existing schools are not coordinating currently. What are the barriers and how does the creation of NU overcome them? Could a new governing board for education without a new university suffice? Finally, it seems that the study conceptualizes "learning" too narrowly in terms of activities that take place within educational institutions. The report does not tackle ways in which the DON can harness recent developments in organizational learning. How can feedback mechanisms that enhance learning be improved in ships and subs, for example? How can Navy bases learn from data and enhance evidence-based decision making?

2) In terms of public relations and congressional approval, at least three major DON problems remain salient to American citizens: ship collisions caused by human errors,

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nearly 35 million dollars in intentional fraud, and high rates of sexual harassment and assault. The fact that this report does not address how education reform will reduce the likelihood of repeating past problems seems like a missed opportunity. I would recommend that the report explicitly tie enhanced education to enhanced performance (reduced problems). It could, for example, cite enhanced education in such topics as the psychology of risky choice, contingent probability, machine learning, and management science as ways it will solve such problems as collisions. I do not mean that the entire report should center on redressing specific problems but at least some connection between poor outcomes and proposed educational reform should be included.

3) There's often only a limited connection between the educational qualities the report deems important and the facts the report measures. More specifically, although the report indicates that the kind of thinking required in the "Cognitive Age" -- creative thought, data-informed decision making, and expertise across domains of warfare -- is what the educational system should seek to bestow on DON officers, the report often enumerates things that aren't related to “Cognitive Age” thinking. In Chapter 3, for example, the report provides administrative background material on different education institutions, revealing little about whether they teach “Cognitive Age” thinking. The start of Chapter 4 provides material on distinguished graduate rates, which may or may not be related to ability to think in the Cognitive Age. Thus, a major disconnect appears between the stated goal (enhance Cognitive Age education) and the report’s assessment of the degree to which the DON is presently meeting that goal.

   Perhaps the best measure relevant to the Cognitive Age is self-reported preparation, which appears in the latter half of Chapter 4. Here, however, the data is less useful than it could be because it is reported at too high a level of aggregation and is not sufficiently analyzed. In Figures 14-17, Chapter 4: It would be useful to show/test for statistically-significant differences in perceived levels of preparedness by different commission sources, different educational majors, different year groups, and different jobs (once in the Navy). For example, does someone responsible for cyber operations feel that their education prepared them as much as, say, someone serving as a pilot or SWO? Does someone with a background in the social or behavioral sciences (regardless of commissioning source) feel more or less prepared than someone with a background in the physical sciences?

4) The qualifications and backgrounds of the proposed Naval University's leadership and oversight board, while enormously impressive in military distinction, would not seem to set it up to solve the problems that the report describes. The primary criterion for leadership seems to be military leadership success. This is necessary, of course, but not sufficient, especially given that leadership success is often a product of the very system of education that the report criticizes. It critiques the system for being inadequate to handle the strategic complexities of the Cognitive Age, but then insists that products of that education system should be responsible for overseeing the system's change. Recommendation: the board should increase the number of civilian academics among its numbers. Ideally, it would add membership from the Top-10 universities within the United States, allowing Naval education to stay aware of the latest developments across

sciences (including behavioral, natural, and physical) as well as engineering. In addition, the President of Naval University would ideally be an officer with a PhD.

5) The report could be shortened without loss of important information. The history chapter, for example, seems like appendix material. As is, the history chapter does not address the question of how the Navy's education system is performing today, and only obliquely addresses how the Navy should change to improve. It could do the latter better if it were organized to show how changes occurred and whether they were as effective as the change-designers intended.

Specifics:

- "A bias for decisive action" seems like the wrong slogan. It lacks the nuance called for in the vision statement (managing the strategic complexities of the Cognitive Age). The Cognitive Age would seem to call for sound and unbiased decision making first. If decision making is “decisive” but wrong, what good is it? We learned this lesson when we decisively went into Iraq aiming to confiscate weapons of mass destruction only to find that we were victims of confirmation bias.

- I whole heartedly endorse the recommendation to develop a differentiated talent management system that seeks to alter the incentive structure such that time in school is no longer viewed as a “black mark” or less valued than “time in the cockpit” (page 27) but it is not clear from the report what that looks like or how education fits in. While perhaps considered beyond the scope of the report, a concrete example of how the “wider use of incentives” (page 49, #3) could be used to engage students and faculty in school (via promotion, eligibility for leadership, or financial incentives?) would be welcome.

- The description of report methodology could be improved. Quantitative, qualitative, and mixed are not necessarily "accepted" research approaches. They are generic types, which may or may not be appropriate, depending on the research question.

- The Clausewitz quote at the start of Chapter 1 seems ill-fitting. It implies that education doesn't teach officers anything they don't already know, except the ability to engage in scholarly-sounding banter.

- More learning from the private sector, especially the financial sector, could be incorporated. It provides an excellent model for how AI and human-machine teaming are revolutionizing the world of trading.

- I was surprised to see little to no discussion of reform in ethics education despite salient ethics abuses and the many new academic discoveries regarding ways to improve ethical behavior (for review, see Bazerman & Gino, 2012, *Annual Review of Law and Social Science)*.

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- The idea that “Today’s naval professionals see themselves as members of tribes within the naval sphere, as opposed to actually identifying as naval professionals” (bottom-left full paragraph on page 27) is an important point that should receive more prominent placement. Naval education needs to produce more than just masterful technicians and tacticians within their specialized field. It needs to produce creative analysts, problem solvers, ethical leaders, and even visionaries who have the knowledge and skill required to help develop, and advocate within government for, more effective security strategy.

- The data on page 43, figure 2 need to be more fully analyzed. The fact that Navy individuals graduate with a lower percentage of DGs may arise from a number of factors that merit analysis. For example, the students sent there may not try their best, believing that it will have little relevance to their careers. Another possibility is that the Navy does not send promising students for further education; it sends who students who they think need more training before they can take on challenging commands. Still another possibility is that the differences are driven by different denominators for each group (i.e., dozens of Navy officers and only a handful of Air Force/Army officers). A certain high percentage of DGs for other services may be effectively baked in for political reasons (i.e., "at least 1 of the 4 Army officers should get DG, otherwise we'll look like we're playing favorites.") I myself don’t know that the reason is but someone should attempt to find out through rigorous data analysis. Leaving the data unexplained and making assumptions about the cause makes for an unsatisfying report.

- Page 44: the drawings (top right, comparative network analysis) don't add value.

- The coding scheme on page 48 lacks face validity. For example, it distinguishes comments coded as “observations” from comments coded as “problems” but fails to account for the fact that pointing out a problem entails an observation. Further, it's not clear how mapping interviewees thought in this manner helps describe education in the Navy. It's likely more a reflection of conversational norms.

- Understanding that it is hard to question existing systems, I wonder if the report considered the viability of military schools in an age where information changes so rapidly. If the best and brightest are sent to civilian programs (see page 39), and if information-intensive sciences are evolving at a rate more rapid than ever before, it seems at least plausible that the educational needs of the service in the eras to come could be met by greater reliance on a partnership with civilian institutions. Rather than attempt to duplicate the impressive educational capacity of the many world-class institutions in the U.S. and increasingly online, a sort of ROTC 2.0 that combines tailored graduate degree programs with military specific instruction (possibly delivered online in a seminar format via video conference) might be a better means of achieving many of the goals set forth in the mission statement.

- The report could more comprehensively present the best practices in education across the U.S. services as directed by the RFI (appendix D, paragraph 3). While occasional points of comparison are made (see page 44), there is not as comprehensive a review as there is

for various foreign militaries (Appendix B). Much can be learned, for example, by examining differing approaches to doctoral-level education. Not only do the services differ in the number (Navy lowest), they differ greatly in how they conceptualize what PhD level personnel will do. The Air Force, for example, aims to place PhD level personnel not only in the service academy, but also in strategic command positions.

- Page 49: the meaning of "more practical" in the first recommendation from the interviewees is unclear without a statement of what the interviewee thinks the Navy ought to do. It could be construed as directly at odds with aligning PME with the Cognitive Age.

- Significant typo on page 51: The word should be “faculty,” not “facility” in section header. As you likely know, the document as a whole needs a careful edit. Even the executive summary contains grammatical errors and/or typos. For example, the following sentence is missing the word “to” between “department” and “think.” “Much greater emphasis on strategic education and critical thinking for greater lethality, partnership, and reform is required for the future, to include institutionalized team learning and war-gaming opportunities planned across the entirety of naval careers that enable the leaders of the Department think and fight as a united, coherent naval force in a new era of inter-state competition.”

In sum, the report draws much needed attention to educational reform but also could be improved were time and resources available.

Sincerely yours,

Jennifer S. Lerner

Jennifer S. Lerner, Ph.D.
Thornton F. Bradshaw Professor

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Mr. George Nolfi

Writer, Director, and Producer of film and television: Mr. Nolfi's combination of experience as a professional storyteller and expertise on the federal government have led to his being consulted by a number of government organizations and public interest groups on messaging, strategy, and political communications.

Response:

Dear Mr. Modly,

My general feeling about the E4S draft report is that when it gets very specific, it's quite good, but that the Executive Summary and many of the introductory sections generally are not as good as they could be at pulling the reader in, primarily because they are too abstract and repetitive.

Executive Summary Feels Like It Needs an Executive Summary

That's facetious but makes the point. Imagine the summary you'd get if you were an outsider and sat down with author of the report and said "what did your report say?" The summary should feel like that. The goal of the summary, I believe, is to allow the report impact the widest possible audience by narrating the key findings in a way that the casually engaged reader will retain them and beyond that, be able to repeat them to others in the future.

Engaging the Reader Is as Important as the Substantive Point Being Made

I believe that most reports such as this do not get read fully, or if they are read fully, they are not read thoroughly. If the goal of the report is to drive change then it's crucial that the report's key points are not only relatively easy to grasp, but that the points are memorable, and get passed on to others. That is a very high bar -- and certainly an extreme rarity for institutional writing -- but it should be one of the few principal aims of this report.

Concrete Examples Pull Readers in and Allow You to Make Points in a Memorable Way

While the ability to abstract is one of the key things that makes us human and could not be more important in history of human advancement (mathematics, logic, science) it is not as inherently engaging to our atavistic minds as providing us with a concrete example. There is a reason people choose to read novels and magazine articles and watch movies rather than read bureaucratic documents -- and it's not just that the subject matter of bureaucratic documents is dry. It is the fact that there are too few concrete examples and too little narrative writing, which is the marrying of the concrete with direct or implied sympathetic identification. ("Narrative" is a larger more complex discussion but one we could have in the future.)

The first place that I felt instinctively pulled in to this report was p. 8 (in the Google Doc) where I learned about the unusual (by today's Navy's standards) educational experiences of Farragut, Nimitz, Burke, etc.

The second place was the mention of the USS THRESHER and the aftermath of its loss on p. 9.

I would have liked concrete examples like this early in the Exec Summary. And it's worth noting that both examples were "narrative" in the sense that they created positive sympathetic identification between the reader and the Navy's history and traditions.

The Unexpected Pulls Readers In

The report gets high marks on this front. Its honesty about how little the Navy currently values higher education, particularly as compared to other services (not much), and about the Navy "tribes" and promotion boards have undermined attempts in the past to increase the stature of higher education grabbed me and pulled me in. Most of the written product produced within as large a bureaucracy play it much "safer." Wherever this frankness comes from (mandate from above or the specific authors of the report) I cannot praise it enough from the standpoint of capturing you audience's attention.

Succinctness

One of the strictures from the famous Strunk and White, Elements of Style book is "omit needless words." And everyone has heard the aphorism "less is more." But it leaves open the question of what are the specific words that are needless? And less of what is more?

I believe readers almost immediately judge the sentences they are reading to determine if they are reading anything they need to pay attention to. This generally a subconscious process.

When you give them bland abstraction their minds wander and you lose them. When you give them concrete examples and narrative, they instinctively want to soak that up and retain it. Likewise, when you make an argument they were not expecting (or say it with a bluntness they were not expecting.

Of course, no piece of writing can (or should) be devoid of abstraction, so the general solution is to be ruthless at saying what must be said abstractly in the fewest words possible.

The Bureaucratic Environment

The report had one statement that really stuck with me, and allows me to make my point writ large:

"It is highly unlikely that the greatest naval strategists and leaders of our past, such as Mahan, Ellis, and Krulak, would be successful in today's bureaucratic environment. Simply put, the best naval strategists that our naval education enterprise can produce today will fail without improving the organization in which they operate."

I would argue that bureaucratic language (and presentational style more generally) is one of the core features of the bureaucratic environment that stultifies — both in terms of literally slowing things down, and in terms of hindering creativity.

Rigor and Detail

None of what I've written above should in any way be taken as a denigration of the importance of rigor and detail for the purposes of "readability." The Navy must be rigorous and detailed -- and sober -- in the way it addresses its mission. But if that rigor and detail can come with more concrete examples, strive towards "narrative," and put the reader in the space of the new or unexpected, it will be maximally engaging.

Please let me know if I can be of further assistance.

Best,

George Nolfi

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ADM James G. Stavridis, USN (Ret)

Admiral James Stavridis spent over thirty years in the Navy, rising to the rank of 4-star Admiral. Among his many commands were four years as the 16th Supreme Allied Commander at NATO, where he oversaw operations in Afghanistan, Libya, Syria, the Balkans, and piracy off the coast of Africa. He also commanded US Southern Command in Miami, charged with military operations through Latin America for nearly three years. He was the longest serving Combatant Commander in recent US history. In the course of his career in the Navy, he served as senior military assistant to the Secretary of the Navy and the Secretary of Defense. He led the Navy's premier operational think tank for innovation, Deep Blue, immediately after the 9/11 attacks.

He won the Battenberg Cup for commanding the top ship in the Atlantic Fleet and the Navy League John Paul Jones Award for Inspirational leadership, along more than 50 US and international medals and decorations, including 28 from foreign nations. He also commanded a Destroyer Squadron and a Carrier Strike Group, both in combat.

He earned a PhD from The Fletcher School at Tufts, winning the Gullion prize as outstanding student in his class in 1983, as well as academic honors from the National and Naval War Colleges as a distinguished student. He speaks Spanish and French.

Admiral Stavridis has published six books on leadership, Latin America, ship handling, and innovation, as well as over a hundred articles in leading journals. An active user of social networks, he has thousands of followers on Twitter and friends on Facebook. His TED talk on 21st century security in 2012 has had over 700,000 views. He tweeted the end of combat operations in the Libyan NATO intervention. His memoir of the NATO years, "The Accidental Admiral," was released in October 2014.

Admiral Stavridis

Response:

Thanks for a chance to comment.

I read this carefully and here is my reaction:

First, my compliments to the staff. Very well done! And my respects to SECNAV, Under SECNAV, Admiral Mullen and the remainder of the senior leaders who clearly spent considerable time in this worthy effort.

This is a powerful, data-driven, and sweeping analysis of the challenges the Department of the Navy faces with education. Some of the data about the low quality of officers attending war colleges, for example, are truly shocking and deeply disturbing. While I had heard anecdotal evidence along these lines, it is embarrassing and disappointing to see it laid out in such depth and detail. Clearly we need to fix that immediately.

In terms of the specific recommendations, they seem sensible across the board. A few thoughts:

Rather than rotate the President of the Naval University lock-step between Navy and Marines, I would recommend it be a competition each term, seeking the kind of truly unique officer who can take it on. Over time, I'd guess the Marines would do very well in an open race.

The CLO could be a powerful and important position if we aim high and shoot for a post-University President, for example. We do not need another retired Flag there, in my view. Shoot for a national figure from the world of higher education here. I'd be happy to suggest some names.

More emphasis on technology and the emerging power of on-line education is warranted. In particular, look closely at 2U (publicly traded company) and other emerging companies that have harnessed this to great effect. This is the best route to achieving scale quickly, and accommodating the challenging career patters of our naval forces.

In the end, implementing this will be a matter of will. The President must have true budge authority over the various elements of the educational domain. The reason the DNI position remains weak and tenuous in the intelligence community is a lack of true control over the various agency budgets. There are significant lessons to be learned (and pitfalls to be avoided) looking at the torturous journey of the DNI position.

Hope that helps, and I cc several very close friends involved in the effort -- to all, again, I say very well done. BZ

V/R

Jim

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Dr. Joesph (Jay) Walsh

Vice President for Research, Northwestern University Dr. Jay Walsh began his service as the University's Vice President for Research on December 1, 2007. Over the past few decades as a professor of Biomedical Engineering, his research has focused on diagnostic and therapeutic applications of light. He serves on the Board of Governors at Argonne National Laboratory, the MIT Corporation Visiting Committee for Sponsored Research, and on the Board of Directors of the Chicago Council on NATO Training Mission-Afghanistan in 2011.

Response:

Top-line assessment of the E4S Study
J. Walsh
Dec 3, 2018

This is a comprehensive, well-done study with conclusions and recommendations that aim to significantly improve naval education and change the culture regarding education in the navy.

The need for a strategy for education that cross the entire Navy is obvious. While in the past, the Navy could overpower enemies with superior technological assets, it is manifest that education will be the key differentiator against a technological near-peer. The reports call for a strategy and a high-level (three star) person to lead the development and implementation of the strategy is excellent. The call for centralized thinking about and resourcing of education from top-leadership to the newest enlisted recruits is well considered.

There is a call for education to be delivered with contemporary methods – for example, on-line learning. Just as the US Navy is significantly advantaged relative to our enemies by the Nation's industrial base, so too should the Navy take advantage of the excellence of the Nation's world-leading high education system by continuously learning new methods from that sector and enrolling navy leadership (where appropriate) in programs at our best universities. Every day, executive education is delivered by the nation's universities to industry leadership (both established leaders as well as those rising fast within an industry). Some of the executive education programs are business based; others deliver more technical skills. In some cases, these programs are tailored to specific companies. The Navy should have programs of a similar nature within leading universities for its current and rising leaders.

While the call for a three star leader for education seems obvious, I do not know enough to intelligently comment if the proposed Naval University will achieve the stated goals.

The call for naval personnel to be life-long learners, and for their promotions to be dependent upon documentation of the learning is wise, timely, and increasingly standard in industry.

There is a brief reference on page 14 to the link between research and education. Many decades of experience in civilian universities has shown educational outcomes are significant when the two are linked.

The concerns about the financial constraints at some of the navy's educational institutions as well as the concerns about the quality of matriculating students should be taken seriously. Further, the comment about the Navy's apparent under-valuing of education (e.g. see page 49) is a concern. Remedies and metrics of success to mitigate these concerns should be developed and implemented.

GEN Anthony C. Zinni, USMC (Ret)

General Anthony (Tony) C. Zinni, is a retired four star United States Marine Corps general. He served his country in numerous diplomatic roles, as the U.S. special envoy to Israel and the Palestinian Authority and in missions to Pakistan, Somalia, Eritrea and Ethiopia. General Zinni retired from the U.S. Marine Corps in 2000. In his final tour of duty, from 1997 to 2000, he was commander-in-chief of the U.S. Central Command.

General Zinni completed his undergraduate degree in economics at Villanova University. He earned graduate degrees in international relations from Salve Regina University and in management and supervision from Central Michigan University. General Zinni has been awarded honorary doctorates from Villanova University; the College of William and Mary and the Maine Maritime Academy.

He has held academic positions that include the Stanley Chair in Ethics at the Virginia Military Institute, the Nimitz Chair at the University of California, Berkeley, the Hofheimer Chair at the Joint Forces Staff College, and the Harriman Professorship of Government at the Reves Center for International Studies at the College of William and Mary. He has worked with the University of California's Institute on Global Conflict and Cooperation and the Henry Dunant Centre for Humanitarian Dialogue in Geneva.

He was Chairman of the Board of BAE Systems Inc., and a member of the board of Dyncorp International before being appointed an executive vice president. He also served as president of International Operations for M.I.C. Industries, Inc. General Zinni is the author of two best-selling books on his military career and foreign affairs: *Battle Ready* and *The Battle for Peace*. His most recent book, *Leading the Charge*, was published in 2009.

General Anthony Zinni

Response:

I would first commend the study group on producing a great analysis of the need to improve our naval education structure and concept. All recommendations are solid in my view. As an old manpower guy (one tour as penance) who managed officer programs, I did not see the cost and effect in manpower terms. The T2P2 will go up for sure. Will we get added manning to support this? What is the selection criteria? Will education be tied to promotion, command selection, etc.? Will off-duty, online, and other non-institutional education be valued the same as residence education? Can time in grade be expanded to meet all the "wickets" for high demand criteria specialties? --Tony Zinni

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CDR Jonathan "Flopper" Murphy
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NAVADMIN 18263 (UPDATE TO NAVY GRADUATE EDUCATION PROGRAM)

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SUBJ/UPDATE TO NAVY GRADUATE EDUCATION PROGRAM//

RMKS/1. This NAVADMIN announces policy changes to in-residence graduate education (IRGE) programs for Unrestricted Line (URL) communities. The Navys Graduate Education Program supports our National Defense Strategy by developing Navy leaders who understand the art and science of warfighting and can lead in complex strategic environments. In-residence education programs provide the best opportunity to mature critical and/or strategic thinking skills.

2. Beginning in fiscal year 2019, administrative boards will screen the most fully qualified, due course officers for top-line, key competitive IRGE and in-residence Joint Professional Military Education opportunities, such as Naval War College, Naval Postgraduate School, Fleet Scholar Education Program, Olmstead Scholar and other similar programs. Tuition Assistance, Graduate Education Vouchers and other opportunities will remain available without the board selection requirement.

3. Starting with fiscal year 2020, statutory and administrative boards shall adhere to revised precept language that makes clear the Navys expectation that we invest in developing future Navy leaders as critical/strategic thinkers through attendance at IRGE programs.

4. Officers in year group 2015 and beyond will be required to graduate from an in-residence program prior to assuming Major Command. Officers will be

able to screen for Major Command before completing the in-residence requirement to allow maximum career flexibility. For the purpose of this policy, IRGE is defined as a completion of a graduate degree or professional military education program allowing officers to dedicate time in an academic environment. The program may be funded through the Navy or self-funded. Distance learning degree programs and the compressed JPME Phase II course at Joint Forces Staff College will not count toward this requirement.

5. This message will remain in effect until superseded or canceled, whichever comes first.

6. Released by Vice Admiral R. P. Burke, N1.//

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