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**NAVAL POSTGRADUATE SCHOOL
Monterey, California**



***A Bottom-Up Assessment of
Navy Flagship Schools:***
The NPS Faculty Critique of CNA's Report

by

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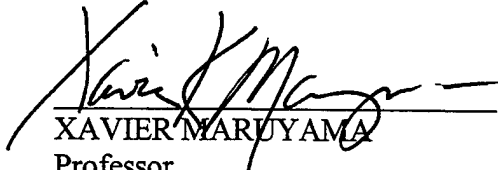
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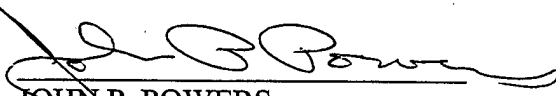
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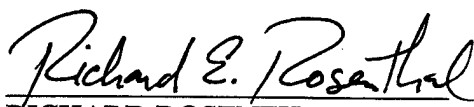
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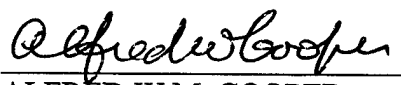
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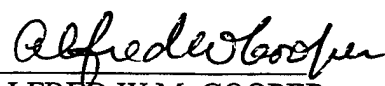

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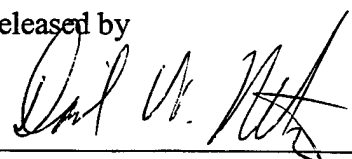

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13. ABSTRACT (Maximum 200 Words) This report is a critique of the report from the Center for Naval Analysis (CNA) titled <i>A Bottom-Up Assessment of Navy Flagship Schools</i> . This critique identifies benefits of Naval Postgraduate School (NPS) programs that were overlooked in the CNA report including availability of government housing, year-round operation, rapid refresher, ability to efficiently transition officers to fields of study different than their undergraduate major, and higher course-loads. Cost analyses incorporating these benefits indicate that NPS is highly efficient at providing graduate education to naval officers at a low cost per student. Other ancillary advantages are identified including the military relevance of course materials and laboratory facilities, the professional military environment of NPS (including the presence of officers from all services and international officers), and the production of research products that are useful to the Navy.				
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EXECUTIVE SUMMARY

The Navy has established a program of mid-career, professional, graduate education at the Naval Postgraduate School in order to meet its needs for a technically qualified, intellectually equipped officer corps. In addition, the graduate education program provides an opportunity for the Navy to transition officers from one set of skills developed in their undergraduate education to another that meets the Navy's current needs. Another benefit is the expertise in military-relevant topics that has developed in the faculty and students, leading to a vigorous graduate-education research program in support of the Navy and the Department of Defense.

The Center for Naval Analyses (CNA) recently published its assessment of the Navy's flagship educational institutions, including the Naval Postgraduate School (NPS). The report found the quality of the NPS program to be high. In assessing the level of funding required to maintain the excellence of the Navy's flagship institutions, CNA explored the costs of using civilian-sector universities to obtain the same product. Two such approaches would be to send officers to civilian universities to obtain graduate education or to contract with a civilian university to operate NPS.

CNA found the program costs at NPS to be much higher than the tuition costs at 28 other universities referenced in the study. However, we feel that the CNA study contains two crucial flaws that bias the comparison against NPS. First, in comparing costs between NPS and civilian alternatives, CNA fails to hold the desired outputs constant. Second, for both NPS and civilian institutions, CNA gives an incomplete measure of costs. Our analysis shows that the major factors of cost are the officer salaries and housing costs and, hence, the program duration. Additional significant cost factors are the year-round operation of NPS and the higher student contact-hour loads at NPS.

Incorporating the salary and housing costs in this study, we find that NPS is the 8th least expensive of the 29 universities considered by CNA. Computing the cost per class hour (including the officers' salaries and housing), NPS is the least expensive of the alternatives.

The existence of NPS is due to the benefits that NPS offers to the professional and technical development of the officer corps. Among these benefits are:

- (1) military, technical relevance of courses, theses, and curriculum content
- (2) specialized educational laboratory facilities devoted to military hardware and computer systems
- (3) officers and faculty with military expertise who produce analyses and research products that benefit the Navy and DoD
- (4) an admissions system with primary emphasis on military performance and secondary emphasis on academic performance
- (5) refresher and transition mechanisms that efficiently and effectively meet the need to allow for a time delay between undergraduate and graduate studies and for the assignment of officers to curricula that meet current Navy personnel requirements
- (6) an instructional tempo that operates year-round and allows higher-than-average course loads
- (7) military infrastructure that allows the officers to remain in a professional military environment while at school, including opportunities for interaction with officers from other services and countries.

Comparing tuition at civilian universities to the NPS program cost (per year per student), NPS is most expensive of the 29 universities included in CNA's study. However, such a comparison is flawed since tuition costs alone do not measure the complete costs of providing graduate education to a military

officer in the civilian sector. The following factors are necessary components of a complete cost-effectiveness analysis:

- (1) The officer-student's salary, benefits, and housing allowance should be considered. These costs exceed any tuition payments and are very sensitive to the cost of housing and the length of programs. NPS has existing base housing, which is less expensive than housing in the civilian sector. In addition, the average NPS masters program is 1.2 months shorter than the average masters program taken by Navy URL officers enrolled in civilian universities.
- (2) The role and cost of transition and refresher courses also must be incorporated into the analysis. These courses support the Navy's policy decisions to provide mid-career education to its officers and to transition officers into areas of expertise to meet Navy needs.
- (3) The higher contact-hour load carried by the officers receiving graduate education at NPS should also be added to the analysis. NPS officers attend approximately 768 hours of instruction annually, compared with approximately 486 hours per year at a civilian school.
- (4) Graduate courses are more expensive to offer than undergraduate courses, especially in the technical areas favored by the Navy. While it is difficult to separate graduate costs in the overall cost data from most civilian universities, a trend-line analysis indicates that the cost per graduate-course hour at NPS is much lower than the same cost for any civilian university. If a civilian school were to take over the management of NPS, therefore, there is no basis for believing that it could manage NPS more cost-effectively than the Navy is doing now.

Including these factors in the cost analysis enables a more accurate comparison of NPS against civilian alternatives. Our cost comparison shows that the special benefits of NPS education come at little extra cost. **Specifically, we conclude that**

- (1) Measured by the cost per graduate, NPS is the 8th least expensive of the 29 universities considered by CNA.**
- (2) Measured by the cost per class hour, NPS is the least expensive of the 29 universities.**
- (3) The Navy is unlikely to reduce its graduate education costs by transferring NPS operational control to a civilian institution, unless that institution is willing to subsidize DoN students through its endowment or state tax funding.**
- (4) Since the overall costs of graduate education are dominated by officers' salaries and housing costs, our analysis shows that the total costs are about the same, regardless of the provider. Hence, any policy decisions made on graduate education should be made on the basis of benefits to the Navy, in addition to costs.**

The CNA report also criticizes the relatively low rate of using NPS graduates in subsequent assignments in corresponding P-coded subspecialty billets. But CNA's solution, consolidation of subspecialties and curricula, is not based on any cost-benefit analysis, as CNA admits in its report. For some restricted-line and other Navy communities, NPS programs are highly successful in providing officers with the desired skills and utilization rates are high. In these communities, the subspecialty system is working properly and is efficiently coupled to the NPS graduate education system. For some other communities (notably the URL warfare communities at sea) the P-code system is not applicable and does not measure the contributions of graduate education to the performance of the officers. Even without a complete assessment of the value of graduate education, those communities with nominally low P-code

utilization *are* benefiting from the analytic reasoning skills, military-technical familiarization, and other products of NPS graduate education. The P-code utilization rate does not measure these benefits and was never expected to do so. At-sea billets, for example, are rarely P-coded and, yet, officers in these billets *do* use their graduate education skills. In summary, the benefits of NPS graduate education extend beyond the subspecialty system. The challenge for the Navy and for NPS is to identify these benefits and incorporate an assessment system that will feed the emerging culture of Navy graduate education.

The NPS Faculty Critique of CNA's *A Bottom-Up Assessment* of Navy Flagship Schools

This is a response prepared by a committee of the NPS faculty to the report *A Bottom-Up Assessment of Navy Flagship Schools* by Linda C. Cavalluzzo and Donald J. Cymrot, Center for Naval Analyses Report CRM 97-24, January 1998. This response was endorsed by the faculty of the Naval Postgraduate School on 2 June 1998.

Review of CNA Report Findings and Recommendations

The CNA report documented the quality of education at the Navy's flagship schools including the Naval Postgraduate School (NPS). Using a variety of criteria, the report made the following findings in regard to NPS:

- the masters-level program quality is high,
- the labs are excellent (although a maintenance funding issue was identified as a potential problem)
- the programs are approximately 23 months long with refresher and transition activities accounting for 21% of that total,
- the curricula have a highly specific content as a result of meeting the needs of the P-code subspecialty system
- there is a low utilization rate (approximately 37%) of graduates in P-coded billets. There is liberal substitution of related P-codes in filling billets.
- NPS has the highest per-student expenditure relative to other "top-level" schools offering graduate-level technical education.

CNA then went on to make the following recommendations¹ relative to NPS and graduate education:

- Navy leadership should reassess its system of graduate and professional military education and "...in particular the missions of the schools and curricula that fulfill those missions should be reevaluated and better tailored to meet Navy needs..."² rather than relying on a subspecialty system focused on shore billets that has poor utilization.
- Navy leadership should consider a curriculum that "...might substitute some technical education with military education. This could take the form of a 'Masters of Science in Military Management and Technology.' Such a degree could include a military core that might cover

¹ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," pp. 2-10 and 73-75

² CNA, "A Bottom-Up Assessment of Navy Flagship Schools," p. 5

strategy and operations, and one of several technical tracks that would correspond with the broad technical areas of study that currently form the basis of the subspecialty education.”³

- Since current utilization rates and substitution patterns suggest that the curricula are overspecified, reduce the level of detail in curricula to allow combination of curricula and to allow competition with civilian schools to offer the resulting streamlined curricula.
- Reduce the time on campus by
 - reducing program lengths through pruning of material,
 - offering refresher courses via distance learning methods,
 - offering provisional acceptances to officers requiring transition to new disciplines (i.e., require officers to complete transition courses before arriving at NPS), and
 - when possible, assigning graduates of USNA directly to NPS.
- Explore the possibility of “...combining NPS and AFIT into a single school at NPS, with the Navy as executive agent.”⁴
- Consider “fencing” funding within a fiscal year to avoid funding instabilities
- Explore the concept of asking for legislative relief to allow the establishment of endowments.

In our continuing self-evaluation process, NPS had already identified some of these issues and had begun working on them. Initiatives were underway in such areas as

- reducing program length by paring material,
- combining six curricula into a common Information Sciences, Systems, and Operations curriculum,
- preparing a curriculum focused on warfare for the warrior (designed to be of special interest to URL officers),
- developing asynchronous and synchronous distance learning courses, and
- incorporating Joint Professional Military Education (JPME) and Defense Acquisition Workforce Improvement Act (DAWIA) acquisition course material into appropriate programs.

Our main criticism of the report is the lack of consideration given to the unique benefits of NPS, which make this institution difficult to compare to a civilian university. In addition, we feel that the cost analysis did not incorporate the full spectrum of factors. The following is our assessment of the CNA report.

While NPS may (or may not) appear to be more expensive than civilian alternatives (and our cost analysis shows that NPS is *not* more expensive), the fundamental question in assessing NPS is whether the costs are justified by the benefits that NPS provides. The following are relevant special features of NPS, which the CNA report ignored in its analysis of NPS and civilian alternatives.

³ CNA, “A Bottom-Up Assessment of Navy Flagship Schools,” p. 5

⁴ CNA, “A Bottom-Up Assessment of Navy Flagship Schools,” p. 9

Educational Issues

There are several features of NPS that make it different from any other civilian graduate school. These differences are in direct response to Navy needs. The following is a listing of the most important of these benefits.

1. **Military Relevance of Education:** NPS courses and theses are designed to be militarily relevant. The military relevance of NPS education is the primary reason for the existence of NPS. Many courses are devoted entirely to specialized military topics not available at civilian universities. Some courses at NPS are classified, an option that is not allowed on most civilian-school campuses. Even courses that appear to have counterparts at other universities are taught at NPS with military relevance through the examples and applications.

NPS curricula are designed to meet the needs of the military communities who sponsor the curricula. NPS is capable of responding rapidly to changing sponsor needs, such as increased technical content in the Special Operations/Low Intensity Conflict (SO/LIC) curricula or the developing curriculum in information technology for the warrior. Civilian universities would not give the Navy the same degree of influence over curriculum design and content.

2. **Special Laboratories and Officer Experience Tours:** NPS's specialized laboratories and facilities provide educational benefits to our officers that would not be available at civilian universities without recreating the facilities there. These include:

- (1) Radar/Electronic Warfare Laboratory (containing classified, military systems)
- (2) FLTSATCOM satellite telemetry, command system and spacecraft simulator
- (3) Point Sur SOSUS underwater acoustic array
- (4) Secure Systems Technology Laboratory with CINC-level Global Command and Control System (GCCS) suite and Global Broadcast System (GBS) Receiver
- (5) Shipboard Power Systems Laboratory
- (6) SCI-classified Signals Processing and Space Systems Laboratory
- (7) Fleet Numerical Meteorological and Oceanic Center, the Navy's center for world-wide weather prediction (a tenant activity of NPS)
- (8) CIRPAS, an interdisciplinary facility for testing unmanned airborne vehicle (UAV) flight parameters, atmospheric soundings from UAVs and electromagnetic sensors on UAVs
- (9) Aircraft Combat Survivability Laboratory
- (10) Space Structures Dynamics Laboratory
- (11) Turbo-Propulsion Laboratory
- (12) Marine Propulsion Laboratory
- (13) Secure Wargaming Laboratory

In some curricula, the faculty and curriculum sponsors take the view that "the real world is the laboratory." In order for the officers to understand and perform thesis research on real operations, they take extended field trips, called "experience tours," to other military commands and industrial centers. This enriching opportunity would not be available at a civilian university without disruption of the normal academic schedule.

3. **Required Masters Thesis:** The thesis (required at NPS) provides the officers a chance to practice their newly developed skills on a problem of military interest and relevance (including classified theses up to the SI level). It allows the officers to

- define a problem to be studied and resolved in a limited amount of time, under a firm deadline
- integrate the materials studied during their time at NPS in order to bring their new academic knowledge to bear on a practical problem, and
- organize, prepare and deliver written and oral versions of their thesis work.

Most theses represent a high-quality contribution to the DoD. Faculty members are experts in military-related research and incorporate their thesis students in their research teams. Some theses have resulted in large savings for the Navy. Others have introduced important new ideas that have had immediate effect on combat effectiveness. For example, *Challenge Athena*, which demonstrated a dramatic improvement in the ability of commercial satellites to provide essential, high bandwidth communication to Navy ships, was developed in a (classified) NPS thesis. When assessing NPS's value to the Navy, one should consider the body of valuable research produced by students and faculty.

The thesis is required at NPS because it is considered the keystone of the masters degree program. Thesis students work closely with faculty mentors, focusing on DoD problems, often producing solutions that make substantive contributions to the Navy and other services. NPS tightly integrates the thesis into the educational program. Research-oriented civilian schools focus on doctoral-level work, giving little regard (and sometimes no opportunity) for the masters thesis. At the typical PhD-producing university, advising of masters theses is not considered a significant accomplishment, whereas, at NPS, we consider the quality of MS thesis advising to be one of the most important dimensions of faculty instructional performance.

4. **Dealing with Needs of the Adult, Mid-Career Learners After Selection Based on Navy Requirements:** Many officers do not have the necessary undergraduate preparation for graduate study in their assigned field. Due to the selection emphasis on military performance and the skills needed by the Navy, in addition to academic performance, the admissions requirements are significantly different at NPS than at civilian universities. Before entry, NPS officers are not required to be exactly matched into their graduate fields or to provide evidence of high-level academic achievement (e.g., high undergraduate grades, recommendations of instructors, and scores on the Graduate Record Exams). NPS is extremely adept at efficiently transitioning these officers to new fields if it is in the interest of the Navy. (This is particularly important to the military since its closed-pipe personnel system precludes mid-career accessions in areas of Navy need.) No civilian university routinely faces this requirement to transition its students to new fields or can deal with it as efficiently and effectively as NPS.

Similarly, NPS does an efficient and effective job of refreshing officers who have been away from the academic world for a while. Mid-career, adult learners, no matter how bright, need some assistance in getting back into the academic mode.

Meeting NPS officers' transition and refresher needs adds time that civilian masters programs do not need to spend. The CNA report recommends the use of distance learning (DL) and computer-based instruction to reduce the length of NPS programs. NPS already delivers some graduate instruction by video-teleconferencing DL and is actively pursuing asynchronous network-based learning. As educational innovators, the NPS faculty welcomes the opportunity to develop these courses in support of the officers' needs. However, past experience with correspondence courses and anecdotal evidence from our students suggest that little time is available to study during duty assignments. We propose

that pilot studies be undertaken to develop some courses in order to prove the concept before any large-scale implementation.

Similarly, CNA recommends that officers be given provisional acceptance to NPS, subject to their acquiring the undergraduate background needed for their program before arriving at NPS. This suggestion is a great disincentive for officers to transition into programs of Navy needs. Few would transition into the engineering and science fields and, for those few, the time required for the preparation would be prohibitive. For example, about eight undergraduate engineering courses and an engineering design project would be required for a non-engineering major to be prepared for admission into a graduate engineering program. The result of this recommendation would be for officers to seek admission only to programs with minimal entrance requirements, i.e., programs outside of the science, engineering, and technical areas of critical Navy need.

5. **Calendar and OPTEMPO:** NPS operates 48 weeks a year, compared with civilian universities which offer full programs for only 32 weeks per year (semester system) or 33 weeks per year (quarter system). Courses at NPS are scheduled in response to curricular requirements, not department preferences, improving curricula efficiency.

In addition, while at NPS, officers take around 16 credit-hours per quarter or 64 credit-hours per year, an aggressive academic load that necessitates having more faculty than a civilian school (where most faculty are off during the summer).

NPS respects the officer's scheduled completion date. Programs at civilian universities with thesis options have unpredictable duration. Students take as long as they need to finish and are not hastened by the faculty, in contrast to NPS, where the faculty understands the career consequences of a student not finishing on time.

6. **Military Infrastructure:** NPS provides a complete military infrastructure that supports the military and professional aspects of the officer's career while at NPS. The officers are still immersed in a military environment and are not "away" from their parent service. The presence of fellow officers from other services enriches the experience and makes possible joint military education. International officer-students also add a unique professional dimension, especially since a large percentage of them will ultimately become high-level leaders of their nations' militaries. The experience with officers from other nations enhances future performance in combined operations and exercises. In addition the presence of military instructors at NPS provides an additional dimension of military presence. It is noted that this benefit of maintaining military connectivity does not come without costs, however. NPS maintains a military line of command involving a Dean of Students/Director of Programs office, headed by an O6, and a set of Curriculum Officers (10 O5's) with associated support personnel. This line of command would not exist at civilian universities.

Each of these educational benefits has evolved over time at NPS in response to Navy needs. They collectively establish NPS as a unique educational institution that is closely coupled to the Navy's requirements. Establishment of graduate education programs at civilian institutions will require study of whether these attributes should be retained or not, since civilian programs will have to be reorganized to provide them. Any efforts to compete NPS against civilian institutions will have to clearly specify the features desired.

Utilization Issues

The CNA report finds that the P-code subspecialty system results in increased curriculum specificity.⁵ In turn, this specificity is assumed to contribute to the "high" cost of an NPS education. The report concludes that, with low P-code utilization rates, the "high" education costs due to this perceived specificity are not justified. Thus, the CNA report recommends that the Navy move toward less specific curriculum requirements to allow streamlining of curricula; the elimination of small, inefficient curricula; competition with civilian universities to offer the resulting, general programs; and the development of a more generic program leading to a degree such as a "Master of Science in Military Management and Technology."⁶

In contrast, the analysis provided in the remainder of this report indicates that NPS provides cost-effective graduate education including curriculum specificity. The extent to which curriculum specificity increases program duration is unclear; thus, the additional costs of maintaining specificity are not quantified in the CNA report.

Furthermore, the benefits of a P-code driven educational program have not been assessed in the CNA report. The P-code-driven curriculum model currently serves a number of shore-based (and some fleet-based) communities exceedingly well; these communities value graduate education and have high fill and utilization rates. Loss of these curricula would severely impact the effectiveness of these communities.

Since the P-code system was devised to support only the shore-based activities of the Navy, it is not clear that the utilization rates and other such measures capture the true impact of graduate education. In the absence of any assessment instruments, it is particularly difficult to capture the impact of graduate education on the URL officers who have attended NPS. Numerous flag visitors have attested that, while they have not recently used the specific disciplinary information received at NPS, they have definitely benefited from the resultant critical thinking skills and problem-analysis capabilities throughout their career.

We caution against substituting a generic program leading to a degree such as a "Master of Science in Military Management and Technology" for the traditional technical curricula. Such a generic program, while perhaps appropriate for some warfighters, runs counter to the trend of increasing sophistication of systems and the skills needed to utilize them fully. The Navy would be best served by having a significant fraction of officers familiar with the details of the technology. Navy leaders should consider the advantages of having a "dual-track" graduate education system for both those who use technology and those who foster its development and insertion in support of warfighting needs.

Cost Competition

The CNA report recommended that graduate degree programs for Naval officers be competed from multiple providers including NPS to establish a market mechanism for achieving cost-effective delivery.⁷ However, such a market mechanism requires that the requirements of program offerings are clearly stated and held constant. The requirements to be included in a request for proposals should include:

⁵ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," pp. 60-63.

⁶ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," p. 5.

⁷ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," pp. 71.

- requiring that officers complete a military-relevant thesis
- maintaining a military command infrastructure
- offering classified courses and opportunities for classified thesis research
- providing specialized educational laboratories devoted to military hardware and computer systems
- providing military-relevant course material
- committing to predetermined officer graduation dates
- providing each officer with at least 16 contact hours per week, including in the summer
- letting admissions be determined predominately on military performance, in addition to academic performance, and letting admissions functions be shared with the Navy
- providing refresher and transition courses

and any other requirements, as necessary.

Cost-Effectiveness of NPS in Delivering Graduate Education

The CNA report uses data from the Integrated Postsecondary Education Data System (IPEDS) to compare the costs of NPS graduate education and the cost of education at 28 top ranked civilian universities offering engineering Ph.D. programs. In their comparative cost analysis, CNA concludes "...that in 1993-1994 NPS's expenditures were in the top-quartile for total and educational expenditures per student."⁸ They found that NPS is the most expensive school when the comparison considered only tuition costs for the civilian schools. This leads CNA to recommend strategies to reduce the "high" costs of an NPS education and later to suggest that the Navy consider greater use of civilian schools. In particular, CNA recommended that

"...Navy schools be invited to compete along with civilian schools for contracts to furnish educational services that meet Navy needs. Educational contracts need not go to the lowest bidder, but would presumably go to the most cost-effective provider. Faced with competition, Navy schools would be encouraged to seek out their own opportunities for efficiency gains, eliminating the need to benchmark spending. Even if the Navy makes no changes in its choice of providers, we would expect competition to improve efficiency."⁹

Competition and expanded use of civilian schools can take on three forms: transferring control (and, perhaps, ownership) of NPS to a civilian institution, transferring all officers in particular curricula to another specific civilian sector curricula, and transferring individual or small groups of officers to any of several approved civilian programs.

⁸ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," page 70.

⁹ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," pp. 7.

The cost-effectiveness analysis in the remainder of this report considers the first and third of these options. The cost of the second option should be between the two considered. More specifically, the analysis is designed to answer two questions:

- *Can DoN expect to reduce its graduate education costs by transferring NPS ownership and operational control to a civilian sector university?*
- *Can DoN reduce its graduate education costs by sending officers to civilian institutions rather than NPS?*

To answer the first question, this analysis compares the cost of operating NPS to the total cost of graduate education at civilian institutions, after normalizing for several factors. These factors are: student salaries and benefits, transition and refresher courses, course loads and contact hours, and lower undergraduate costs (the results are summarized in Figures 1 and 2 below). The second question is addressed by comparing the cost of operating NPS to the cost of tuition at civilian institutions. Costs in this comparison are normalized for student salaries and benefits, transition and refresher courses, and course loads and contact hours (these results are summarized in Figure 3 below).

The analysis to follow shows that, after normalizing costs across institutions, the Navy is unlikely to reduce its graduate education costs by transferring NPS operational control and ownership to a civilian institution, unless that institution is willing to subsidize DoN students through its endowment or state tax funding. Similarly, cost savings from sending NPS officers to civilian universities are limited and must be balanced against NPS's unique benefits as described earlier in this report. As a result, a competitive contracting process is unlikely to find a more cost-effective provider than NPS. The detailed analysis supporting these conclusions follows.

An appropriate comparison between NPS and civilian sector alternatives should be structured as a "cost-effectiveness" analysis. A cost-effectiveness analysis is appropriate when it is impractical to consider the dollar value of the benefits provided by alternatives under consideration. Given the difficulty in identifying the dollar value of an NPS or civilian sector education, a cost-effectiveness analysis is appropriate. This approach is the standard for policy and program analysis; it is also mandated by OMB Circular A-94, *Guidelines and Discount Rates for Cost-Benefit Analysis of Federal Programs*. This Circular applies to all agencies of the Executive Branch of the Federal Government, including analyses conducted within or for the Department of the Navy (DoN) or the Department of Defense (DoD).

More detailed guidance for cost-effectiveness analyses is found in many references.¹⁰ The cost analysis portion of CNA's report is most appropriately interpreted as a "fixed effectiveness" cost-effectiveness analysis.¹¹ This approach compares the costs of alternative means to provide a fixed benefit; the least expensive approach is the most cost effective. The key to using this approach is to ensure that the assumed benefits are as consistent as possible across the alternatives.

While the CNA analysis provides a useful first step, it currently falls short of a comprehensive cost-effectiveness analysis. As outlined earlier in this critique, there are significant educational differences between NPS and civilian graduate programs that are not accounted for in CNA's analysis. Many of these have cost impacts that are easily estimated, particularly the refresher and transition courses

¹⁰ For example, *Policy Analysis: Concepts and Practice*, by David L. Weimer and Aidan R. Vining, Prentice Hall, 1989.

¹¹ Weimer and Vining, page 221.

and the extra academic loads taken by NPS students. The cost impacts of these factors will be incorporated here, using data from CNA and N81¹².

There are several differences between NPS and civilian sector graduate programs that bias any comparisons based on IPEDS data, including CNA's analysis. These differences include:

1. Student Salaries and Benefits

The IPEDS data and the CNA analysis consider only the cost of education. Full-time military graduate students receive full salary and benefits while attending school. The total cost of a Master's degree includes both salary and benefits payments and educational expenses. Salary and housing costs can create significant cost differences across institutions if graduate programs differ in duration.

2. Transition and Refresher Courses

NPS offers transition and refresher courses for officers entering graduate programs that differ from their undergraduate degrees and to compensate for any lags between undergraduate and graduate enrollment; civilian programs include only degree-related graduate education, students must be fully prepared before entering the program.

3. Course Loads and Contact Hours (Calendar and OPTEMPO)

NPS requires officers both to carry a heavier class load each quarter and to attend classes more weeks per year than do civilian sector universities. Officers are exposed to more material per time period at NPS than at civilian sector universities.

4. Lower Undergraduate Education Costs (Cross-Subsidies)

NPS has no undergraduate program, while all civilian universities included in CNA's comparison offer both undergraduate and graduate degrees. Graduate education is widely acknowledged to be more expensive than undergraduate education, artificially lowering the cited civilian sector costs relative to NPS.

5. Endowments and State Funding

Civilian-sector universities have endowments or state funding that cover a significant portion of graduate school costs; tuition covers a relatively small portion of total costs.

We now consider a detailed discussion of each of the five cost factors.

1. Student Salaries and Benefits

CNA reports that the average NPS student spends 22.8 months in residence at NPS. This compares to an average program of 24 months for Navy URL officers enrolled in graduate programs at civilian institutions (called "civins") in 1994.¹³ If NPS resident and civins programs are of different

¹² "Memorandum for the Deputy Chief of Naval Operations (Resources, Warfare Requirements and Assessments)," Ser N81/3U639949, 29 March 1993.

¹³ Data are from the Manager of Navy CIVINS programs, Naval Postgraduate School, Monterey CA.

durations, any cost comparison must include the opportunity cost of the officers' time. This is a significant portion of the total cost of graduate education for Navy and Marine Corps officers. N81 estimated the cost of salary, benefits, and housing (referred to as MPN costs) for both NPS-resident and civins students.¹⁴ In particular, N81 estimated that in FY1994 the annual MPN cost per NPS-resident officer was \$63,300, compared with the annual MPN cost of \$72,300 per officer-student at civilian institutions. The higher MPN cost for the civins officer-students reflects differences in housing costs. NPS-resident officers predominantly live in base housing; DoN civins officer-students live in more expensive off-base housing. (Note that NPS MPN costs include base-housing maintenance.)

Using N81's estimated MPN costs, CNA's IPEDS educational cost data, and the average program length for NPS and civins students, we can calculate the present value of the total cost of a master's degree. In this calculation, second year costs are discounted to reflect the time value of money. (Present value calculations reflect the direction in OMB circular A-94 for analyses involving multi-period decisions.) The calculations here use a 2.1% real discount rate; this was the short-term real discount rate mandated in 1994 by Appendix C to OMB Circular A-94. (Appendix C is updated annually, but the 1994 discount rate was used in this analysis for consistency with the 1994 IPEDS cost data.¹⁵) In these calculations, the total educational expenditures in dollars per FTE are assumed to remain constant in real terms (increase in nominal terms at the rate of inflation) during the officer's graduate program.

Incorporating program duration and MPN costs reduces the total cost of an NPS graduate degree relative to civilian sector universities. In particular, NPS's cost of a graduate degree is \$231,024; the most expensive master's degree from the schools on CNA's list is \$387,947 for the California Institute of Technology (Cal Tech), the cheapest degree is \$175,091 for the University of Maryland-College Park. The weighted average cost of a master's degree is \$210,112. This adjustment moves NPS from the fifth to the ninth most expensive school on CNA's list. This reflects both the civins program's longer duration and the higher housing costs. The cumulative effect of this and later adjustments is shown in Figure 1.

2. Transition and Refresher Courses

NPS provides officers transition and refresher courses before they begin their graduate education at NPS. CNA estimates that this accounts for 21% of the time the average officer spends at NPS. According to CNA, the average NPS residency is 22.8 months; by inference from CNA's data, 18 months (79%) is spent in graduate courses and 4.8 months (21%) is spent in transition (20%) and refresher (1%) courses.¹⁶

Transition and refresher courses are not graduate requirements at NPS. In contrast, these courses reflect Navy policy that selects officers for graduate work based on criteria beyond their undergraduate background and academic performance. If the Navy chose to adopt traditional civilian sector admissions standards, these courses could be eliminated from NPS's curriculum. On the other hand, if NPS officers were transferred to equivalent civilian sector programs, these costs would be incurred at the civilian universities.

Transition and refresher course costs are not included in the civilian graduate program costs as measured in the IPEDS database. To include these costs as part of NPS's graduate degree program inappropriately biases the analysis against NPS. To compare NPS and civilian graduate program costs

¹⁴ "Memorandum for the Deputy Chief of Naval Operations (Resources, Warfare Requirements and Assessments)," Ser N81/3U639949, 29 March 1993).

¹⁵ OMB Circular A-94, "Guidelines and Discount Rates for Cost-Benefit Analysis of Federal Programs: Appendix C," revised January 1998.

¹⁶ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," page 66.

more accurately, transition and refresher course costs should be eliminated from NPS's cost base, just as they are from the civilian alternative.

To make this adjustment, the average residency at NPS can be reduced by 21%, to reflect CNA's estimate of the purely graduate course work at NPS. As stated, this reduces NPS average residency to 18 months and NPS's graduate program costs to \$182,919. No adjustment is required for the civilian sector IPEDS cost data. Eliminating transition and refresher course costs from NPS's cost base lowers NPS from the ninth most expensive program to the 22nd most expensive program. *NPS now becomes the eighth least expensive program.*

3. Course Loads and Contact Hours (Calendar and OPTEMPO)

In addition to the preceding differences, a comprehensive cost-effectiveness analysis should correct for differences in program content across alternative institutions. NPS programs satisfy both traditional academic degree and Navy P-code subspecialty requirements. With these dual requirements, NPS programs are likely to include program content beyond that found in civilian institutions. Ideally, a cost-effectiveness analysis would compare NPS program content to the content of corresponding civilian programs. However, detailed program content data is not readily available. In fact, CNA states that they did not consider specific degree programs in their analysis.

There are two possible measures to capture differences in program content, program credit hours and program class hours. Credit hours and class hours are inputs to the education process. However, each can serve as a proxy for program content if this input is similar across institutions. In other words, this comparison is appropriate if there is consistency across the programs in the rate at which faculty can deliver and students can absorb class material. There is no reason to believe that NPS faculty and students are less able to deliver and absorb material than their civilian counterparts.

NPS officers carry a heavier class load per quarter and attend classes more weeks per year than civilian sector universities. In particular, NPS officers typically have 16 contact hours per week and attend classes 48 weeks per year. As a result, the typical NPS officer receives credit for 64 contact hours per year and attends 768 hours of instruction per year. In contrast, civilian sector graduate students typically attend classes 13 hours per week for 32 weeks during the standard academic year. During the summer, some students attend classes seven hours per week for ten weeks. Thus, the typical civilian sector student is unlikely to receive more than approximately 486 hours of instruction per year, including summer classes.

This analysis uses class hours as a proxy for program content. Credit hours have different implications for quarter and semester system programs and cost per credit hour comparisons would not correct for the extra weeks of instruction in the typical NPS academic year. In particular, NPS officers receive 1,152 hours of graduate instruction in the 18 months after they complete their refresher and transition courses. In contrast, civilian institutions provide 972 hours of graduate instruction in their typical 24-month graduate programs. These values are used to convert total graduate program costs to graduate program costs per hour of instruction.

Figure 1 shows the results of combining the adjustments for officer salaries and housing, the need for transition and refresher courses, the forty-eight week NPS school year, and the increased academic load at NPS. (The "expected graduate class premium" assumes that graduate education is twice as expensive as undergraduate education as explained in section 4 that follows.) *Even without this graduate premium, NPS has the lowest graduate program costs per hour of instruction among the universities in CNA's list. NPS's graduate education costs are \$159 per class hour; civilian sector costs range from \$399*

per class hour (Cal Tech) to \$180 per class hour (University of Maryland-College Park). The weighted civilian sector average is \$215 per class hour.

It is interesting to note that the same result pertains if this adjustment is applied to the NPS program including transition and refresher courses. Including transition and refresher courses would increase both class hours and total program costs by the same percentage. Cost per class hour would be unaffected. Nevertheless, both this and the previous adjustment portray important considerations. This adjustment indicates that NPS offers a more intensive instructional program than typical civilian universities. The prior adjustment indicates that NPS officers typically graduate more quickly than students in equivalent civilian graduate programs.

These two adjustments help explain the seeming contradiction between CNA's results and the results reported here. NPS's intensive academic program requires a similarly intensive use of faculty, staff, facilities and equipment. This will increase NPS's annual costs per officer, as reported by CNA. A higher annual cost per officer is the disadvantage of intensive education. However, a more intensive educational program also exposes officers to more material per unit time, allows them to graduate more quickly, and reduces the associated officer salary and benefit costs. These are benefits of the more intensive education. CNA's analysis only measures the disadvantages of NPS's relatively intensive education; this analysis incorporates the advantages. The results reported here indicate that the advantages outweigh the disadvantages.

4. Lower Undergraduate Education Costs (Cross-Subsidies)

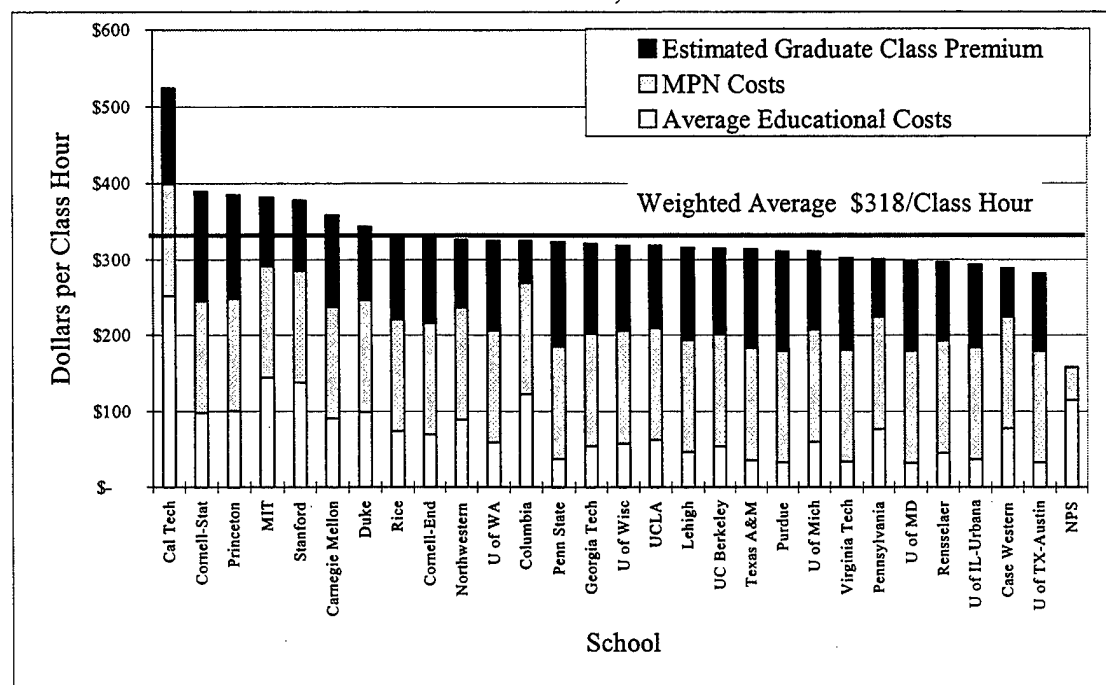
It is generally acknowledged that graduate education is more expensive than undergraduate education. Larger undergraduate class size and instruction by graduate teaching assistants are at least two of the reasons to expect this cost difference. Graduate instruction and research also require more expensive equipment and specialized laboratories, especially if every student is required to complete a Master's thesis. This is particularly significant for technical graduate programs.

Unfortunately, the magnitude of this difference is difficult to estimate. One analysis found that graduate education was two to three times as expensive as undergraduate education in studies conducted by three states: Washington, Florida and Illinois.¹⁷ However, the report noted that each state used a different method to collect data and allocate costs across programs. While this may indicate that cost comparisons are relatively insensitive to differences in data collection and cost allocation, the study's authors cautioned against extrapolating these results to other states.

The CNA report uses IPEDS data that combine undergraduate and graduate costs for all schools except NPS. The 28 comparison schools include a graduate student body that ranges from 15% to 66% of the total student body; the weighted average graduate population is 35% of the student body. Only a portion of these graduate students are in engineering and other equipment- and laboratory-intensive programs. NPS is 100% graduate students, with a relatively high percentage of students in technical and engineering graduate programs. This biases the comparison against NPS.

¹⁷ Peter D. Syverson and Moira J. Maguire, "Estimating Institutional Costs of Graduate Education: Reports from Three States Demonstrate Promise, Pitfalls of Cost Studies," Council of Graduate Schools, 1997.

Figure 1
Comparative NPS Graduate Military Education Costs
 Annual costs per student,¹ with adjustments for students' salary/benefits,² program duration,³
 transition and refresher courses,⁴ course load and contact hours.⁵



¹Student population is defined as full time equivalent students at NPS; fall enrollment elsewhere.

²Military Salary and benefits is \$63,300/year at NPS; \$72,300 elsewhere, reflecting higher off-base housing costs. Program duration is 24 months at civilian universities.

³NPS program duration is 22.8 months, including transition and refresher courses.

⁴NPS graduate program is 18 months, excluding transition and refresher courses.

⁵Civilian universities include 972 class hours (a 24 month program with 13 class hours/week for 32 weeks during the normal academic year, plus 7 class hours/week for 10 weeks during the summer). NPS program includes 1152 class hours (an 18 month program with 16 class hours/week, 48 weeks/year). The NPS cost per class hour would be the same for the graduate program plus transition and refresher courses (class hours and program costs both increase proportionally).

There are at least two ways to account for this inconsistency. One approach uses the IPEDS data to impute a cost per graduate student. CNA provides data on total costs, total full time equivalent (FTE) students (measured in this data by Fall enrollments), and percent graduate student body. Assuming that graduate school costs are two to three times as high as undergraduate student costs, this data can be used to impute a cost per graduate student for each of the civilian sector universities. This will increase the real resource costs of the civilian universities, while not affecting NPS costs per graduate credit hour. The results of this adjustment, assuming that graduate costs are twice as high as undergraduate costs, are reported as the "expected graduate class premium" bars in Figure 1. As expected, this adjustment increases NPS's cost advantage per graduate class hour relative to civilian institutions. In particular, NPS's graduate education cost is \$159 per class hour, as found above; civilian sector costs with graduate premiums range from \$525 per class hour at Cal Tech to \$282 per class hour at the University of Texas-Austin. The weighted civilian sector average costs with the graduate premium is \$318 per class hour.

An alternative correction is to plot the cost per student against the percentage of graduate students for the 28 comparison schools. A trend line can be estimated from this data that projects the average cost per student as a function of the graduate population. The cost per student at NPS can be compared to this trend line to determine if NPS is above or below this trend. This correction is illustrated in Figure 2. Two trend lines have been included for reference: a linear trend line (dashed) and a logarithmic trend line (solid). *In either case, NPS is well below the trend line, indicating that NPS's total cost per student is below the average that would be expected at civilian sector schools with 100% graduate students.*

5. Endowments and State Funding

The IPEDS data reported by CNA indicate that average tuition payments in the civilian sector are only 27.5% of the total cost of education. The remainder is covered by endowments and state tax funding. NPS has no endowment and is currently restricted from developing one. Thus, the Navy must pay 100% of the education costs at NPS. NPS faces an inherent cost disadvantage in providing graduate education for a budgetary cost that competes with civilian sector tuition.

The Navy is concerned about the budgetary implications of its military education decisions. CNA reports that NPS has a significantly higher annual "tuition" cost than all other civilian sector universities. CNA also reports that NPS's annual "tuition" cost is \$59,488; tuition costs for the civilian universities in CNA's analysis range from a high of \$20,014 for the Massachusetts Institute of Technology to a low of \$2,805 for Texas A&M University.

Again, this cost comparison does not consider either the cost of officers' MPN costs or NPS's more intensive educational program. These factors reduce NPS's cost disadvantages in two ways: NPS's intensive instructional program reduces residency requirements at NPS relative to civins for a given class hour requirement, and NPS has lower MPN costs (due to lower housing costs). To account for these differences, the IPEDS data in the CNA report can be modified to include MPN costs and to equate class hours across NPS and civilian universities. To equate class hours, either the NPS program can be shortened to 972 graduate class hours, the typical civilian program requirement, or the civilian programs can be extended to 1,152 class hours, the typical NPS program. The results of the latter modification are shown in Figure 3.

Figure 3 shows that NPS total program costs, including MPN, are the 19th lowest among the 29 schools considered, even when civilian sector schools are valued at their tuition costs. In particular, the present value of NPS's total cost per officer for a 1,152 class-hour program is \$182,900, compared to \$215,500 for MIT (the most expensive program by this measurement), and \$175,300 for Texas A&M (the least expensive program by this measurement). The present value of the weighted average total cost per student is \$191,500. For a 972 class-hour program, the present value of NPS's total cost per officer is \$154,700, compared to \$182,700 for MIT and \$148,700 for Texas A&M; the present value of the weighted average total cost per student is

Figure 2

Projected Civilian Graduate Education Costs per Year

Uses IPEDS data on total education costs and percent graduate student population, reported by CNA, to project education costs as the percent graduate student population increases.

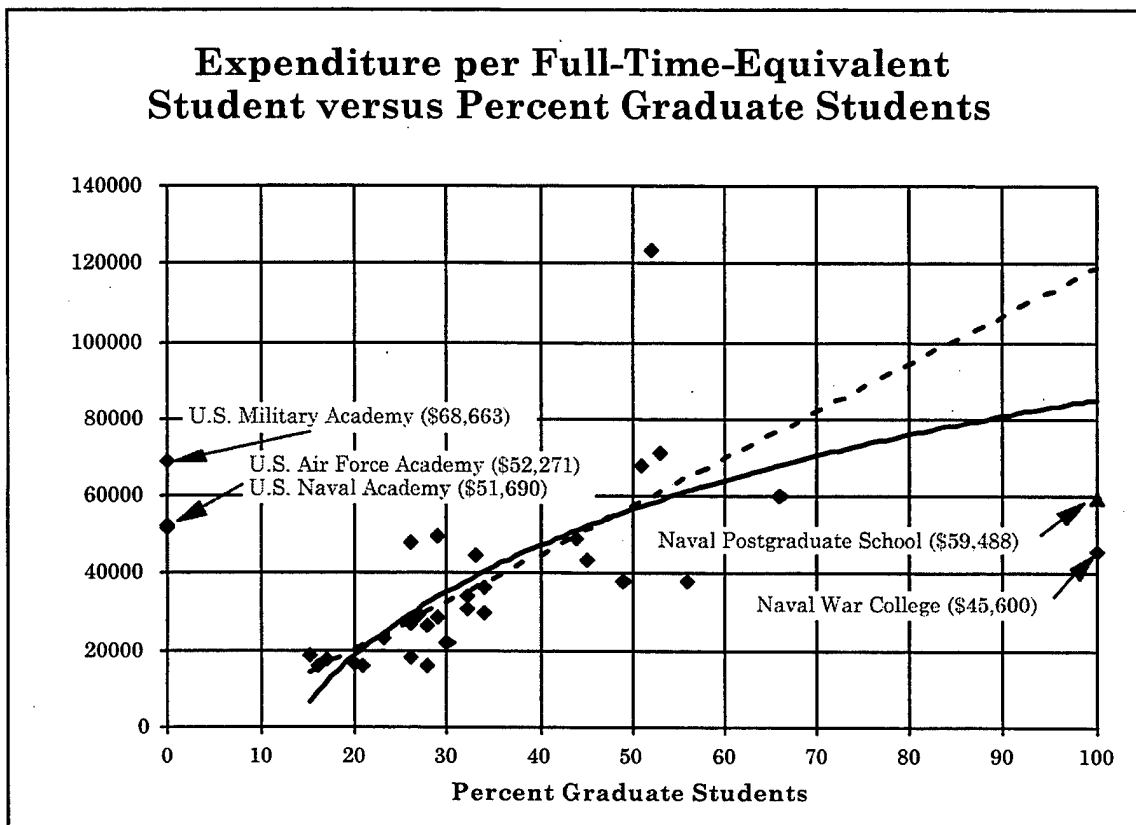
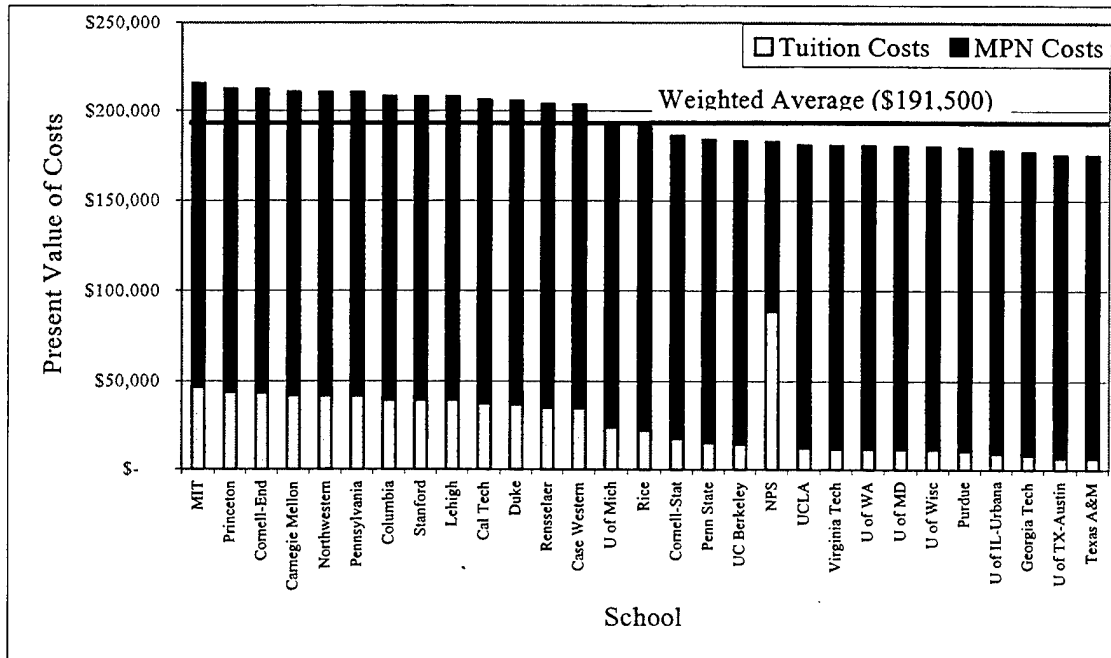


Figure 3
Present Value of Total Program Costs for 1,152 Graduate Class Hours:
Tuition Expense and MPN

Total graduate program costs per student, from IPEDS data reported by CNA, adjusted for program duration and students' salary/benefits, assuming program lengths of 1,152 class hours.



\$162,400. Thus, NPS remains cost competitive with civilian sector schools even if the civilian program costs are valued only at the tuition values plus MPN.

Figure 3 also shows that MPN costs dominate the tuition costs in calculating the total cost of a graduate degree. NPS remains cost competitive with tuition costs at civilian schools, despite their endowment and state tax financing subsidies, because NPS has lower MPN costs. Lower MPN costs reflect the more intensive educational program and lower housing costs at NPS. This distinction is illustrated in Figure 3. Figure 3 breaks the present value of total costs per officer, for a 1,152-hour program into its tuition and MPN cost components. *From Figure 3, it is obvious that NPS compensates for higher "tuition" costs with lower MPN costs. CNA's cost comparison captures only the tuition cost differences; this analysis incorporates the MPN cost implications.*

6. Cost Analysis Summary

The IPEDS data reported by CNA indicate that NPS has higher annual costs per FTE than comparable civilian sector schools. However, this comparison does not indicate that civilian universities could more cost-effectively provide the services NPS offers. In particular, NPS and civilian schools can not be compared on the basis on the IPEDS data; NPS's unique mission and officer body is not comparable to civilian universities without further adjustments.

Preliminary adjustments were described and incorporated in this analysis. In particular, the IPEDS and NPS education costs were modified to:

- reflect the total cost of producing a graduate, including MPN;
- separate the cost of NPS's graduate courses from transition and refresher courses;
- account for NPS's heavier class load and additional weeks of instruction;
- highlight the fact that NPS offers only graduate education while civilian universities also provide undergraduate education, which is less expensive.

After making these adjustments, it appears that NPS provides cost-effective graduate education compared to the civilian universities included in CNA's report. Figure 1 demonstrates that NPS's costs are lower than comparable costs at civilian universities. This comparison is based on total graduate program costs per class hour. Per OMB circular A-94, this comparison measures the real cost of military graduate education, as is appropriate in evaluating public sector programs. This comparison indicates that DoN should not expect significant education cost savings by transferring NPS ownership and oversight to a civilian university; education costs would likely increase.

Figure 3 demonstrates that NPS remains cost competitive with civilian sector universities when evaluated on tuition costs. This reflects NPS's intensive academic program and lower MPN costs. This indicates that the potential total cost savings from sending Navy and Marine Corps officers to civilian universities is limited; in many cases the total costs are higher at civilian universities after correcting for class hours. Of course, any cost savings must be balanced against benefits of NPS as described earlier in this critique.

The results of this cost analysis are consistent with one of CNA's findings. CNA reports that NPS accreditation reviews commented on both the heavy student and faculty workloads. This reflects NPS's intensive academic program. The cost-effectiveness implications of heavy student and faculty workloads and the resulting intensive academic program are not captured by the IPEDS annual education cost data. The adjustments incorporated here account for these factors and more accurately measure cost-effectiveness.

CNA concludes that there are two major factors accounting for the "high" costs of an NPS education: program duration and specificity of the curriculum.¹⁸ The analysis presented here counters these findings. Program duration is largely driven by the Navy's policy of both delaying entry into graduate education after officers complete their undergraduate degrees and requiring some officers to change their course of study from their undergraduate degrees in order to meet Navy needs. This policy has both costs and benefits. This policy is vital to allow the Navy to meet its specialty requirements despite its closed-pipe personnel system that precludes mid-career accessions in areas of Navy need. However, it increases education costs and program length, whether officers attend NPS or civilian universities. If Navy policy requires that officers attend transition and refresher courses, the analysis provided here indicates that NPS delivers these courses more cost-effectively than the civilian universities highlighted by CNA. Transferring officers to resident civilian university programs is not likely to reduce the real cost of the transition and refresher courses. In evaluating NPS's cost-effectiveness it is important to distinguish between the costs NPS controls and the cost implications of the Navy's graduate military education policy.

¹⁸ CNA, "A Bottom-Up Assessment of Navy Flagship Schools," page 72.

There may also be effective alternatives for providing transition and refresher courses. However, the costs and benefits and cost-effectiveness of the current policy and its alternatives (including the opportunity cost of the officers' time) should be systematically evaluated before recommending dramatic changes to the current system.

The analysis presented here also has implications for CNA's P-code utilization discussion. CNA concludes that the P-code system drives curriculum specificity. In turn, this contributes to the "high" cost of an NPS education. With low P-code utilization rates, the resulting high education costs might not be justified. Thus, CNA recommends moving toward a program leading to a generic degree in military management and technology. We feel that such generic approach, with option tracks that allow some specialization, might be appropriate for the URL officer; however, this approach would not meet the Navy's needs for technical subspecialists in the restricted line or specialty communities.

In contrast, the analysis provided here indicates that NPS provides cost effective graduate education despite curriculum specificity. The extent to which curriculum specificity increases program duration through transition and refresher course requirements is unclear and has not been analyzed; thus, the costs of maintaining specificity are unknown. Furthermore, the benefits of NPS's P-code driven educational program has not been assessed. Benefits include the value of P-code driven curriculum versus a more generic curriculum for the restricted and unrestricted line officers that fill exactly matching and closely related P-coded billets. If the value of exact and close matches is significant, and the costs of specificity low, NPS's current curriculum structure may be appropriate. Similarly, it is important to evaluate the benefits of a P-code driven curriculum against the benefits of more generic curriculum for officers who never fill exact or closely matching billets. The additional benefits of a generic curriculum on general officer performance may be significant; or they may be limited. These issues should be assessed in a comprehensive cost-benefit analysis before concluding that the Navy should restructure NPS's curricula because of the current P-code utilization rates. There may well be a convincing argument that the 21st century Navy needs technically educated officers. One should think carefully before mandating that all officers-students should take management degrees.

Critique Summary

In 1909, the Navy decided to make a strategic investment in developing its junior officers. It put in place an enlightened program that allowed its brightest officers, with proven military leadership skills, to recapitalize their intellectual skills at a critical point in their career paths. The leadership decided at that time that civilian universities could not provide exactly the desired program; so they established the predecessor of NPS to provide the environment and the programs that would produce the desired goals. The resulting program can be considered a model for providing mid-career, professional, technical education.

The present curricula and operation of NPS have evolved over time in response to Navy needs. Specifically, NPS programs provide specific benefits to the Navy beyond traditional graduate-degree programs. These benefits include the military relevance of the programs, the specialized facilities that extend this military relevance, the theses and studies that support DoD and the Navy, an admissions process focused on military performance of the officers rather than academic performance, an efficient refresher and transition system that meets the Navy's mid-career professional development of the officer corps in areas of technical need, an intense academic schedule that fully absorbs the officers' energies, and a military infrastructure that keeps the officers fully involved in their profession.

The P-code system was established to meet the shore-based needs of the Navy; it mostly ignores the benefits that graduate education provides to billets at sea. Anecdotal evidence indicates that the benefits of graduate education (e.g., problem analysis, solution synthesis, critical thinking skills, time management) carry over into non-P-coded billets and have special impact at flag rank. The challenge is to devise an assessment system that measures the impact of these skills in order to make critical decisions about benefits and costs of graduate education. The Navy's graduate education must then meet the needs of both the warfighter and the subspecialist; a generic management and technology program cannot provide the level of content required by the subspecialists and some warfighters..

Contrary to the CNA's analysis, our cost study indicates that NPS is highly cost efficient when the following factors are included: (1) the officers' salary and benefits (including housing), (2) the costs of transition and refresher courses that have been established to meet the Navy's policies of delaying graduate study until some on-the-job experience has been obtained and to transition officers into technical areas of study to meet Navy needs, (3) the higher number of hours that officers are in contact with the faculty at NPS, and (4) the extra expense of technical graduate education compared to schools that can subsidize their graduate programs with their undergraduate enrollments.

The Committee cautions that any attempt to have NPS compete for programs against civilian institutions must decide in advance what non-degree benefits will be provided. Must the institutions provide refresher and transition support? Must the institutions accept all officers that the Navy sends or will they apply their existing graduate-program admission standards? Must a thesis be part of the program? These and other requirements need to be addressed in order to fairly compete for provision of the programs.

CNA made also recommendations that the Navy explore the possibility of merging NPS and AFIT, and explore legislative relief to allow the establishment of endowments. These policy revision are outside of the purview of the NPS faculty. The Committee has no objections to the exploration of these issues. CNA also encourages consideration of fencing funding within a fiscal year in order to remove funding instabilities. The Committee welcomes this idea since it would add stability to annual funding cycle.

The Committee believes that the primary question that should have been addressed in any outside study of NPS is whether NPS has accomplished its mission. *Does NPS contribute to the combat effectiveness of the Navy?* While we answer this question strongly affirmative, the CNA study would have been an opportune time for an independent answer. We believe the issues raised in our report are relevant if this inquiry is made.

In closing, we quote Vice Admiral John Scott Redd, Director for Strategic Plans and Policy of the Joint Staff, who earned an M.S. in operations research with distinction from NPS in 1978. During a recent graduation speech at NPS, VADM Redd mentioned that "he had turned in his numbers license long ago," indicating that he was no longer a practicing operations analyst. Nevertheless, the following remarks show that he derives profound and lasting value from his NPS education whether or not he is serving in a matching P-coded billet.

"The purpose of this letter is to put in writing my feelings on the value of the education I received at the Naval Postgraduate School and its impact on my career. The two years my family and I spent in Monterey were among the best in our lives and the education I acquired there has proven priceless. I have experienced first-hand the critical importance of higher education in a naval officer's career. It is important not only for the technical competence and skills gained in specific fields of study, but also for the expansion of one's mental horizon achieved from exposure to a broad range of new ideas. Most

importantly, however, higher education engenders a disciplined manner of examining problems, which is useful regardless of the technical requirements of one's duties.

"Indeed, I have found that the method of thinking and problem solving instilled during my attainment of an operations research degree has been useful in a variety of positions, most of them in the realm of national security policy. At the Naval Postgraduate School I acquired an educational storehouse and critical thought process that I have drawn on throughout my subsequent career, especially after achieving flag rank. All too often, senior leaders do not have time to build new intellectual capital – they just consume it.

"The years I spent in Monterey were important in other ways as well. They allowed me to develop lasting bonds of friendship with my fellow students."¹⁹

¹⁹ VADM John Scott Redd, letter to Prof. Rosenthal dated March 9, 1998.

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