

# Developing an Education Strategy for URL Officers

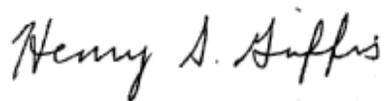
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A handwritten signature in black ink that reads "Henry S. Griffis". The signature is written in a cursive style with a large initial 'H'.

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## Executive summary

This study supports the development of an Education Strategy for unrestricted line (URL) officers. Motivation for this study is the widely held belief that the Navy does a good job developing officers within their warfare communities but a less effective job of preparing them for the later stages of careers, when assignments require a variety of expertise beyond primary warfare areas. Consequently, the primary focus of the study was the latter stages of an officer's career.

## Interviews

We started by identifying requirements for assignments on staffs of operational commanders. We interviewed several operational commanders, who identified eight areas of expertise as requirements for their staff and also areas where they were deficient:

1. Critical thinking
2. Written and oral communication
3. Knowledge of other services
4. Knowledge of joint operations
5. Broad knowledge of the Navy
6. Expertise in operational planning
7. Cultural awareness
8. Expertise in fiscal issues.

The operational commanders also strongly believed in the Navy's culture of command and that it produces the leaders that the Navy and the Nation need. They did not want to weaken the culture of command while making improvements to staff officers.

Next, we met with warfare community leadership and discussed their perspectives on education and their response to the requirements identified by the operational commanders. The community leaders made the following observations:

- They agree with the importance of the command culture.
- A technical degree is vital for some communities, especially the submarine force.
- The training schedule is extremely tight, so we should look at ways to make education and training efficiently meet the needs.
- Career path changes have recently been made to address joint requirements.
- The existing process can accommodate talented staff officers; board precepts need to contain explicit guidance.

Then, we spoke with the leaders of the Navy's education establishment to get their perspectives on education in the officer corps and their responses to the issues raised in our earlier discussions. In summary, the educators told us the following:

- They are concerned that the Navy does not value education.
- They would welcome an education strategy with enough specificity to design education programs and align resources.
- Their programs are oriented toward the needs of the Navy.
- They have ideas for how to expand and/or add programs focused on critical thinking.

Our last round of discussions was with junior officers (JOs). We asked them questions regarding both undergraduate and graduate education, and we received the following feedback:

- A technical undergraduate education is not important because the Navy gives sufficient community training to new officers.
- All of the officers expect to get a graduate education. They are motivated by (1) a belief that it is a requirement for promotion to senior grades and (2) preparation for a second career.
- The officers preferred in-resident education but realized that this was not an option for many of them. They believe that the Navy does not care where they get a Master's degree (at an Ivy League school or online at a diploma mill), but they certainly do care.
- The JOs noted that they had little time or command support to take graduate education, either during or after work hours.

## Insights

Numerous issues were raised during the foregoing discussions, which we further explored. We obtained the following insights.

There are many reasons for graduate education:

- Enhance critical thinking skills, needed in all senior positions
- Provide specific expertise (e.g., financial management)
- Provide Navy and Joint Professional Military Education (JPME), which is required for many Joint assignments
- A graduate degree is a recruiting and retention incentive.

Officer career paths are busy, however, leaving precious little time for graduate education. The Navy needs a mix of education delivery options to provide education that is integrated into officer careers.

The Navy does an uneven job of providing education at the right 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—that is, 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.

The poor timing of education causes problems with the use of graduate education. The Navy educates sufficient personnel in specific subject areas to meet Navy requirements, but very few are assigned to billets where these skills are needed. The constraints of officer career paths mitigate against personnel using their graduate education.

Barriers to implementation of an education strategy are numerous:

- Commands have incentives not to support graduate education.
- Education funding regulations may be out of date.

- The Fitness Report (FITREP) process is indifferent to resident graduate education.
- Education opportunities are poorly advertised.
- 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).

## Recommendations

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.

Second, 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.

Third, the Navy should *expand PME* to broaden officers' knowledge of the Navy beyond their own communities.

Fourth, to *increase education utilization*, the Navy should rethink the p-code process to attain a system that provides education when needed.

Fifth, the 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.

During this study, we considered the need for education and did not address resulting expenditures. It is unclear whether our recommendations would increase or decrease expenditures. Many details of implementation need to be addressed before it will be possible to estimate the fiscal impacts of our proposals.

# Introduction

Complete and execute a Navy Education Strategy, emphasizing the importance of critical thinking, leadership, cultural awareness, jointness, innovation, and adaptability.

*CNO Guidance for 2007*

The Navy's warfighters and leaders are products of the Navy's own personnel system. The Navy educates them, trains them, assigns them, mentors them, rotates them, and promotes them. The Navy is fully accountable for the quality of the preparation officers have for their jobs.

Careers can be broken into phases, and so can the education requirements. In the first phase, a URL officer is focused on the operations of his or her platform. The officer is responsible for making sure that platform can perform all missions assigned. That requires a considerable degree of technical expertise, which is gained in college, in Navy training after college, and on the job in operational units. In the next phase of a career, officers prepare to take on leadership roles in their warfare communities, contribute to the management and shaping of the future Navy, represent the Navy in joint commands, and contribute to relations with allies and potential allies. Their tasks build on technical knowledge and operational experience but also require decision-making in complex military and nonmilitary environments.

Some of the latter skills are learned through progressive leadership positions and responsibilities. But frequently that learning is not sufficient. The Navy must provide these additional skills through some form of formal education. This education must be managed by the Navy within a framework that folds it into officer career paths.

This paper seeks to provide some of that framework and identifies the challenges within the framework. It seeks to bring us closer to an education strategy.

All officers—indeed, all personnel—require education. URL officers, however, provide the greatest challenge to the development of an education strategy: they man the widest variety of billets, their education requirements are comparatively ill defined, and their career paths have the largest challenge in finding time for all desired assignments. Consequently, the study focused on URL officers. In addition, there is general agreement that the Navy does a good job in preparing officers for early assignments within their communities but has more difficulty with preparation for more senior positions. This study, therefore, has focused on senior officers (i.e., O-6 and above).

Our work was based on a series of intensive discussions with different groups of Navy leadership:

- First, we spoke with *operational commanders* and asked them, “What are the skills required for URL officers to fully perform their work on both Navy and joint staffs?”
- Then, we met with *community leadership* and posed the question, “What are the implications of these requirements to careers, assignments, and promotion criteria?”
- Finally, we held discussions with the *education establishment* and asked, “What education and training is needed, and when should it be provided?”

We also held a number of focus groups with junior officers to obtain their opinions and insights regarding education. The series of discussions identified many issues, and we analyzed most, if not all, of them. We performed extensive literature reviews and data analyses (see [1]) and conducted further discussions with pertinent experts.

## Background

The Navy has been thinking about education of its officer corps for many years, and many commissions and panels have addressed the requirements for education; we seem to have these panels every 2 or 3 years. The findings of the panels have some common themes. They all say something along the following lines:

- The Navy requires an educated officer corps.
- Education should be a continuum over the course of a career.
- Education should be directed at the needs of the Navy.

The following synopses of two reviews of officer education from many years ago show that many issues have been with us for a long time, and that progress has been attained, albeit gradually.

### 1919 Knox Report

Reference [2], known as the Knox Report, produced a set of recommendations that crafted a continuum of PME for naval officers. A major thrust of the Knox Report was identification of the need for both an advanced education and practical experience:

The opinion has generally been held, in the Navy, that the only way to learn things is to do them. This opinion has had much truth and fact to justify it, but has been undergoing a marked transformation in recent years. It is becoming more and more that although one cannot learn to do a thing by merely being told how it is done, such previous knowledge greatly facilitates learning how to do it when practical work is started. This knowledge affords its possessor a strong foundation, barren and useless in itself, but a firm basis upon which to build the structure of practical experience. Book learning, abstract knowledge, is like fertilizer; it does not of itself produce anything, but it stimulates growth and advance when the live seed, practical experience, is instilled in the soil.

The recommendations of the Knox Report are all still topical:

- Educate to attain unity of action.
- Require recurring education and give officers the time to get it.
- Establish specialties to enrich officers and the officer corps.
- Develop a plan to implement the recommendations.
- Establish a permanent board to supervise the educational enterprise.

## 1948 BUPERS Board on Education of Line Officers

After World War II, the Navy reviewed the need for education in line officers. The Chief of Naval Personnel convened a board to study and recommend a program of education and training to best fit line officers for high command [3]. Key excerpts from the board's findings follow:

The Board approves in general the present system of training and education for high command except as noted in the following recommendations.

- Divide an officer's career into two parts:
  - First eighteen years of service
  - After the eighteenth year of service
- The first assignment of formal education should begin at the end of five years' commissioned service. It should comprise:
  - General line course
  - Courses other than the above to insure education in the various specialties inherent in the Navy
- The second assignment should be during the first three years in the grade of lieutenant commander. It should comprise:
  - A Command and Staff Course (at the Naval War College)
  - From this course, a specified group of officers should attend one of the following schools:

- The Armed Forces Staff College, Norfolk, VA
  - The Command and General Staff College, Ft. Leavenworth, KS
  - The Air University, Maxwell Field, AL
  - The Air War College, Maxwell Field, AL
  - Air Command and Staff College, Maxwell Field, AL
  - Amphibious Warfare School, Quantico, VA
  - Marine Corps Command and Staff School, Quantico, VA
  - Anti-aircraft and Guided Missile Course, Ft. Bliss, TX
- The Third Assignment should be during the first three years of the grade of Commander and will be controlled by the Career Planning Board recommended later in this report [see below]
  - The Fourth Assignment should be during the grade of Captain or Flag Officer and will be controlled by the Career Planning Board.

The BUPERS Board recommended that a Career Planning Board be established to make recommendations concerning the education, training, and assignment of officers after the 18<sup>th</sup> year of service. The BUPERS Board further recommended that this Career Planning Board be directly responsible to the Chief of Naval Personnel and that its membership comprise three admirals and four captains. As we will see later, this recommendation is still very relevant today: our current Navy requires better management and career development of Navy officers, for assignments in positions that extend beyond their warfare specialties—which includes most senior billets.

In more recent years, numerous high-level panels have considered education in the officer corps. We have read many, if not all, of the reports, and have endeavored to build on them. Most of these reports are worth reading: the panel lead by VADM Harms (CNETC) in 2003 [4] and some CNA research from the 1980s [5] provide a good representation of earlier reports.

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# Discussions

## Operational commanders

The focus of the study was on unrestricted line senior officers. We wanted to start the study by identifying expertise requirements for such officers. We went looking at commands that exemplify these requirements. We interviewed component commanders and asked them, “What are the skills required for URL officers to fully perform their work at both Navy and joint commands?”

We spoke with five fleet commanders: Pacific Fleet, Seventh Fleet, Fifth Fleet, Sixth Fleet, and Third Fleet. The admirals all thought this was an important issue and gave us hours of their time. Before giving their responses, it is worthwhile to reflect on the diverse nature of their commands. Table 1 provides characteristics of the commands.

Table 1. Operational command environments

	PACFLT	3rd Fleet	5th Fleet	6th Fleet	7th Fleet
Tours	2 -3 years	2-3 years	1 year	2-3 years	2-3 years
Officers	160	83	139	209*	76
Role	Complex theater	Operational & Training	Complex theater	"3" Theaters	Complex theater
	NCC & Force Provider	Little COCOM interaction		NATO-centric	
		Sea Shield, Missile defense			

\* includes NAVEUR

The commands have a wide variety of sizes, assignment lengths, and roles. So, it is striking that the commanders provided very similar input on the requirements for their staff. Table 2 summarizes their

comments. It is also noteworthy that all of the commanders noted that the following areas of expertise were both requirements for their staff and areas where they were deficient.

Table 2. Summary of component commander feedback

	PACFLT	3rd Fleet	5th Fleet	6th Fleet	7th Fleet
Written & oral communication	X	X	X	X	X
Other Services	X	X	X	X	X
Joint operations	X	X	X	X	X
Operational planning	X	X	X	X	X
Fiscal Issues	X	X	X		
<b>Critical thinking</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Cultural awareness	X	X	X	X	X

Table 2, our “statement” of requirements, requires amplification.

- **Written and oral communication.** Everyone stressed the importance of communication skills and noted the poor ability of staff to write a concise description of an issue. The move from well-crafted point papers to flashy PowerPoint presentations has been a step backward in communication. The highlight from COMSIXTHFLEET reflects his concern with overall communications: the ability to listen and understand body language is also important, especially in the multinational environment of the Sixth Fleet.
- **Other services.** The need to understand the other services is crucial for successful functioning in a joint environment. Navy officers need to understand what motivates representatives of other services and to work with them to build consensus positions. The highlighted response from COMSEVENTHFLEET reflected his concern that this goes beyond understanding other services and extends to having a broad understanding of the Navy. A staff officer at Seventh Fleet needs to be able to describe Navy capabilities to other services and foreign military staff. For example, an aviator may need to describe the capabilities and value of the submarine force in the Korean peninsula.

This requires officers having a broad knowledge of Navy capabilities, something that is lacking in many officers, and indicates the need for improved professional military education.

- **Joint operations and operational planning.** It's no surprise that the commanders noted the importance of joint knowledge in today's Navy. They also stressed the need for understanding of operational planning, and they highly valued graduates of the Naval War College's Navy Operational Planner Course (NOPC) and the Army's School of Advanced Military Studies (SAMS) course. They noted that the "go to" guys on their staffs are not necessarily the Navy's front-runners. Front-runners typically have lots of operational experience but may not have much understanding of staff operations. Staff expertise in operational planning may reside with officers who are not front-runners. This is especially true in the Fifth Fleet, where the short (1-year) assignments do not allow officers much time to get up to speed. The tension between operational and staff experience is important, goes to the essence of officer development, and is analyzed in detail later in this report.
- **Fiscal issues.** A majority of the commanders noted the value of having staff that understand the arcane world of Navy finances. Knowledge of the Program Objective Memorandum (POM) process and experience in OPNAV N8 is valuable.
- **Critical thinking.** Everyone noted the importance of being able to tackle complex problems. It's a defining characteristic of much of the work encountered by their staff. Critical thinking is an essential capability for undertaking such work. We highlight this issue because it is not only a crucial capability but also a 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.
- **Cultural awareness.** Everyone noted the importance of cultural awareness and drew a distinction between cultural awareness and language expertise. They did not see a need for their staff to speak the local languages. The Fifth Fleet Commander went further: he did not want his staff to speak Arabic with the local

population in official communications because Arabic is a complex, nuanced language, and it is easy to miscommunicate if you are not an expert; a little knowledge is dangerous. Instead, he had professional interpreters for the occasions when a knowledge of Arabic was required and wanted the remainder of his staff to understand local customs and speak English. This concern was reinforced later in the study by an observation from ADM Donald (Naval Reactors), who noted that the protocol for the hotline between the U.S.A. and the U.S.S.R. was that each nation sent messages in its own language. When it's really important, we need to speak in a language we truly understand.

## Community leaders

Our next discussions were with the leaders of the warfare communities. We had the opportunity to meet with them together, for a group discussion. We spoke with the following:

- Deputy Commander, U.S. Fleet Forces
- Commander, Naval Surface Forces
- Commander, Naval Submarine Forces
- Commander, Naval Network Warfare Command
- Commander, Naval Air Forces
- Commander, Navy Expeditionary Combat Command
- Deputy, Naval Reactors.

We described our conversations with the operational commanders, including the requirements articulated in those discussions, and asked them, "What are the implications of these requirements to careers, assignments, and promotion criteria?"

The community leaders were very interested in this topic; they gave us many insights, and several of them had followup conversations with us. One evident take-away from our study is that Navy community leaders understand the importance of an education strategy and very much want to have one. We summarize their comments:

- Career paths are extremely tight.
- Changes have been made recently to address joint requirements.
- The officer management process can accommodate talented staff officers.
- Operational commanders are satisfied with the technical proficiency of Navy officers because of the community leaders' processes.

Once again, we elaborate on the leadership comments.

- **Career paths are extremely tight.** There is not enough time in URL careers for officers to readily do all the things the Navy would like them to do. Officer careers have always been busy, and the addition of joint requirements, as required by the Goldwater Nichols Act, puts great stress on officer careers and makes it very difficult to find time for education. This was the most important and far-reaching observation from the community leadership. We explore the tightness of career paths and the ramifications in detail later in this report.
- **Recent changes address joint requirements.** It has not been easy to find time for joint requirements in a Navy career, and the Navy has taken many years to overcome this constraint and fully embrace jointness. In recent years, however, joint education and experience has been integrated into officer careers. For example, the Navy is sending its best and brightest for joint education at the Naval War College. It may take a while for the results of these actions to become apparent; cohorts with joint knowledge and experience need to age.
- **The officer management process can accommodate talented staff officers.** Promotion within the URL is restricted to officers on the command track: being screened for executive officer (XO) is a prerequisite for becoming a commander, and having a commander command is a prerequisite for becoming a captain. There is good reason for this. 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. However, the community leaders also appreciate the value of good staff officers and believe that there is room within the officer management process to reward talented staff officers. They observed that it is both necessary and possible to accomplish this by including appropriate guidance in promotion board precepts to permit promotion of a small number of excellent staff officers.

- **Operational commanders are satisfied with the technical proficiency of Navy officers because of the community leaders' processes.** There is a general belief that the Navy is a technological institution and that a certain amount of technical proficiency is required by all Navy officers. The extent of required technical proficiency is a matter of debate, with no clear-cut answer. There is also some division between the major officer communities, with the submarine community expressing the most concern that the Navy should increase the percentage of officers with a technical/engineering undergraduate education. We address this topic in detail later in the report. We raised this issue with the operational commanders, and they were all content with their officers' technical proficiency. The community leaders noted that this is due to officer career development: the community leaders ensure that officers have the required technical education, training, and operational exposure.

We also had a lengthy discussion with the Commander, Naval Reactors, who was concerned that, by focusing on the latter stages of an officer's career, we not lose sight of the need for technical understanding in Navy officers. He made numerous observations regarding the nature of today's Navy and the need for technological understanding:

- Look at campaign analysis, where the U.S. is leveraging technology to overcome a larger force.
- The Navy is building ships with smaller crews, where there is more demand for technology.
- Modern warfighting systems are highly complex, and to be able to use them, you need to understand the technologies.

## Education establishment

We continued our discussions with the leadership of Navy education institutions:

- United States Naval Academy (USNA)—Superintendent, Academic Dean, department heads
- Naval War College (NWC)—President and various deans
- Naval Postgraduate School (NPS or PG School)—President, Provost, deans
- Naval Reserve Officers Training Corps (NROTC) program management.

We gave them the findings of our earlier discussions and asked them, “What education and training is needed and when should it be provided?”

The educational institutions have different missions from each other, and they focus on different topics. Their comments reflected this, and we provide some details below. However, they all provided the same comments with regard to some broad and basic issues:

- They are concerned that the Navy does not value education.
- They would welcome an education strategy with enough specificity to design education programs and align resources.
- Their programs are oriented toward the needs of the Navy.
- They have ideas for how to expand and/or add programs focused on critical thinking.

Their comments identify major issues and require amplification.

- **They are concerned that the Navy does not value education.** The Navy education establishment is frustrated with the lack of Navy support for its initiatives and endeavors. There have been many Navy education initiatives during the past 50+ years, but progress has been painfully slow. The Navy may say that it values education; however, when it comes to assignments, operational

concerns always outweigh education requirements, resulting in education taking a back seat. This concern is at the heart of this study and points to the major impediment of implementing an education strategy—namely, that there is not enough time in an officer career to meet all operational needs and also obtain in-residence graduate education. A successful education strategy not only needs to have the education establishment provide necessary programs but also requires education to be integrated into officer career paths. We address this in detail later in the report.

- **They would welcome an education strategy with enough specificity to design education programs and align resources.** The education establishment feels that it has been making many decisions without policy guidance, or sometimes with conflicting policy guidance. For example, in recent years, USNA had guidance from SECNAV to have 70 percent of students obtain a technical degree, while CNO guidance was 60 percent. USNA has done its best, absent clear guidance, but would prefer to respond to a clear articulation of policy. (The situation with the proportion of technical degree graduates has recently changed, with new policy being staffed through OPNAV and approved by SECNAV.) A similar situation has existed for all education institutions, which have done their best to build programs that respond to Navy needs. However, absent an overall strategy, it's hard to ensure that all programs are appropriate and resources are in the right places.
- **They have programs that are oriented toward the needs of the Navy.** There is a widespread opinion in the Navy that the educational establishment, especially the PG School, is an academic ivory tower that is removed from Navy life and is not responsive to Navy needs. The educators made it very clear that they do not believe this is so, and that they pay great attention to Navy needs and build their programs accordingly. For example, the PG School has a variety of nonresident programs, in response to the difficulties of officers having the time for in-residence graduate education. We explore education delivery methods later in this report.

- **They have ideas for how to expand and/or add programs focused on critical thinking.** Critical thinking is a concept that is commonly used but hard to accurately define. Peter Facione [6] provides an expert consensus on the meaning of critical thinking, “Critical thinking is purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which judgment is based.” All of the educators understood 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

We also spoke with junior officers (JOs), to get their opinions and insights into education. We held a series of focus groups. Each group consisted of a small number of officers from a warfare community; we believed that the different characteristics of warfare communities might lead to community specific responses. We held five such meetings (surface warfare officers (SWOs), submarine officers, TACAIR pilots, helicopter pilots, and NFOs). We asked about both undergraduate and graduate education. Our undergraduate education questions were:

- 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?

These questions were aimed to get some insights regarding the need for a technical undergraduate education. The question about a core technical curriculum arises from the education at the Naval Academy. The curriculum at USNA has a strong technical core curriculum,

which includes calculus, engineering, chemistry, and physics courses. So, every Naval Academy graduate has some technical education, and it is of interest whether the core curriculum or the major is more important.<sup>1</sup>

There was a uniform response from all focus groups. A technical education is not important because the Navy provides sufficient community training to new officers that allows them to function well within their communities. The JOs went further, noting that their work required rote knowledge, and that critical thinking and innovation were not required, or, in some cases, even encouraged. This response was most strongly expressed by the submarine officers, who observed that they were trained to follow detailed written procedures in reactor rooms, with no room for any deviation or questioning of procedures, and it did not require them to make use of their technical expertise.

The foregoing comments need to be considered in the context of a comparative lack of experience and perspective in the officers. However, they do capture the nature of career development: in the early stages of an officer's career, the emphasis is on performance and proficiency, as the officer gains experience in his/her warfare area.

For graduate education, we asked a number of questions.

- How important is graduate education 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?

Their responses were very informative. All of the officers expected to get a graduate education. Their motivations were revealing. The

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1. NROTC programs also have a core technical curriculum, though not to the extent of the Naval Academy.

dominant motivation was that everyone believed a graduate degree was a requirement for promotion to more senior grades. Even if it is not a *de jure* requirement, written into board precepts, it is a *de facto* requirement, as a tie-breaker between otherwise similar officers. Some community managers have told us that this belief is false, and that a graduate degree is not a promotion requirement, indicating a need for the Navy to make clear exactly what it expects from its officers. Another major motivation was personal development, such as preparing for a second career.

The disciplines for their expected graduate education varied and did not provide any insights. Very few of them had any graduate education because they were too early in their careers to have had the opportunity.

The officers much preferred in-resident education but realized this was not an option for many of them, due to career path demands. Consequently, they were reconciled to obtaining a degree by some form of nonresident education (at night, distance learning, etc.). They believe that the Navy does not care where they get a Master's degree (whether at an Ivy League school or online at a diploma mill), but the JOs certainly do care. They see a great difference in quality of education between different institutions and want to pursue "good" programs. There are obvious concerns with the quality of any nonresident graduate education program, and the PG School has addressed these concerns in the design of its programs (more about this later).

The JOs had some strong responses to the question regarding pursuing education on their own time:

- What "own time"? We work 12+ hours a day and would like to spend some time with our families.
- Some of their commanding officers were less than supportive of them taking graduate education, even prohibiting it, as a detractor from their duties.
- They were concerned about being perceived as slackers within their commands if they took any time off to study.

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## Education: purpose and content

We now start to build an education framework for the Navy. We begin by considering the variety of education officers receive, and we address the purpose and content of the education.

### Mental model for education

We consider a top-level view of the role of education in an officer's career, which allows us to view education in the context of how it supports and fits into an officer's career. Our analysis has identified two broad stages in an officer's career:

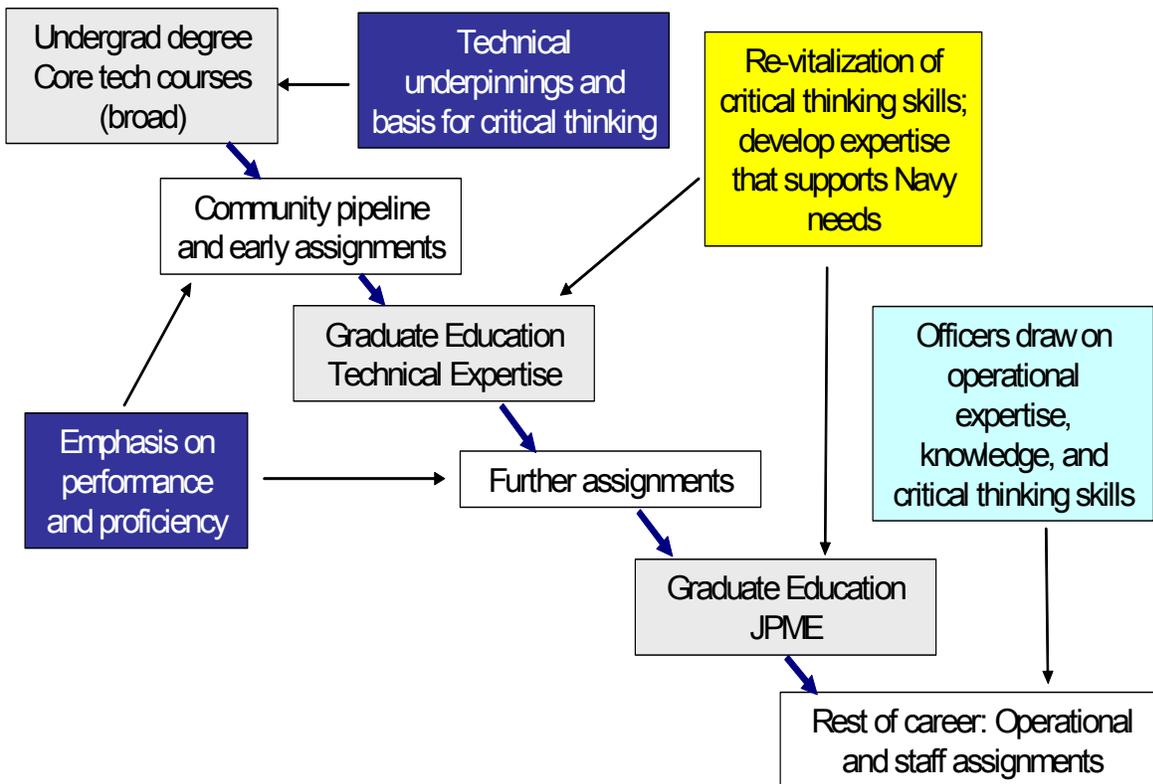
- First stage: emphasis on performance and proficiency in warfare community, requiring technical expertise
- Second stage: emphasis on broad operational issues, requiring critical thinking.

We need an education strategy that enables officer development to meet the requirements of officer careers. A picture/mental model of officer development is a useful tool for understanding how officer development advances. The diagram in figure 1 is our "model" for officer development.

The model shows the flow of officers through a career, and the timing and role of education in officer development. We start with an undergraduate education that provides both the technical background that is necessary for proficiency in a warfare area, and the basis for critical thinking. Then, officers have early assignments within their communities, attaining required community proficiency. Next, officers have two kinds of graduate education, technical (e.g., financial management) and Joint PME (JPME). The education is interleaved with further community assignments. The graduate education revitalizes and enhances critical thinking skills, and develops expertise that supports Navy needs. Officers utilize their cumulative capabilities (knowledge,

experience, and critical thinking) for the remainder of their careers. The challenge for an education strategy is to provide an officer personnel management and career development process that delivers education in this fashion.

Figure 1. Mental model of officer development



It is worth taking a little time to consider the distinction between two related terms: *education* and *training*. This study is supporting the development of an education strategy, not a training strategy. So, we should understand the differences between these two terms.

During our discussions, we frequently talked about the difference between education and training, and heard such phrases as “train for the short-term, educate for the long-term.” The following definitions provide more detail:

- “*Education* encompasses teaching and learning specific skills, and also something less tangible but more profound: the imparting of knowledge, positive judgment and well-developed wisdom. Education has as one of its fundamental aspects the imparting of culture from generation to generation. Education means to ‘draw out’, facilitating realization of self-potential and latent talents of an individual” (see <http://www.teachers-mind.com/htm>).
- *Training* means “to make proficient with specialized instruction and practice” (see <http://firegrantsupport.com/prog/glossary.aspx>).

One can find many other definitions of both education and training, but the above definitions are as good as any in conveying the distinction. There may be no clear boundary between where education ends and training begins, and any education strategy may have some effects on training. However, the focus of this study is on education.

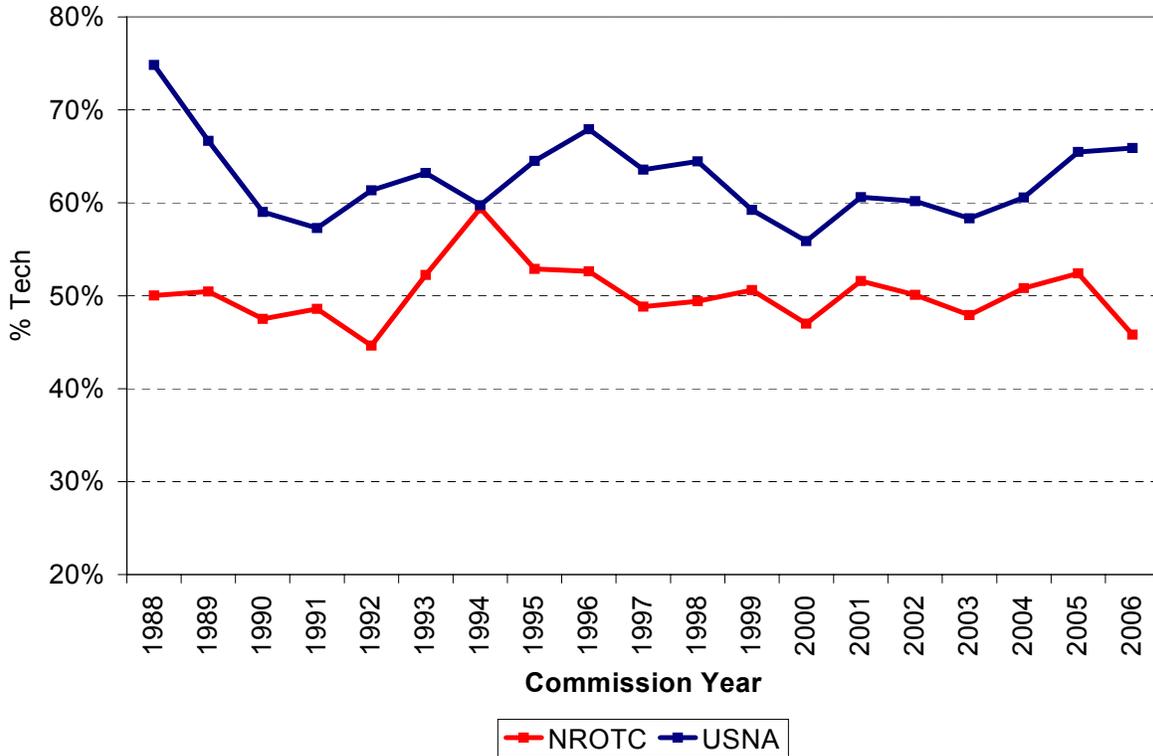
## Undergraduate education

Our mental model notes that, early in an officer’s career, the emphasis is on performance and proficiency, drawing on an undergraduate education. Discussions regarding the nature and content of officer undergraduate education are dominated by one question: “What percentage of officers require a technical education?”

The context of this discussion is a belief that the technological nature of the Navy leads to a requirement that officers understand the technology around them—and that they need a technical education to do that. It is intuitively believable but very hard to prove.

Historically, Navy officers have had strong engineering backgrounds. Until the early 1970s, the Naval Academy offered only one degree, and it was essentially an engineering degree. USNA has since offered various degrees, from political science to mechanical engineering. NROTC programs also offer a wide variety of majors to their students. Figure 2 shows trends in the proportion of officers with technical undergraduate degrees. (For more statistics on undergraduate education and a variety of other education-related issues, see [1].)

Figure 2. Officers with technical undergraduate degrees



Before commenting on the figure, we need to define a *technical degree*. The Naval Academy has three tiers of degrees: Tier I = Engineering, Tier II = Mathematics & Science, and Tier III = Humanities & Social Sciences. A technical degree is any Tier I or II degree. The Navy uses this definition to measure the extent of technically educated officers. However, this definition is not universally agreed on: the submarine community wants engineers (mechanical and electrical engineers) and would prefer to focus on Tier I graduates. Regardless, figure 2 shows fluctuations in Naval Academy graduates with technical degrees in the past 20 years, with a decline being arrested and turned around in the past 5 years. Roughly half of NROTC graduates have had technical degrees. For each of the past 10 years, the percentage of technical graduates has been smaller for NROTC than for USNA.

It is also important to note that all students at the Naval Academy receive a significant technical education, regardless of major: the

USNA core curriculum, taken by all cadets, contains a large number of technical courses. A humanities and social science major will take the following semester-long courses:

- Calculus (3 courses)
- Differential equations (1)
- Physics (2)
- Chemistry (2)
- Engineering (3)
- Ship performance and propulsion (2)
- Naval science (1).

The technical core curriculum complicates an assessment of the need for technical education: should we consider the major, or does it suffice to consider the core technical curriculum?

Many analyses have addressed the need for and value of a technical education (see [7 through 10]). They address the value of education in terms of personal success, by considering whether officers with technical (compared with nontechnical) educations pass training courses and get promoted at higher rates. These studies have some results in common:

- Officers with technical degrees pass initial community training at higher rates than officers with nontechnical degrees. Differences are roughly 10 percentage points (e.g., an 80-percent vs. a 70-percent pass rate)—significant, but not overwhelming.
- After officers have passed their initial training, a technical degree has 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.

Polk, in his Master's thesis [10], shed further light on this topic. He analyzed predictors of success of USNA graduates in the submarine

training pipeline. He showed that two factors—a technical major and grades in the core technical curriculum—are significantly correlated with training success. He also showed that core technical curriculum performance had a larger effect than the major. This suggests that the Navy should focus on the core curriculum and not the major.

This situation is further complicated by the observation that our measures of performance (i.e., individual officer success) do not address and capture the underlying concern, which is that technical expertise is required for operational readiness. In other words, we need to understand the effect of technical expertise on the Navy’s warfighting capabilities. Obtaining such an understanding, however, is a daunting task. Our measures of warfighting capabilities/readiness are poor, and we need to relate our imperfect measures of technical expertise to these poor readiness measures. Consequently, we tend to fall back on measures of personal success (passing training, obtaining promotion, etc.) as a proxy for operational readiness—the implicit assumption being that successful officers have superior operational proficiency—because these are precisely the officers that the Navy promotes and screens for command.

We studied whether there is any evidence that undergraduate major has an effect on tactical readiness. A full description of this analysis is found in [11]. We provide a summary of results here. As noted earlier, a major difficulty with tackling this problem is finding good measures of tactical readiness. We analyzed two distinct readiness measures:

- Navy pilot success in delivering laser-guided bombs (LGBs) against tactical targets in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)
- Battle E winners.

For more than a decade, CNA has collected extensive data on naval aviation LGB employment during combat operations. We analyzed the OEF and OIF data to determine whether the educational background of the pilots had an effect on tactical results.

Battle E winners are judged to be the best ships and submarines in the Navy, so we analyzed the ward rooms of Battle E winners to determine

if undergraduate education was correlated with winning a Battle E. For example, do Battle E winners have a disproportionate number of engineering majors? Our results were clear: there was no discernible relationship between education major and tactical proficiency.

We conclude this section with a few observations and opinions regarding the need for URL officers with technical educations.

First, many URL officers, after a few years of service, make the transition into technical restricted line (RL) communities. The RL communities want to recruit officers with some operational experience and rely on the URL communities as an accession source. For example, the Engineering Duty Officer (EDO) community relies on laterals from the surface warfare and submarine communities, and the Aviation Engineering Duty Officer (AEDO) community relies on laterals from the aviation community. The RL communities are looking for officers with technical backgrounds. So, this use of the URL as an “agricultural” source for the RL imposes a requirement for technically trained officers.

Second, a decrease in officer technical education increases the reliance on chief petty officers’ technical knowledge and on the “black box” equipment working as advertised. Unfortunately, there are many situations in which this will not suffice (e.g., the navigation gear on the plane dies when the pilot is 200 miles from the ship).

Third, the JO focus groups downplayed the need for a technical education, but their limited perspective was apparent. For example, some of the helicopter pilots we interviewed were flying the new Romeos. They did not feel the need for a technical education and relied on their “Gucci equipment” (their words) operating as advertised. When one considers the complexities of antisubmarine warfare, and the possibility of exploiting the latest technology for improved tactical procedures, this blind reliance on equipment seems inappropriate.

## **The need for graduate education**

We now turn our attention to graduate education. There are far more issues surrounding graduate than undergraduate education in an

officer's career. Consequently, the majority of this report focuses on graduate education.

A modern workforce requires and contains many people with graduate degrees. The Navy is no different, and there is uniform agreement that many officers need graduate degrees. Disagreements arise over the extent of required graduate education and how it should be provided. In this section of the report, we analyze the need for graduate education among URL officers. We draw a distinction between graduate education and a graduate degree: in many situations, some graduate education is required, but not necessarily enough to require a graduate degree.

There are at least four distinct reasons why the Navy needs to provide graduate education to its officers:

1. Enhance critical thinking skills, needed in all senior positions.
2. Provide specific expertise (e.g., financial management).
3. Provide Navy PME and JPME (JPME is required for many Joint assignments).
4. A graduate degree is a recruiting and retention incentive.

We consider each of these requirements and obtain some conclusions regarding the need for graduate education in the URL.

Before starting this analysis, we make a point about the nature of the Navy workforce. Numerous officers voiced the opinion to us that the Navy does not have to provide graduate education because civilian employers do not routinely pay for large numbers of their staff to attend graduate education. This perspective regarding civilian companies' support of graduate education is only partially true; many companies invest considerable resources in educating their labor force. However, and more important, this perspective is inappropriate because the Navy workforce is fundamentally different from the civilian workforce. The officer corps is a closed labor market, in which all personnel enter the Navy at a young age. If the Navy needs graduate qualifications among its more senior personnel, the Navy has to

provide this education. Unlike private industry, the Navy does not have the option of hiring staff with graduate qualifications.

## Critical thinking

Leaders agree that critical thinking is very important to the Navy:

- “Complete and execute a Navy Education Strategy, emphasizing the importance of **critical thinking**” (CNO Guidance for 2007)
- “All colonels and captains are skilled joint war-fighters, who are strategically minded, **critical thinkers**” (CJCS Vision for Joint Officer Development)
- Operational commanders stressed the importance of critical thinking during our conversation with them.

Critical thinking is especially important to an education strategy because it is education that enhances a person’s critical thinking abilities. So, it is worth reflecting on critical thinking—to address its meaning and how we may measure improvements in critical thinking abilities.

Critical thinking is a concept that is commonly used but hard to accurately define. During the course of this study, we reviewed a variety of documents and had numerous discussions about critical thinking. We tried to understand what is meant by the term, and how people both obtain and improve their abilities in critical thinking. We gained many insights, though exact knowledge is not available in this arena. A summary of what we learned follows.

To start, we give a couple of definitions:

- “Critical thinking is purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which judgment is based” [6].
- “*Critical thinking* is that mode of thinking—about any subject, content, or problem—in which the [solitary] thinker improves

the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them” [12].

These definitions are similar but certainly not identical. This causes some difficulty when we are trying to determine whether officers have sufficient expertise in critical thinking, and we seek to better understand how people obtain and improve their critical thinking.

Critical thinking is an expertise that people acquire through education, and educational institutions address their role in it. The following is taken from the University of Chicago’s web site:

The objective of our faculty-taught general education courses—which constitute the major component of the first two years in the College—is not to transfer information, but to raise fundamental questions and to encourage those habits of mind and those critical, analytical, and writing skills that are most urgent to a well-informed member of civil society.

Note that the point of the education is not to impart information but to enhance mental capabilities, including critical thinking.

Graduate education further enhances critical thinking, and, as stated earlier, a primary goal of graduate education is the enhancement of mental capabilities and not the particular information learned. Thus, any accredited graduate education program may provide required critical thinking skills. (This does not mean that the particular knowledge/discipline is not important, but its importance does not relate to critical thinking capabilities.<sup>2</sup>)

We are unable to specify the exact amount of critical thinking expertise obtained from graduate education; this is not a capability amenable to precise measurement. We also do not claim that all people are

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2. On a personal note, many years ago I received a grant from the U.K. Science Research Council to undertake my graduate education. The stated purpose of the grant was to “teach me the methods of research.” I thought it was to take a Ph.D.—the Science Research Council knew better. (David Rodney)

unable to obtain critical thinking skills without a graduate education because some people are more capable than others. However, we are aiming for Navy policies that ensure that all senior officers have critical thinking expertise. To obtain this capability among the entire senior officer corps, we need to provide a means for every officer to attain this capability. Graduate education is the vehicle for obtaining this expertise.

The Navy is always searching for metrics, and it is certainly reasonable to ask whether one can measure critical thinking and its impact on productivity and, hence, get an understanding of the value of education. Dr. Julie Filizetti of the Naval Postgraduate School addressed this very issue in her D. Ed. thesis, "Master's Degree Highly Desired: Measuring the Increase in Productivity Due to Master's Education in the United States Navy" [13]. Dr. Filizetti developed a survey instrument that measures productivity gains from higher education for Navy officers.

Testing of this survey instrument has provided evidence that graduate education does indeed improve performance. A Navy-wide implementation would provide valuable insights into the impact of improved critical thinking, and the value of graduate education.

### **Provide specific expertise**

The Navy has requirements for officers with graduate degrees in specific areas. For example, OPNAV N8 requires some officers with a Master's degree in financial management. Graduate degree requirements are articulated in billet subspecialty codes (see [14] for details). The subspecialty code is a five-character field: the first four describe the type of expertise required in a billet, and the last character provides the level of experience. The frequently referred to "P-coded" billets show a "P" in the fifth character of the subspecialty code, denoting the need for a Master's degree level of education. "Q-coded" billets require both a both a Master's degree and a prior experience tour in this area. P- and Q-coded billets provide almost all the graduate-level education requirements (a handful of billets call for doctorate-level education). A tabulation of FY 2006 URL billets provided the statement of requirements in table 3.

Table 3 requires some explanation:

- The column headings are broad areas of study. For example, “Resource management and analysis” includes such topics as operations research and financial management, and officers obtain degrees in specific topics.
- The “Any URL” row refers to billets that may be manned by any URL officer. These are mostly the 1000/1050-designated billets. For example, many N3 and N5 billets on major staffs may be filled by any unrestricted line officer. Collectively, the URL communities need to man the 1000/1050 billets, and each community needs to provide a fair share of officers.

Table 3. FY 2006 URL graduate degree billet requirements

2006 graduate degree requirement	National Security Studies	Resource Manage- ment & Analysis	Applied disci- plines	Engineer- ing	Oper- ations	Any discipline	Total
Any URL	143	138	40	68	116	268	773
SWO	35	79	14	178	161	2	469
Submariner	17	13	6	753	22	2	813
Special Warfare	102	6		3	3		114
Aviator	24	36	5	227	55	2	349
Total	321	272	65	1,229	357	274	2,518

Some of the statements of requirements are imperfect. For example, all DDG CO billets are P-coded for a Master’s degree in antisubmarine warfare (ASW). The “true” requirement may be that all DDGs require someone in the wardroom who is an expert in ASW. However, there is no way to articulate such a requirement in the Navy’s system of manpower requirements, which are expressed solely through individual billets. Perhaps the Navy should review how requirements are articulated and address this issue. Until this happens, this is the system the Navy has, and we need to address how to provide educated officers to meet these requirements.

The challenge for the Navy is to both educate a sufficient number of officers with the appropriate knowledge and assign them to the billets that require their expertise. We explore education utilization issues later in this report.

## Provide Navy and Joint PME

The Department of Defense is a joint organization, and officer development occurs in this context. Officer careers are planned and organized to develop joint warfighters. Professional Military Education enables development of fully joint officers and leaders. Reference [15], CJCSI 1800.01C, *Officer Professional Military Education Policy (OPMEP)*, promulgates PME policy and describes PME objectives:

PME—both Service and Joint—conveys the broad body of knowledge and develops the habits of mind essential to the military professional’s expertise in the art and science of war. The PME system should produce:

1. Officers educated in the profession of arms who possess an intuitive approach to joint warfighting built upon individual Service competencies. Its aim is to produce graduates prepared to operate at appropriate levels of war in a joint environment and capable of generating quality tactical, operational, and strategic thought from a joint perspective.
2. Critical thinkers who view military affairs in the broadest context and are capable of identifying and evaluating likely changes and associated responses affecting the employment of US military forces.
3. Senior officers who can develop and execute national military strategies that effectively employ the Armed Forces in concert with other instruments of national power to achieve the goals of national security strategy and policy.

Reference [15] describes a PME continuum throughout an officer’s career:

1. Precommissioning—prepares officer candidates to become commissioned officers within their prospective service

2. Primary (grades O-1 to O-3)—prepares junior officers to serve in their assigned branch or warfare or staff specialty
3. Intermediate (O-4)—expands understanding of joint force deployment and employment at the operational and tactical levels of war
4. Senior (O-5 or O-6)—prepares for positions of strategic leadership
5. General/flag officer—prepares senior officers for high-level joint, interagency and multinational responsibilities....

The Naval War College (NWC) further defines the outcomes of PME [16]:

- Officer primary PME
  - Versed in the essentials of naval power
  - Effective maritime spokespersons
  - Versed in service capabilities and the fundamentals of joint warfare
  - Prepared as maritime advocates within the joint arena
- Officer intermediate PME
  - Skilled in applying OPART to maritime, joint, interagency and multinational warfighting
  - Skilled in Joint/Navy planning process
  - Capable of critical thought with operational perspectives
  - Prepared for operational level leadership challenges
  - Effective maritime spokespersons
- Officer senior PME
  - Skilled in formulating and executing strategy and U.S. policy
  - Skilled in joint warfighting, theater strategy and campaign planning

—Capable of strategically-minded critical thinking

—Capable of excelling in positions of strategic leadership.

It is worth commenting on some key required outcomes of the PME continuum:

- **Critical thinking.** Once again, we see the identified need for critical thinkers and the role of graduate education in building/enhancing these intellectual skills.
- **Effective maritime spokesperson.** A Navy officer needs a broad understanding of the Navy to be able to speak for the Navy to other organizations. Consequently, officer education needs to go far beyond the knowledge an officer acquires of his/her own community, to include the full spectrum of naval capabilities.
- **Expertise in joint warfare.** As noted previously, the Department of Defense is a joint organization, and all officers need to understand how to operate in a joint environment. JPME I and II and joint tours are providing this joint expertise.
- **Knowledge of operational planning.** Planning joint operations is an arcane complex process, and the Navy needs and values officers with this expertise. The Naval War College's NOPC course provides highly valued graduates to the operational forces.

Joint education is also required to be eligible for many joint assignments. A significant subset of joint billets are specified as critical standard-joint duty assignments (critical S-DJA) [17]. Critical S-DJA billets are filled by Joint Qualified Officers (i.e., have completed JPME I and II, and have joint experience), unless waived by the Chairman of the Joint Chiefs of Staff.

## A recruiting and retention incentive

A graduate education acts as a recruiting and retention incentive. Today, a graduate degree is a norm for many professions, and a large percentage of the workforce expects to obtain a graduate degree at some point. Navy officers are part of this workforce, and most officers assume that they will get graduate degrees, which will be of value to

them, either in the Navy or in a subsequent career after they leave Navy service. The attractiveness of a Navy career is enhanced when the Navy provides opportunities for its officers to receive graduate education, and, consequently, providing graduate education enhances the Navy's ability to recruit bright officers.

The effects of graduate education on retention are difficult to measure. Some officers may wish to leave the Navy and use their graduate education to start a new career. However, officers acquire service obligations when they receive graduate education, after which the pull of the 20-year retirement pension ensures that many officers will stay on active duty. Also, as noted previously, a graduate education enhances the likelihood of promotion to higher grades, and from this perspective graduate education will increase officer retention.

## Lessons from the civilian sector

There are some lessons to be learned from looking at major corporations. We can look at how well their staffs are educated. This gives some interesting insights into how industry values education. We analyzed the educational background of some senior executives from Fortune 500 companies, splitting the analysis into two parts:

- 34 technology-intensive companies, including AT&T, Dow, Proctor & Gamble, Hewlett Packard, Google, Verizon, Exxon Mobil, General Electric, and Lockheed Martin.
- 14 nontechnical companies, including Mattel, Land O'Lakes, Kimberly-Clark, Kellogg, General Mills, ConAgra, FedEx, and Estee Lauder.

We looked at both undergraduate and graduate degrees. Tables 4 and 5 present the data. The major field categories are Engineering, Science/Tech, Business/Economics, Liberal Arts, Medicine/Law, and Unknown. Engineering is self-explanatory—any major with “Engineering” in the title. Business/Economics are either an MBA or any degree in a management type of field, such as Finance or Marketing. It also includes “Senior Executive Programs,” such as program management. Economics is included with the Business degrees. Science/Tech are the “hard” sciences: math, physics, chemistry,

biology, operations research, and statistics. Liberal Arts majors include Fine Arts, Classics, History, Psychology, and National Security. (The graduate Liberal Arts degrees are Psychology and National Security.) Medicine/Law includes lawyers, doctors, and veterinarians. The preceding lists of majors are not exhaustive but give the flavor of the types included in each of the categories.

Table 4. Distribution of degree fields for technical companies

Field	Degree					
	Undergraduate		First graduate		Second graduate <sup>a</sup>	
	Number	Percentage	Number	Percentage	Number	Percentage
Sample size	212/212	100	149/212	70.3	64/212	30.2
Engineering	84	39.6	44	29.5	16	25.0
Science/Tech	40.5 <sup>b</sup>	19.1	23	15.4	13	20.3
Business/Economics	26	12.3	12	8.1	23	35.9
Liberal Arts	10.5	5.0	4	2.7	1	1.6
Medicine/Law	0	0	4	2.7	1	1.6
Unknown	51	24.1	62	41.6	10	15.6

a. Very few executives had a third graduate degree.

b. One executive had a Science and Humanities major from MIT; we split it between Science and Liberal Arts.

Table 4 shows that in technical companies the largest portion of undergraduate degrees is in Engineering. If you combine Engineering and Science/Tech Bachelor's degrees, over 50 percent of the sample falls into that category. For the first graduate degree, again, the most fall into Engineering, followed by Science/Tech. A caveat on these data is that almost half of the 149 first graduate degrees are unknown fields. For the second graduate degree, the majority shifts to Business, though the combination of Engineering and Science/Tech does exceed Business/Economics.

The first thing to note from table 5 is that the percentage of engineering degrees is much lower than it was for the high-tech companies, and the percentage of business degrees is much higher. Also, the types of majors within the Science/Tech division are different from the high-tech company group. There are fewer "standard" science fields and more food science types of major. There are no medical

degrees of any type in this group, and the law degrees sometimes have an international or business flavor to them.

Table 5. Distribution of degree fields for nontechnical companies

Field	Degree					
	Undergraduate		First graduate		Second graduate	
	Number	Percentage	Number	Percentage	Number	Percentage
Sample size	109/109 <sup>a</sup>	100	83/107	77.6	11/107	10.3
Engineering	7	6.5	1	1.1	0	0
Science/Tech	9	8.4	5	5.6	3	27.3
Business/Economics	52	48.6	69	77.5	6	54.5
Liberal Arts	11	10.3	1	1.1	0	0
Law	0	0	10	11.2	1	9.1
Unknown	28	26.2	3	3.4	1	9.1

a. Two of these are double majors, each with a Tech and a Liberal Arts degree.

Overall, the education of executives, especially in technical companies, is consistent with the need for education in the officer corps—a technical foundation, with most executives having a graduate degree, covering a variety of disciplines, mostly science, engineering, and MBAs.

## Issues and challenges

There are a variety of challenges to the development of a framework for education. They mostly revolve around difficulties in finding time for education in a Navy career. We address them next.

## Career paths

Navy careers are crammed. In a 20-year career, an officer needs:

- Several warfare community tours
- Operational training for a warfare community
- Joint education and experience
- Some shore tour experience (OPNAV, PERS-4, Staffs, etc.)
- Graduate education.

Each warfare area has its own career path, but they all face difficulties finding time for all of the above requirements. Table 6 is derived from current URL officer community career paths.

Table 6. Twenty-year URL careers

URL officer	Requirement (years)		
	Sea duty	Shore duty	Operational training
Aviator	10	7	3
Submarine	10	7	3
SWO	10	8.5	1.5

All communities require 10 years of sea duty to develop an officer and prepare him or her for command. Operational training requires 1.5 to 3 years, with SWOs requiring less time than aviators and the submarine force. The remaining 7 to 8.5 years need to fit in all shore duty,

which includes JPME I, JPME II, a joint tour, Navy shore duty, and graduate education. This is a real challenge, and something has to give. Frequently, it is graduate education that gets squeezed. Our challenge is to find a way to integrate education into officer careers.

We emphasize that we are striving for careers of the Navy's best and brightest that include joint education and tours, as well as in-resident education at the PG School (or other universities). We do not want a system in which the front-runners go to NWC for JPME, and PG School students are not the front-runners.

Each warfare community has its own challenges and its own response to the need for graduate education. We provide some details for each of the three major warfare areas.

### Surface warfare community

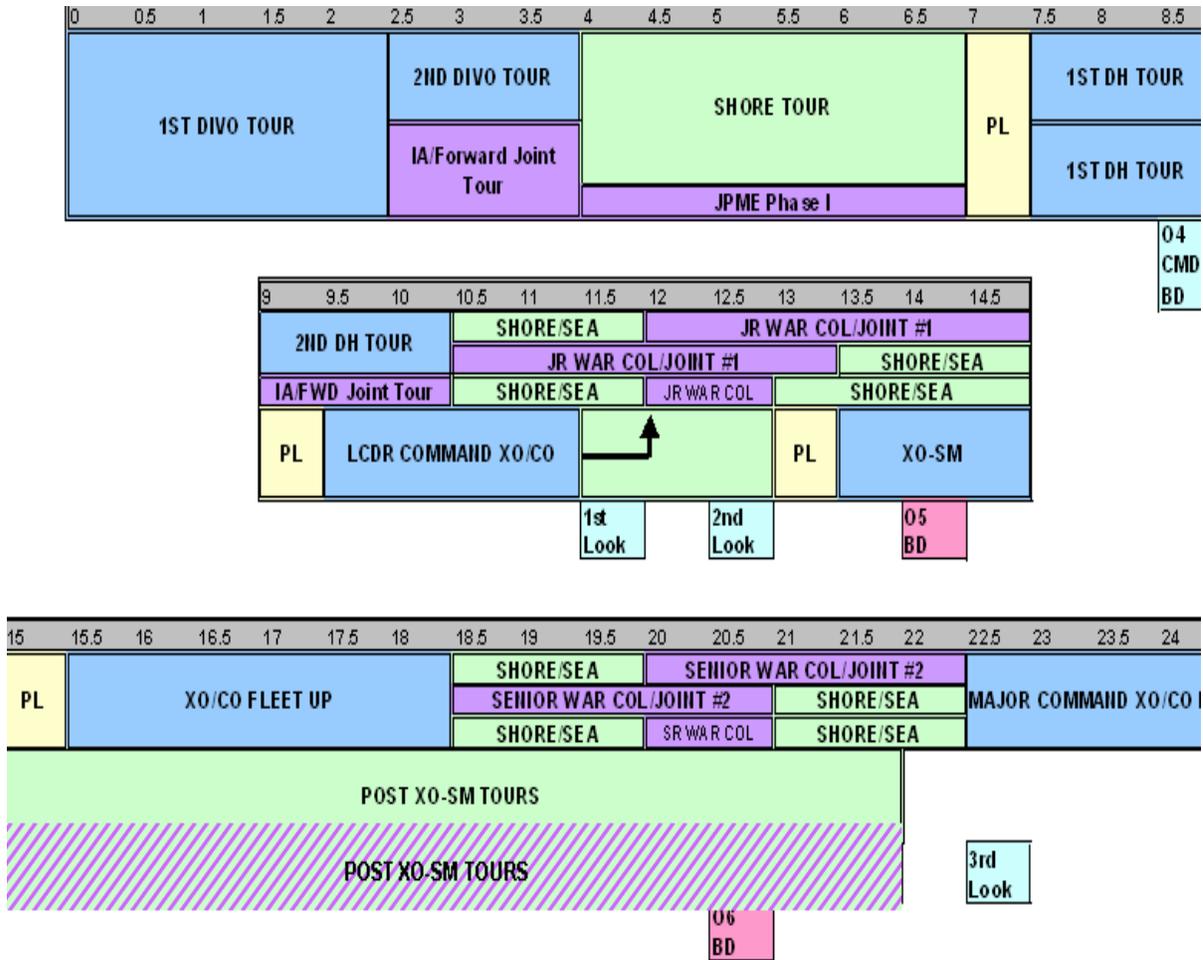
Each community has a career path that is advertised within the community and provides guidelines for officer career development. Figure 3 shows the SWO career path. Note that shore tours after the department head tour(s) focus on providing joint education and tours, and PME (mostly at NWC). The first shore tour is the primary SWO opportunity for in-resident postgraduate education at the PG School, or other universities.

The SWO community supports graduate education and the PG School. In particular, it has large quotas for graduate education:

- 100 per year to NPS
- Small SWO MBA program at Wharton and other top business schools
- 50 per year receive graduate education vouchers (pays for tuition for courses that officers take "on their own time").

The above data need to be considered in the context of a SWO community of approximately 6,500 officers, of whom the year group with 4 years of service (prime opportunity for resident graduate education) numbers roughly 600. The PG School has amended its programs to allow all URL officers to complete JPME I while they are pursuing their Master's degrees.

Figure 3. SWO career path

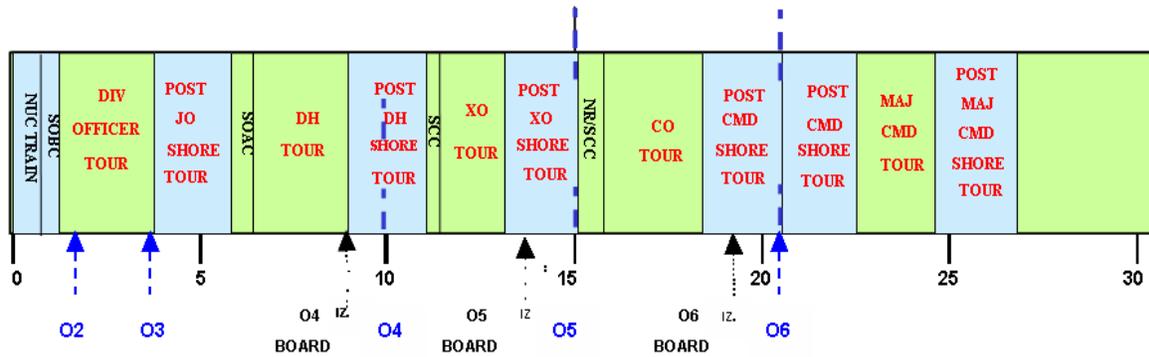


### Submarine community

The SWO and submarine communities have similar constraints (see figure 4). Though not shown in the figure, post-department-head shore tours focus on providing joint education and experience to due course officers. Again, the first shore tour is the primary opportunity for submarine officers to attend in-residence education at the PG School or other universities. The submarine community has a quota of 32 students each year for in-residence graduate education, and the community is selecting front-runners for this education opportunity. The size of support for graduate education should be considered in

the context of a submarine force of approximately 2,500 officers, of whom roughly 300 have 4 years of service.

Figure 4. Submarine officer career path



The submarine community is also working with the PG School to provide distance learning education opportunities to officers who are unable to have in-residence education:

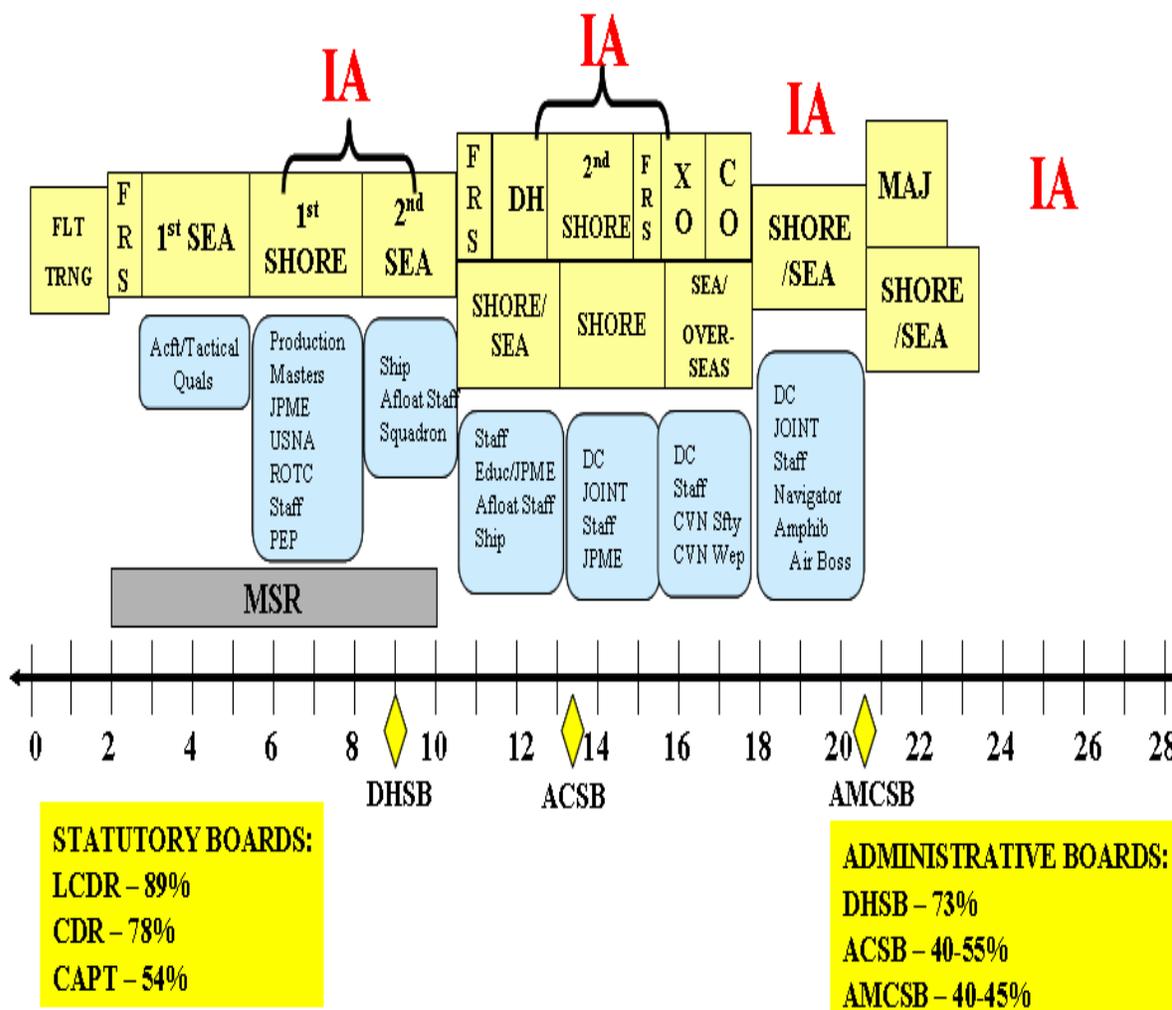
- Mechanical engineering Master’s degree at Naval Reactors HQ for graduates of Bettis Engineering Reactor School
- Engineering management Master’s degree starting in Bangor and Kings Bay.

One frequently noted concern regarding an officer taking time (18+ months) for resident graduate education is that the officer is away from an operational environment for a long period of time and needs to get back up to speed on returning to the fleet. The submarine community career path avoids this situation for officers who take in-residence education on their first shore tour. Following this education, they would have a department head tour, which is preceded by the Submarine Officer Advanced Course (SOAC). SOAC is a 22-week course of instruction that provides submarine-qualified officers with advanced in-depth training in numerous areas of submarine operations. SOAC provides an opportunity for submarine officers to get back up to speed in submarine operations.

## Aviation community

The aviation community has the most difficulty in finding time for in-residence graduate education. Figure 5 shows the aviator path.

Figure 5. Aviator career path

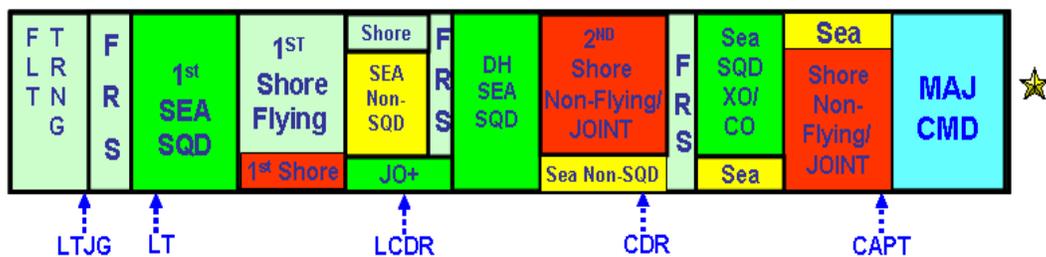
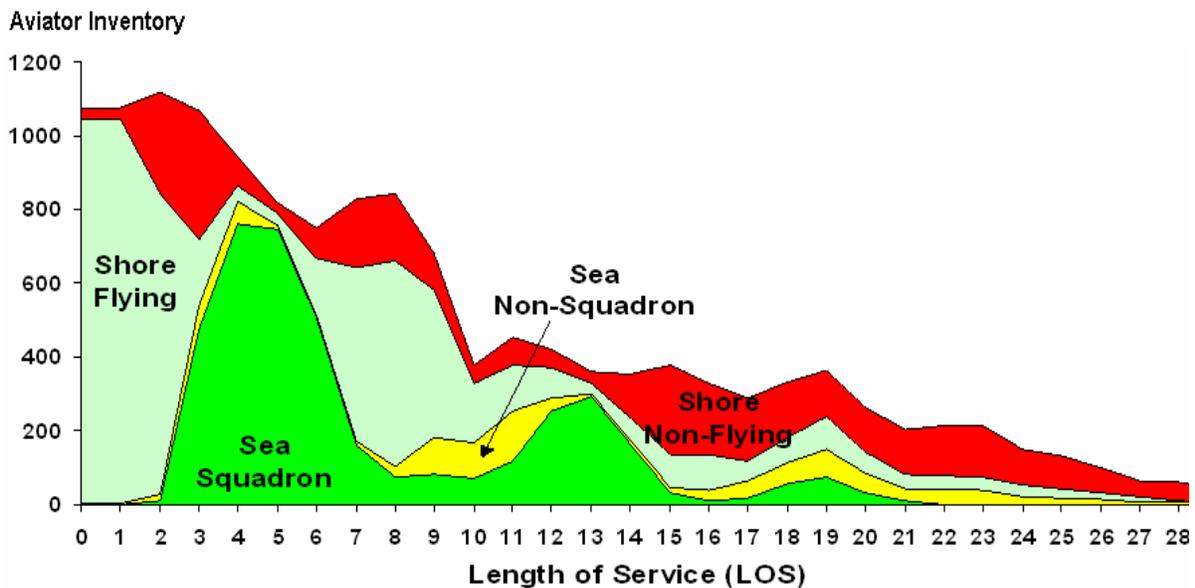


Post-department-head shore tours are dominated by the need for joint education and experience, as is the case with the other communities. However, unlike the SWO and submarine communities, the aviation community does not have “space” in the career path during

the first shore tour for in-residence education. The demand for aviator instructors during the first shore tour is large; they train the latest aviator year groups. Consequently, there is no easy way of finding time in an aviator's career for in-residence graduate education. Albert Monroe, in an analysis of aviator career paths [18], displayed the duty distribution of aviators in FY 2004 (see figure 6). Figure 6 shows the two primary characteristics of aviator careers:

- Most aviators are in some form of flying or sea duty until they are senior lieutenant commanders
- The later stages of a career (commander and above) involve much less flying.

Figure 6. 2004 aviator duty



This situation is worse for pilots, in comparison to NFOs. NFOs have shorter training than pilots, and there is less demand for NFO instructors, leading to more opportunity for education.

The aviation community, working with educators, has implemented a successful program for in-residence education. A tour as a test pilot is a prestigious first shore tour. The aviation community has a Test Pilot School co-op program, where aviators attend the Air Force Institute of Technology (AFIT) for 1 year before going to PAX River, attending test pilot school, and having a test pilot tour. This co-op program provides the pilots with Master's degrees in aeronautical engineering while keeping pilots current. The Navy should seek to implement more such programs that are integrated into Navy careers and provide needed education.

The PG School offers a variety of certificate courses (i.e., short courses that are focused on a particular topic). Such courses may be suited to aviator careers and would be taken as en route training during PCS moves. An officer could take sufficient courses, over a period of several years, to obtain a Master's degree. This may not be ideal, but it might be the best option for officers with a very busy and tight career path. This approach may have an additional benefit in education utilization. Unfortunately, officer career paths inhibit the immediate use of education: officers need to return to an operational environment after completing graduate education, and it may be several years before the officer has an opportunity for an assignment that uses the specific expertise gained in graduate education. Short courses could provide knowledge applicable to the officer's next tour, significantly increasing utilization.

## **Alternate career paths**

The foregoing discussion identified difficulties in current URL career paths providing officers the expertise that the Navy needs. The URL communities are aware of this situation and are implementing a variety of specialist career paths for post department head, non-due-course officers. For example, the SWO community is developing specialist career paths in missile defense, strategic sealift, shore installation management, undersea warfare, ant-terrorism/force protection, and mine warfare. The Navy should consider extending this idea to

all non-due-course O-5s, and helping these officers transition into alternate career paths, providing them needed education during the transition. Such officers could provide needed expertise in a wide variety of staff billets. This would have the added benefit in the aviation community of occurring at a time when officers have an opportunity to pursue graduate education. For such a program to be attractive and retain officers beyond minimum retirement points, the Navy should promote a limited number of such officers to O-6.

### The timing of graduate education

URL officers have various requirements for graduate education, and for each requirement we have seen that the current timing of graduate education may differ from when it is needed, Table 7 summarizes the situation. We see that 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, as will be seen when we address the utilization of graduate education.

Table 7. Timing of graduate education

Type of graduate education	Current timing	When is education needed?
Enhance critical thinking	Whenever graduate education occurs	Increases as career progresses
Navy and Joint PME	After department head	After department head
Specific expertise	Frequently early	Mostly later in career

### Education delivery

The education establishment wants to provide an opportunity for every officer to take graduate education but understands that resident graduate education is not an option for every officer. Consequently, many education delivery methods have been developed and implemented, collectively aimed at increasing education opportunity. We consider NWC and NPS separately because they have different roles and are subject to different constraints.

## **Naval War College**

NWC provides military education, both Navy and joint. The Goldwater Nichols Act has made JPME a requirement for promotion in the URL, and the Navy has responded by ensuring that its front-runners attend NWC.

NWC programs are aligned to Navy needs:

1. Navy PME is essential for every Navy officer; it is the core of NWC education.
2. NWC builds on its Navy PME and provides JPME parts I and II. The War College provides staff to NPS, to include JPME I in NPS degree courses.
3. Senior PME at the War College has been accredited since the early 1990s, and NWC students routinely obtain Master's' degrees in National Security Studies.
4. The Navy needs operational planners, and the War College provides a Navy operational planner course (NOPC).

Navy leadership and the War College have, undoubtedly, made good progress in providing required PME to URL officers. More progress is needed, however. As we observed earlier, officers need to have a greater all-round understanding of the Navy beyond their immediate warfare area, and the Navy's challenge is to find a way of delivering this knowledge.

## **Naval Postgraduate School and civilian universities**

NPS and civilian institutions provide specific expertise education (e.g., financial management). NPS education is predominantly technical in nature. NPS has developed programs that deliver education in a wide variety of fashions, reaching out to the officer community by tailoring the education vehicle to the availability of the officers. Delivery methods include the following:

- Resident graduate education
- Distance learning

- Satellite campuses at fleet concentration areas
- Certificate courses
- CD-ROM instruction
- Collaboration with other universities.

Civilian universities also provide many options for graduate education, both resident and nonresident. Officers have an additional opportunity for education when assigned as NROTC instructors: NROTC colleges routinely provide graduate education to instructors.

The Navy’s challenge is to ensure that officer careers provide opportunities to take advantage of the education possibilities we have described.

## Utilization of graduate degrees

In table 3, we described the requirements for graduate education as specified by billets with subspecialty codes that are P-coded or Q-coded. The Navy educates officers to meet these requirements, and NPS student quotas are established in response to these requirements. It is not enough to educate the officers. The Navy also needs to assign these officers to billets that require the expertise. In this subsection, we examine how well the Navy does in utilizing the graduate education of its officers. We shall see that it does a very poor job.

Subspecialty codes are four-character fields that provide a detailed specification of expertise. The first character of the code provides a broad category of expertise, as shown in table 8.

Table 8. First character of subspecialty codes

First character	Broad expertise
0	Any discipline
2	National Security Studies
3	Resource Management & Analysis
4	Applied disciplines
5	Engineering & Technology
6	Operations

The entire four-digit code provides a more detailed specification of expertise. For example, a subspecialty code of 3130 denotes Manpower Systems Analysis Management, 1 of 13 different disciplines within the Resource Management & Analysis category.

In considering utilization of education, ideally we would like officers to have the precise P-code required by the billet. For example, an officer with a 3130 P-code would fill a billet with a 3130P designation. However, we start by considering a looser requirement: we consider only the first character of the subspecialty code. For example, an officer with a Resource Management & Analysis P-code (3xxx) is using his or her education if filling a billet with any 3xxx P-code. Table 9 shows the results of such a computation.

Table 9. Graduate education utilization

	Billets	Filled	Subspecialty match	Inventory
All P/Q-coded billets	2,518	2,238	43%	8,743
National Security Studies	321	284	41%	2,562
Resource Management & Analysis	272	231	29%	2,035

The results of table 9 are sobering. For example, there are a 272 billets that are P- and Q-coded for Resource Management & Analysis, and 231 of these billets are manned. There are 2,035 officers in the Navy with an appropriate P-code or Q-code, but only 67 (29 percent of 231) are manning one of these billets. That is, the inventory of suitably educated officers is nearly 9 times the requirement, but we manage to meet the requirements less than 30 percent of the time. The situation is much worse if we look for exact matches of P-codes (i.e., looking at all four digits of the subspecialty code); the percentage drops to well under 10 percent.

The cause of the poor utilization of graduate education is found in officer career paths. The first priority of an officer's career is to develop expertise in a warfare community. This, as discussed earlier (see figure 3), takes a lot of time, especially during the first 10 years

of an officer's career. The second priority of an unrestricted line officer is to acquire joint expertise. This also requires considerable time. Graduate education (not JPME) and other shore duty need to fit in during the remaining time. There is not a lot of time, and much of it occurs during early shore tours. After officers obtain their graduate education, operational and joint requirements are likely to preclude using the expertise for 10 or more years. Table 9 shows the results of these career constraints. 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 training may be able to be accredited toward degree programs and/or professional qualifications. Such accreditation would be a good recruiting incentive and may also benefit retention. Moreover, this accreditation may require relatively little effort from the Navy. Some specific ideas regarding accreditation follow:

- Flight training might lead to accreditation with colleges, such as Embry-Riddle Aeronautical University.
- Surface warfare officers might receive credit toward a merchant mariner license (deck and/or engineering).
- The submarine community is already implementing this idea. Officers receive numerous credits from the PG School and a P-code for passing nuclear power school. We understand that Old Dominion University (ODU) recognizes these credits in their graduate programs, and many officers use these credits to help them obtain Master's degrees from ODU.

## Why has progress been so slow?

In the course of this study, we have read many previous reports on officer education and spoken to many Navy staff (both uniformed and civilian) who are dedicated to the advancement of education in the Navy. Perhaps the strongest impression we have formed is one of frustration—frustration over a lack of progress in spite of the good

faith efforts of so many excellent people. We need to ask ourselves why progress has been so slow. If we answer this question, we may be able to make significant headway in advancing officer education.

We believe that the constraints and pressures caused by the busy nature of officer careers are the underlying cause. Officer community leadership stresses the primacy of operational requirements and warfare proficiency in making assignments. The education community stresses the importance and need for graduate education. Everyone is correct: all of the requirements are important. To date, however, the Navy has found it very difficult to implement education recommendations in a manner that is executable within the constraints of a Navy career. The good intent of many education initiatives has died or been greatly diminished by difficulties in implementation.

We have been mindful of this situation, and our analysis and recommendations have been crafted accordingly. We believe that the Navy can successfully implement an education strategy within the constraint of current career paths. It will require cooperation, change, and give and take by both community leadership and the education establishment. We need a mix of education programs and career management initiatives that fit together to provide an executable education strategy. Our recommendations, shown later in this report, are aimed at finding this mix.

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## Implementation barriers

There are a variety of organizational impediments to successfully implementing an education strategy. These policies have arisen over many years; they were put in place for good reasons and were not directed against or even designed to consider officer education. They have become barriers to the implementation of an education strategy and need to be addressed. We describe them in this section.

### Command support

Today, commands are in a difficult position with regard to their officers taking graduate education, either during or outside of working hours.

There are no incentives for commands to send their officers to graduate school, and the current process places pressures on commands to decrease time spent on graduate education. In particular, most commands are busy places and all staff are needed to get the work done. 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.

This is not to say that command leadership does not, on a personal level, value and support their officers' interest in taking graduate education. The work of running the command, however, takes priority and may lead in the opposite direction.

The Navy needs to build an education process that does not place commands in this predicament.

### Graduate education funding

In summary, some graduate education funding rules are out of date, may conflict with education priorities, and need to be reviewed.

Funding regulations are, for good reason, tightly written and lead to strong control of funds. These regulations have been written over many years and have not kept up with all the changes in education. For example, the PG School is increasingly collaborating with other universities in providing graduate education. This may cause funding problems, when the student is receiving graduate education vouchers (GEVs). GEVs are designed to reimburse officers for education received at civilian universities, and the PG School is prohibited from receiving GEV funds. This makes sense for the situation in which an officer is solely a PG School student. However, it makes less sense and causes difficulties when a student takes a couple of PG School courses to augment the education received at a civilian university.

Education delivery methods are evolving, and funding mechanisms need to evolve in response to these changes.

The Navy also needs to be mindful of the fact that the different circumstances of officer communities causes them to rely on some education programs more than others. In particular, aviators are more dependent on GEV funds than other URL communities. The GEV program is often the first one looked at when budget cuts are made, adversely affecting aviator graduate education opportunity.

## **FITREPs**

The Navy's fitness reporting system is based on officers receiving an observed fitness report (FITREP) from a senior officer. This time-tested process works well in most situations: officers receive written reviews from their superiors who have directly observed their performance. However, the process does not work well for officers taking in-resident graduate education. Officers receive an Unobserved FITREP, while they are resident students, which may be a career stopper in the competitive world of officer careers. The following comment from a student at the PG School highlights the situation:

I had a great record, good enough to survive going to NPS for 18 months.

Resident graduate education has a neutral effect on an officers's career. Officers can take resident education within career path

constraints without harming their careers, but officers cannot improve their standing during resident graduate education. Navy officers have adapted to this situation: many avoid resident graduate education for fear of missing career-enhancing opportunities.

The Navy may claim to support graduate education, but the message sent by the current FITREP process is one of faint support. The Navy is indifferent to how well officers perform as students, providing they don't drop out. We need an education and FITREP process that avoids this situation. The Navy should decide who should attend resident graduate education, and it should reward them for being good students.

This may not be welcomed by all officers, who will now find their studies being evaluated. However, if the Navy values education, it should reward 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. Moreover, such a message is consistent with the wishes expressed during the JO focus groups.

## Publicizing education opportunities

Officers do not routinely learn of all education opportunities. The Navy relies on commands providing information to the officers, and some commands are better than others in doing this. This may have been the most effective way to communicate to officers in an earlier time, but it is out of date in the internet era.

The Navy does not provide a comprehensive source of information regarding education opportunities. If one is aware of an education opportunity, it is easy to locate detailed information, using Google or another search engine. However, if one is unaware of the possibilities, it is difficult to discover them: one cannot go to the Bureau of Naval Personnel (BUPERS) web site and click on education options.

BUPERS should remedy this situation and provide a comprehensive education opportunities page on the BUPERS web site.

## Officer community development

There is a tension between the development of officers in their communities and development of all-round Navy officers. The Navy develops great SWOs, aviators, and submarine officers. This is as it should be: this is the bedrock upon which all Navy capabilities are built.

The Navy does a worse job at preparing all-round officers. For example, officers on staffs may lack the knowledge to describe comprehensive Navy capabilities to other services. More generally, officers are frequently ill prepared to fill 1000/1050 billets that grow in numbers as an officer's career progresses.

This situation may be best illustrated by considering aviators in the control grades, O-4 to O-6. Aviators are overmanned in these grades and fill 75 percent of 1000/1050 billets, many of which are P-coded. However, aviators have the smallest percentage of P-coded billets among URL communities, whence comes the smallest demand signal for graduate education. Consequently, the aviator career path does not prepare many officers for the assignments they receive, when serving the needs of the Navy beyond aviation.

This is not a new situation. The 1946 BUPERS Board [3], as we noted earlier, recognized this problem and made recommendations to fix it. Not much has changed today, and the recommendations of the 1946 Board are still applicable, namely:

- Expand PME.
- Establish a panel to manage the careers of senior officers.

As we noted in the previous section, the Navy is making headway with PME, though more progress is required.

The second recommendation of the 1946 Board recognized that management of the latter stages of officer careers (after 18 years of service) should be handled from an all-Navy (ALNAV) perspective, and not from the perspective of the officer communities. This problem persists today. There is strong management of officer careers and billets during the stages of officer careers within their respective communities but weaker management of more senior officer billets.

There is not a strong voice, akin to community leadership, to guide the assignment of officers to 1000/1050 billets. The Navy should review and strengthen the management of senior officer assignments, when the needs of the warfare communities are secondary to ALNAV needs: the recommendations of the 1946 Board are a good starting point.

## Officer career lengths

Officer career lengths are constrained by law. The Defense Officer Personnel Management Act of 1980 (DOPMA) and associated legislation provide strong direction to officer careers, leading to the tight and busy career paths of URL officers. This study has assumed that an education strategy would be implemented within current legislative constraints. Many other options for education would become feasible if careers could be lengthened. We do not address them here, but just note that, in many ways, DOPMA is the largest implementation barrier to an education strategy. The RAND study, *Challenging Time in DOPMA* [19], addresses this topic in detail.

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## Recommendations

Our analysis has addressed a wide variety of issues. We have reached conclusions in five areas:

1. **Graduate education for every officer.** Every officer should have an 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.
2. **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 fit into officer career paths.
3. **Professional military education.** The Navy should expand PME to broaden officers' knowledge of the Navy beyond their own communities.
4. **Education utilization.** The Navy should rethink the P-code process, to attain a system that provides education when it is needed, increasing education utilization.
5. **Implementation barriers.** The Navy should take steps to remove barriers to implementation of an education strategy:
  - a. Commands have no incentives to support graduate education, and operational pressures may cause commands to oppose their officers taking graduate education. The Navy should develop a process that enables commands to support graduate education.
  - b. Some education funding regulations are out of date and need to be reviewed and updated to meet current needs.
  - c. 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.

- d. Officers do not routinely learn of all education opportunities. The Navy should publicize all education opportunities on a BUPERS web page.
- e. 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.

We close with a comment regarding costs. During this study, we have considered the need for education and have not addressed resulting expenditures. It is unclear whether our recommendations would increase or decrease expenditures. Some of our recommendations sound as if they would require additional funding, such as graduate education for all URL officers by the time they reach O-5. However, this is not far removed from what is happening in today's Navy. Moreover, efforts to reduce current inefficiencies may reduce costs. Many details regarding implementation need to be addressed before it will be possible to estimate the fiscal impacts of our proposals.

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