



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

**ACTIVITY-BASED COSTING IN THE
NAVAL POSTGRADUATE SCHOOL**

March 2015

By: Joel Gomez

**Advisors: Stephen Hansen
Wilhelmina Pizzini**

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 2015	3. REPORT TYPE AND DATES COVERED MBA Professional Report	
4. TITLE AND SUBTITLE ACTIVITY-BASED COSTING IN THE NAVAL POSTGRADUATE SCHOOL			5. FUNDING NUMBERS	
6. AUTHOR(S) Joel Gomez			8. PERFORMING ORGANIZATION REPORT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number ___N/A___.	
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) The Naval Postgraduate School is required to report activity costs and set tuition rates annually. The requirement to adequately identify and charge appropriate tuition rates for Naval Postgraduate School programs is critical for complete cost recovery. This thesis reviews the Naval Postgraduate School product lines and applies Activity-Based Costing Theory to provide management with a standard to gauge program and price growth. All Naval Postgraduate School costs are assigned into service and production department costs. Service department costs (indirect and overhead) are accumulated individually and allocated to the Naval Postgraduate School product lines based on cost drivers. The Naval Postgraduate School student load and product line totals are used to reach an average cost per student year.				
14. SUBJECT TERMS Activity-based costing, ABC, direct allocation			15. NUMBER OF PAGES 69	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

ACTIVITY-BASED COSTING IN THE NAVAL POSTGRADUATE SCHOOL

Joel Gomez, Financial Analyst, Civilian, Department of the Navy

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

**NAVAL POSTGRADUATE SCHOOL
March 2015**

Author: Joel Gomez

Approved by: Stephen Hansen, Associate Professor

Wilhelmina Pizzini, Associate Professor

William R. Gates, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ACTIVITY-BASED COSTING IN THE NAVAL POSTGRADUATE SCHOOL

ABSTRACT

The Naval Postgraduate School is required to report activity costs and set tuition rates annually. The requirement to adequately identify and charge appropriate tuition rates for Naval Postgraduate School programs is critical for complete cost recovery. This thesis reviews the Naval Postgraduate School product lines and applies Activity-Based Costing Theory to provide management with a standard to gauge program and price growth. All Naval Postgraduate School costs are assigned into service and production department costs. Service department costs (indirect and overhead) are accumulated individually and allocated to the Naval Postgraduate School product lines based on cost drivers. The Naval Postgraduate School student load and product line totals are used to reach an average cost per student year.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
	A. OVERVIEW	1
	1. Organization.....	2
	2. Product Lines	3
	<i>a. Education</i>	<i>3</i>
	<i>b. Training and Professional Development</i>	<i>4</i>
	<i>c. Research</i>	<i>4</i>
	<i>d. Other Sponsored Activities.....</i>	<i>4</i>
	3. Budget	5
	B. RESEARCH QUESTIONS	5
	C. SCOPE	5
	D. GLOBAL VIEW	6
II.	METHOD	9
	A. UNIT COST RESOURCING GUIDANCE.....	9
	B. ACTIVITY-BASED COSTING	10
	C. SERVICE DEPARTMENT COSTS	13
	1. Financial Framework	13
	2. Department Descriptions.....	14
	D. PRODUCTION DEPARTMENT COSTS.....	19
	1. Education Instruction Department Costs.....	20
	2. Training	22
	3. Research.....	24
	4. Other Sponsored Activities	26
III.	NAVAL POSTGRADUATE SCHOOL ACTIVITY-BASED COSTING MODEL	29
	A. MODELING ISSUES AND LIMITATIONS.....	29
	B. COST POOL ALLOCATIONS TO PRODUCTION DEPARTMENTS.....	31
	1. Cost Pool 1: Indirect	31
	2. Cost Pool 2: Overhead	32
	3. Cost Pool 3: Overhead	34
	4. Cost Pool 4: Overhead	35
	C. SUMMARY	36
IV.	TOTAL PRODUCT LINE COSTS.....	39
	A. PRODUCT LINE COMPARISON	39
	B. AVERAGE COST PER STUDENT YEAR	40
V.	CONCLUSIONS AND RECOMMENDATIONS.....	43
	A. CONCLUSIONS	43
	B. RECOMMENDATIONS.....	43
	C. TOPICS FOR FUTURE RESEARCH.....	44

APPENDIX A. JOB ORDER NUMBER STRUCTURE	45
APPENDIX B. KFS SUB-FUND CODES	47
LIST OF REFERENCES	49
INITIAL DISTRIBUTION LIST	51

LIST OF FIGURES

Figure 1.	Naval Postgraduate School Organizational Chart. The NPS command structure (from Jhoie Pasadilla, personal communication, January 30, 2014).	2
Figure 2.	Global view of total NPS Costs. This figure shows a generalization of how the model works.	7
Figure 3.	Education Resources. This figure shows the sources of funding for education at the Naval Postgraduate School.	21
Figure 4.	Training Resources. This figure shows the sources of funding for training and professional development at the Naval Postgraduate School.	23
Figure 5.	Research Resources. This figure shows the sources of funding for research at the Naval Postgraduate School.	25
Figure 6.	Other Sponsored Activities Resources. This figure shows the sources of funding for other sponsored activities at the Naval Postgraduate School.	26
Figure 7.	Cost Pool 1. Shows the total cost of Indirect service departments including Dean of Students and Academic Affairs. Illustrates the allocation of costs from the forementioned service departments to Education and Professional Development.	32
Figure 8.	Cost Pool 2. Shows the total cost of Overhead service department Comptroller. Illustrates the allocation of costs from the Comptroller service department to Education, Professional Development, Research, and Other Sponsored Activities.	33
Figure 9.	Cost Pool 3. Shows the total cost of the Contracting and Logistics Management overhead service department. This figure illustrates the allocation of costs from Contracting and Logistics Management to Education, Professional Development, Research, and Other Sponsored Activities.	34
Figure 10.	Cost Pool 4. Shows the total cost of overhead service departments including PAO, IG, HRO, President, Provost, Security Manager, Safety Office, Protocol Office, Office of General Counsel, Flag Admin, Facilities, and the Library. This figure illustrates the allocation of costs from the previously mentioned service departments to Education, Professional Development, Research, and Other Sponsored Activities.	36
Figure 11.	Total Product Line Cost. The chart shows the total costs allocated to each of the NPS product lines.	40
Figure 12.	JON Structure with Description (from Paul Effinger, 2012).	45
Figure 13.	Sub-fund Codes in KFS with Descriptions (from KFS Database, 2014).	47

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Service Departments by Type (after Jhoie Pasadilla, personal communication, January 30, 2014).....	11
Table 2.	Product Allocation: newly calculated product line allocation.	37

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

ABC	Activity-Based Costing
CCMR	Center for Civil Military Relations
CLM	Contracting & Logistics Management
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
DOD	Department of Defense
DRMI	Defense Resource Management Institute
FASTDATA	Funds Administration and Standardized Document Automation System
FMT	Foreign Military Tuition
FTE	Full-Time Equivalent
FY	Fiscal Year
JON	Job Order Number
KFS	Kuali Financial System
NPS	Naval Postgraduate School
MWR	Morale Welfare & Recreation
NSAMB	Naval Support Activity Monterey Bay
OPNAVINST	Chief of Naval Operations Instruction
O&M	Operations and Maintenance
RSPO	Resource Sponsored Programs Office
SACS	Southern Association of Colleges and Schools
SJSU	San Jose State University
STARS	Standard Accounting and Reporting System
USPTC	United States Partnership for Peace Training and Education Center
WASC	Western Association of Schools and Colleges
WSCUC	WASC Senior College and University Commission

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would like to acknowledge Professors Stephen Hansen and Wilhelmina Pizzini for their encouragement throughout the thesis process. I greatly appreciate their patience undertaking advising in addition to their existing responsibilities. I am grateful to have them both as my thesis advisors.

I would also like to thank my parents, Joel Marquez Gomez and Maria Gomez, for instilling honorable values in their children. Through their unwavering dedication, I was able to succeed in attaining a graduate education and completing this professional report in the process. I appreciate the support I have received from my brothers and sisters, which gave me the drive to fulfill my goals. I recognize Breonna for being understanding and giving up personal time in support of these efforts.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

As the number of international military students attending the Naval Postgraduate School (NPS) for graduate education rise, the need to effectively identify the costs for graduate education becomes critical. The Naval Postgraduate School has faced budget cut after budget cut, in wake of the need to curb military spending across the Department of Defense (DOD) due to a rising national debt and sequestration.

A. OVERVIEW

The Naval Postgraduate School was established to provide graduate education for United States Navy and Marine Corp Officers. Currently, NPS draws officers from all DOD departments for graduate education. In addition to the DOD, NPS attracts prospective students from other U.S. government agencies, foreign militaries, and U.S. government contractors. The Chief of Naval Operations (CNO) for the Department of the Navy released OPNAVINST (Chief of Naval Operations Instruction) 5450.210D (2012), which determined that the NPS mission was to:

Provide relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. In support of the foregoing, and to sustain academic excellence, foster and encourage a program of relevant and meritorious research which both supports the needs of Navy and Department of Defense (DOD) while building the intellectual capital of NAVPGSCOL faculty. (p. 3)

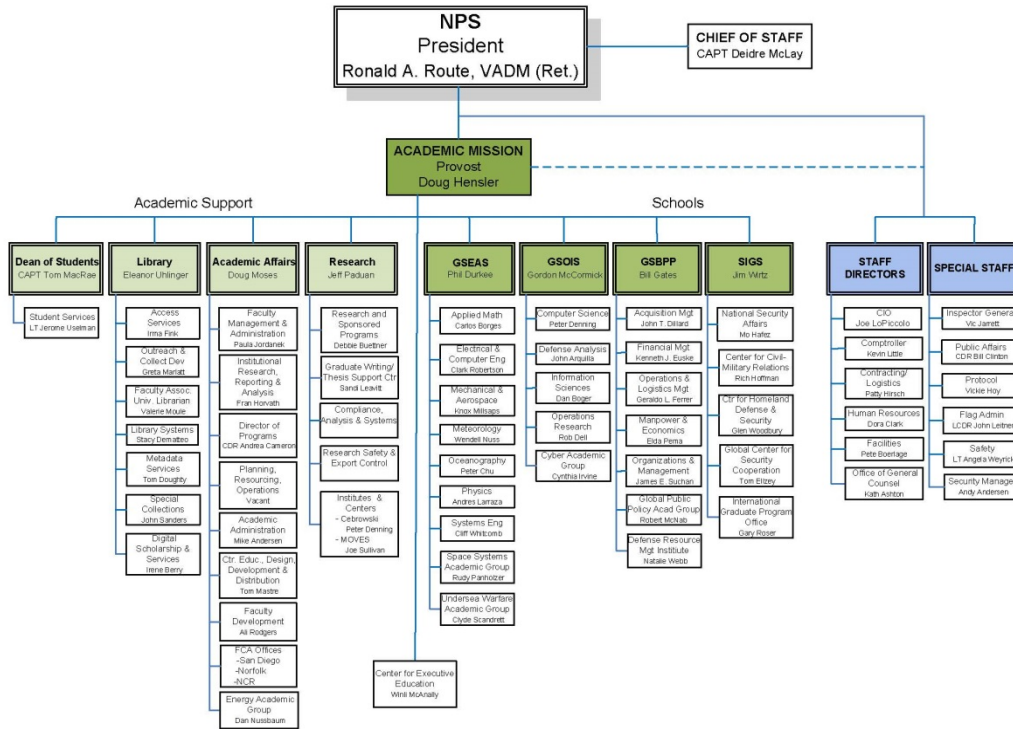
The Naval Postgraduate School is home to various research efforts in support of U.S. government agencies and programs. NPS has its own laboratories to provide faculty and students the tools they need to complete their basic and applied research projects. Other NPS resources include the Dudley Knox Library, close proximity to Fleet Numerical Meteorology and Oceanography Center, and faculty comprised of former military and civilian experts.

1. Organization

The most recent NPS organizational chart created by Academic Affairs is labeled as Figure 1. This chart illustrates the four main components of the Naval Postgraduate School:

- Academic Support
- Schools
- Staff Directors
- Special Staff

NAVAL POSTGRADUATE SCHOOL ORGANIZATIONAL CHART



1/8/2014

Figure 1. Naval Postgraduate School Organizational Chart. The NPS command structure (from Jhoie Pasadilla, personal communication, January 30, 2014).

2. Product Lines

An internal Naval Postgraduate School memorandum identifies the categories of sponsored activities within its purview. The memo defines the main categories to be research, instruction, and other sponsored activities (NPS, n.d.a, pg. 1). This memorandum further distinguishes instruction between sponsored education and professional development on the basis of academic credit. Professional development is instruction or training in which academic credit is not awarded. Given the differentiation in categories, the Naval Postgraduate School effectively has four product lines. All Naval Postgraduate School resources are consumed in support of any combination of these categorized outputs. The academic support, schools, staff directors, and special staff provide the support necessary to facilitate the NPS product lines. The four product lines are:

- Education
- Professional Development/ Training
- Research
- Other Sponsored Activities

a. Education

The education product line entails education delivered by NPS for academic credit. Examples include graduate education in the academic departments in which students are expected to earn a degree. Other examples may include certificate programs which earn education credits towards a degree. Academic credit in the context of the NPS product lines, is meeting the standards set forth by regional accrediting bodies, such as Western Association of Schools and Colleges (WASC) Senior College and University Commission (WSCUC) or Southern Association of Colleges and Schools (SACS). These accrediting bodies have rigorous standards and site visits for certification and renewal (WASC, 2014). Certificates, development courses, and training that does not meet the criteria of education for academic credit as described above, are considered training or professional development.

b. Training and Professional Development

The training and professional development product line includes courses or certificate programs that do not earn education credit as defined by NPS. Examples include developmental or strategic courses offered by the Center for Civil Military Relations (CCMR) or the Defense Resource Management Institute (DRMI). Training and professional development and are used synonymously in the context of this paper.

c. Research

The research product line includes all reimbursable research and Navy research not related to education or training. These costs include both basic and applied research. Research, as defined by NPS (n.d.a):

is the scientific search for knowledge, or any systematic investigation to establish novel facts, solve new or existing problems, prove new ideas, or develop new theories, usually using a scientific method; and includes all of the research and development activities of a institution. (p. 1)

d. Other Sponsored Activities

The other sponsored activities product line includes those reimbursable activities not vetted through the Research Sponsored Programs Office (RSPO) or activities where NPS serves as the Executive Agent for a DOD or Department of the Navy sponsored program. According to the Deputy Secretary of Defense (2002) an Executive Agent is defined as:

The Head of a DoD Component to whom the Secretary of Defense or the Deputy Secretary of Defense has assigned specific responsibilities, functions, and authorities to provide defined levels of support for operational missions, or administrative or other designated activities that involve two or more of the DoD Components. (p. 2)

These costs are not related to training and professional development, education, or research. When NPS serves as the DOD Executive Agent for a sponsored program and it does not fall within the NPS core mission, these activities are labeled other sponsored activities (NPS, n.d.a, p. 2).

3. Budget

According to the Standard Accounting and Reporting System (STARS), the Naval Postgraduate School spent approximately \$312.5M in support of all four product lines in fiscal year (FY) 2013 (STARS database, 2014). A majority of the expenses were linked to civilian labor and associated benefits totaling \$157.4M. Associated benefits include the government's portion of health care insurance premiums, annual and sick leave for federal civilians, thrift savings plan contributions, retirement contributions, etc.

The Naval Postgraduate School receives budget authority from a variety of sources within and outside of the DOD. NPS consumed approximately \$98M in mission funding to support graduate education in FY 2013, according to the same financial database. Roughly \$71.8M was expensed in the form of civilian labor and associated fringe benefits.

B. RESEARCH QUESTIONS

This research addresses the following questions: What level of support do the service departments within NPS provide for each of the four product lines, and what is the average cost of each product line? Which service departments provide support to the NPS product lines? How much should be allocated to each product line? What is the average cost for education?

C. SCOPE

As a standard practice amongst many other educational institutions, the analysis focuses on costs at the institutional level. Costs of support from higher headquarters are not used in these calculations. It must also be noted that costs associated with Commander, Navy Installations Command (CNIC) for building and ground maintenance are omitted. The Morale, Welfare, and Recreation (MWR) programs are a working capital fund, which is considered a separate entity within the Naval Support Activity, Monterey Bay (NSAMB). As such, MWR is not included in the costing model.

Similarly, the cost of student salaries and benefits are not relevant and are omitted from the costing model. The decision of whether or not DOD agencies should send

officers to NPS is not part of the model. The costing model creates a unit/cost measure, which enables management to have greater awareness of unit cost control. If there are cost benefits to send students to civilian universities versus military graduate schools is beyond the scope of this thesis.

The costs that are considered are those that are relevant to the school's main outputs, also known as product lines. Funding in the model includes direct mission funding base operations support, which is categorized as Operations and Maintenance (O&M) appropriated funds. Research, Development, Training & Education funding is used in support of research and supplements the NPS total obligation authority. NPS receives Other Procurement Navy funding for system upgrades, and purchases that are considered other than maintenance. Tuition from other military departments (Army, Air Force, Marine Corp, etc.), U.S. agencies, foreign military tuition (FMT), and contractors are categorized as simply tuition.

D. GLOBAL VIEW

Figure 2 illustrates how we will utilize the available financial data to segregate costs. Total NPS costs include mission funding, reimbursable research, tuition, and other sponsored activities. In Figure 2, the total NPS costs are separated into two distinct groups: production department costs and service department costs. Production department costs are represented by the blue section in Figure 2. Service department costs are signified by the yellow section. Total costs by product line are represented by the green box.

(1) Service Department Costs

Service department costs are the summation of the special staff and staff director costs regardless of source. Service departments usually support multiple production departments. These costs are then allocated to each NPS product line based on a chosen cost driver.

(2) Production Department Costs

Production department costs are costs in direct support of a single product line. These costs are traceable from their funding source to their respective product line. We characterize production department costs as mutually exclusive to one of the four product lines.

(3) Total Cost by Product Line

The newly allocated service department costs are then combined with their respective product line and are represented by the green box. The production department costs are then added to their corresponding product lines. The result is the NPS total cost by each of the four product lines. Once the total product cost are calculated, we can divide by the total output to reach average cost per output.

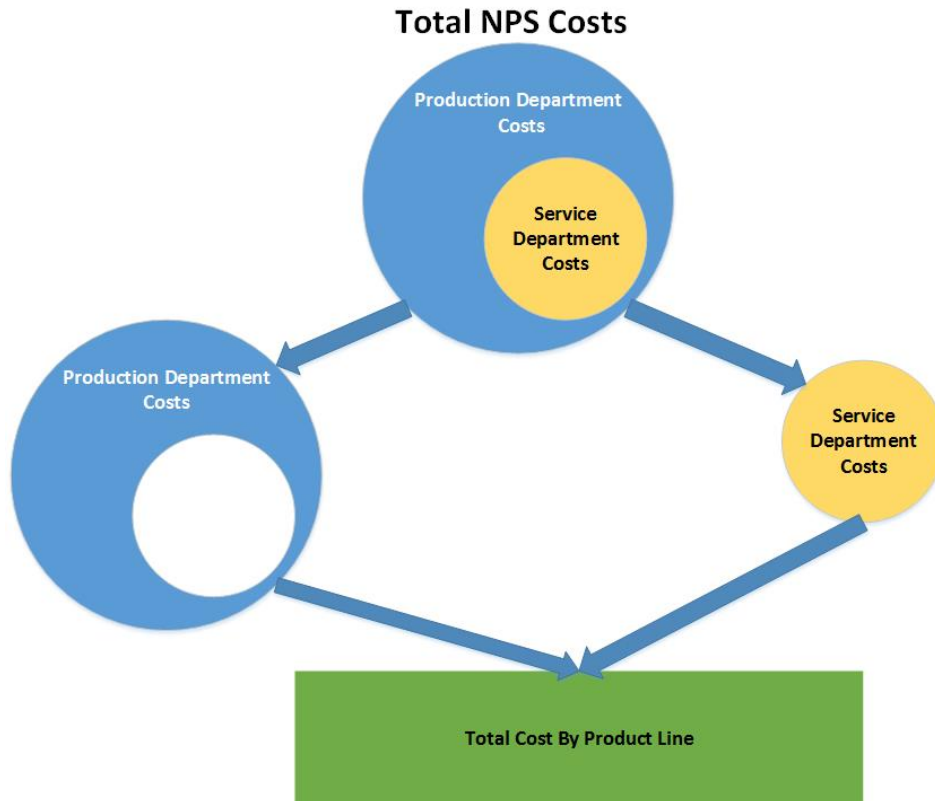


Figure 2. Global view of total NPS Costs. This figure shows a generalization of how the model works.

THIS PAGE INTENTIONALLY LEFT BLANK

II. METHOD

This chapter reviews the principles of the DOD unit cost resourcing guidance as described by DRMI and how it can be applied to the Naval Postgraduate School. All NPS departments are categorized and aligned using a hybrid of these methods. This chapter is used as an outline for the activity-based costing model.

A. UNIT COST RESOURCING GUIDANCE

The unit cost resourcing guidance gives government agencies a method to relate the total cost of activities inputs, to outputs (Defense Resource Management Institute [DRMI], 2012, p. 1). In addition, inputs are resources consumed by an activity which may include dollars spent, civilian and military labor, materials, depreciation, capital equipment, and contracts. These inputs are categorized into three cost categories: Direct, Indirect, and Overhead (also known as general and administrative costs). Direct, Indirect, and Overhead costs mentioned in this report from this point forward will be in reference to the NPS institutional product lines.

(1) Direct Costs

Direct costs for each of the four product lines are easily traceable to a product, service, or output. Direct costs have high correlation with production department outputs. Direct costs may be fixed and/or variable in nature. Direct costs for research may include direct labor charged by the researcher, equipment, or even lab supplies.

(2) Indirect Costs

Indirect costs are costs that are attributable to multiple product lines, but not all of them. This is evident in some of the service departments that only exist to support some of the academic groups. For example a science lab may only be used by various academic groups (education) and research, but is very difficult to trace its costs to a single output.

(3) Overhead Costs

Overhead costs are the general administrative support department costs which are used by all product lines. At NPS, we can categorize various departments as overhead

costs. The Comptroller Department (also known as the Financial Management Directorate) can be classified as an overhead cost, since it provides support for all activities within the command. Contracting and Logistics Management (CLM) also provides support to all product lines at the Naval Postgraduate School. Security and safety are normally considered as overhead costs due to the difficulty in determining the associated outputs.

(4) NPS Unit Cost Resourcing

All NPS activities can be categorized under one of the three cost categories using the unit cost resourcing guidance. Production department costs were previously defined as those costs which can only be attributed to a single product line, or output. This means that each production department is a direct cost to its respective product line. Service departments that support a single product line are considered a direct cost to that product line and will be grouped with production department costs. The remainder of service departments will be categorized as either indirect or overhead. Indirect costs are defined by DRMI as those not directly traceable to a single output, nor is it traceable to all outputs (DRMI, 2012, p. 9). Service departments which support multiple product lines, but not all product lines will be the indirect costs for NPS. Conversely, those service departments which support all NPS product lines will be labeled as overhead.

B. ACTIVITY-BASED COSTING

Activity-based costing (ABC) provides a platform to split indirect and overhead costs among multiple products. An ABC model will be used to answer the question “What is the average cost for NPS education and professional development?” Activity-Based Costing is used to allocate service department cost pools to production departments. ABC attempts to interpret a causal correlation (cause-and-effect relationship) between the consumed service department resources and the production department’s product/service (Hilton, Maher, & Selto, 2008, p. 382). The metric used to define the cause-and-effect is labeled as a “cost driver.”

The initial step is identifying and classifying our production departments. We defined our production departments as groups or divisions which are directly attributable

to one of the four product lines. The education-for-credit product line, also referred as the education production department, would be equivalent to the academic departments that teach and facilitate classes which are categorized as earning academic credit. The research production departments include RSPO and the research groups in support of basic and applied research. The production departments for professional development and training would include academic groups which directly facilitate the professional development/ training which do not qualify for academic credit. The other sponsored activities production departments include those groups or tenant activities which are directly related to their respective program.

The service departments are listed in Table 1. In this table the Naval Postgraduate School command structure is broken into four sections: executive administration, academic support, staff directors, and special staff. Executive Administration includes the NPS President and Provost offices. Policy and institution oversight are the main goals of the executive administration. Academic support includes services such as the Dean of Students, the Dudley Knox Library, Academic Affairs, and Research. Staff directors include the Chief Information Officer (CIO), Comptroller, and Contracting & Logistics Management, Human Resources Office, the Facilities director, and the Office of General Counsel in addition to their associated offices. Special staff includes the Naval Postgraduate School Inspector General, the Public Affairs Officer, Protocol, Flag Admin, the Safety Office, and the Security Manager in addition to their corresponding staff.

Table 1. Service Departments by Type (after Jhoie Pasadilla, personal communication, January 30, 2014)

Executive Administration	Academic Support	Staff Directors	Special Staff
President	Dean of Students	Chief Information Officer	Inspector General
Provost	Library	Comptroller	Public Affairs Office
	Academic Affairs	Contracting & Logistics	Protocol
	Research	Human Resources	Flag Admin
		Facilities	Safety Office
		Office of General Counsel	Security Manager

This model uses the ABC direct allocation method to allocate service department costs to the production departments. The direct allocation method ignores support between service departments (Hilton et al., 2008, p. 385). Accurately determining the best available cost driver is crucial to having an accurate, dependable model in addition to management buy-in.

(1) Cost Drivers

One method of creating a list of possible cost drivers is to find commonalities between the resources used by service departments, and their outputs. For example, the Naval Postgraduate School Human Resources Office is a service department that initiates and submits paperwork for new employee hires, terminations, and wage increases/adjustments. In addition to these duties, the Human Resources service department also gives retirement advice to federal employees, provides health benefit listings, and updates personnel data. Possible cost drivers may include the number of employee's hired, total full-time equivalent employees, number of employee actions completed, or number of terminations. A more accurate model is created by selecting a cost driver characteristic or activity that is perceived to have a causal correlation with the total service department costs (Hilton et al., 2008, p. 153). While there is not a single correct answer, selecting a bad cost driver may affect the integrity of the model, or general consensus of the final results.

(2) Cost Pools

Cost pools are defined as cost items grouped by commonalities (Hilton et al., 2008, p. 147). In this model, we define cost pools by type (direct, indirect, overhead), and combine them with identical cost drivers where appropriate. A caveat to creating cost pools is that they must support the same mix of production departments. Having multiple cost pools allows the model to allocate overhead more accurately than a single cost pool for all service departments. The idea is to find a balance in the number of cost pools to avoid creating a burdensome costing model, yet have confidence that each cost pool is accurately represented by the selected cost driver (Hilton et al., 2008, p. 145). The result is a simplistic model that can readily and easily be compiled, calculated, and reviewed.

C. SERVICE DEPARTMENT COSTS

The service department costs are the sum of its costs, regardless of funding sources. By ignoring the funding source, we can remove any subsidies that may exist between products. Costs are measured in FY 2013 dollars, in this case. The following four paragraphs will outline the financial framework used to calculate and allocate costs to the NPS service departments initially.

1. Financial Framework

The service department costs are collected by job order number (JON), segment, object class code, and site in the Navy's Funds Administration and Standardized Document Automation System (FASTDATA) and STARS financial systems. Service departments have multiple JONs to facilitate budgeting and accounting requirements for sub-groups within it. The Job Order Number, description, and site may be used to capture service department costs.

The current JON structure was revised in the past three years to reflect financial information not readily available in the existing accounting system. See Appendix A for a complete listing of the JON structure and descriptions. In FY 2013, there were 23 characters that defined the first character of a JON. The first character is meant to distinguish the funding source and the purpose of the funding. For example, any JON that begins with "F" is labeled as reimbursable foreign military tuition as seen on Appendix A. The source of the funding is the Naval Education and Training Security Assistance Field Activity and its purpose is to pay tuition costs to NPS for the foreign military students.

In FY 2013, there were 35 alpha-numeric characters used to distinguish department costs utilizing the second character of the JON. The second character of the JON is used to mark the center/department/program which will be making obligations against the source of funding. Using this template in Appendix A we can conclude that a JON in which the second character equals "B" is an account used by CCMR. Using this naming structure we can create cost pools for each of the 18 service departments.

NPS has created a two-digit code assigned to JONs in the Kuali Financial System (KFS) to track the NPS product lines. These codes are call Sub-Fund Group Codes, and are only available in the Kuali Financial System. These sub-fund code descriptions are available in Appendix B. Using simple Excel functions or pivot table, we can select the required fields for a complete financial flat file with categorized financial data.

2. Department Descriptions

In the following paragraphs, we will look at the various product and service departments to determine their purpose, which NPS products they serve, and which cost driver will be used to allocate their costs. Naval Postgraduate School department descriptions are available on the NPS intranet. This provides roles and responsibilities which may be used to choose a cost driver. See reference (Administration Resources, n.d.)

(1) Dean of Students

The Dean of Students Office is academic support for students. The Dean of Students exists solely to support education and professional development at NPS. The Dean of Students is an indirect cost related to the education and professional development product line. A viable cost driver for the Dean of Students would be program dollars. All costs associated costs for the Dean of Students will be allocated on the basis of obligated program dollars.

(2) Library

The Dudley Knox Library provides support for all students on campus and a vast archive of data for researchers. Finding a cost driver for the library proved to be difficult, due to the variation in the types of customers it serves. Graduate students and research faculty use the library differently. Without creating an entry log to track the varying library usage, a measurable cost driver is not readily available. Since the library serves all product lines, it is overhead and will be allocated to all. The cost driver for the library will be full-time equivalent (FTE) staff and faculty. Library costs will be allocated to all production departments based on FTE faculty and staff.

(3) Academic Affairs

Academic Affairs is institutional support of faculty within the academic departments. Academic Affairs costs are academic support. Academic Affairs supports the education and professional development product lines. The cost driver for Academic Affairs will be obligated program dollars. Academic Affairs costs will be allocated by the proportion of obligated program dollars in each product line.

(4) Research

Research capabilities at NPS are dependent on the resources available to faculty, students, and staff. NPS has approximately 15 labs and facilities to assist with research efforts (NPS, n.d.b). Research at NPS is the result of the efforts of roughly 25 research centers (NPS, n.d.b). Although research is categorized as academic support within NPS, research serves as one of its four product lines. It is a direct cost of the research production. These costs will include all reimbursable research including Navy research.

(5) Chief Information Officer

The Chief Information Officer at NPS is the director responsible for the information technology infrastructure and ongoing support base-wide. Costs for the CIO will be categorized as overhead support for education, professional development, research, and other sponsored activities. Various cost drivers may be appropriate for the CIO. Common acceptable cost drivers include: number of computer systems, internet traffic, server space used, and help desk calls. Unfortunately, this information was not readily available in a timely manner. The cost driver for the CIO will be the number of FTE staff and faculty.

(6) Comptroller

The Naval Postgraduate School Comptroller is the financial manager responsible for reviewing, validating, and signing financial documents and agreements. Other areas of responsibility for the Comptroller include accounting, timekeeping, funds receipt, budgeting, and travel.

The Accounting Department duties include accounting entries or adjusting entries in the official accounting systems. The Accounting Department is also responsible for sending requests for contractual procurements to the Naval Supply Systems Command Fleet Logistics Center San Diego and ensuring sufficient funding is available for payments.

Timekeeping is responsible for time sheet accuracy and certifying all labor transactions at the Naval Postgraduate School, with exception of military personnel and contractors. Timekeeping must process supplemental time sheets to ensure leave is properly accounted for, and the appropriate JON is charged for the correct number of hours.

Funds receipt has the responsibility of receiving funding documents from various commands and agencies within and outside the DOD. Funds receipt also assigns JONs to the funding documents in order to allow various programs and departments to track and budget expenditures.

The Budget Division is responsible for the Naval Postgraduate School reporting requirements submitted to the budget submitting office. The financial systems and the overview of NPS obligation authority are also held by this division.

The Comptroller is categorized as overhead support to education, professional development, research, and other sponsored activities. Due to the wide variety of activities within the financial director's purview, the Comptroller costs will be allocated to all four product lines on the basis of obligated program dollars.

(7) Contracting/Logistics

Contracting and Logistics Management is responsible for preparing and awarding contracts for all four product lines on base. Contracting and logistics also posts contract requirements on FedBizOpps.Gov in order to solicit requirements with the public.

The contract specialists and purchasing agents at NPS are overseen by the Contracting and Logistics Management for those purchases between specified thresholds. The CLM is an overhead support for all four product lines at NPS. Costs for Contracting

& Logistics will be allocated using the amount of contract dollars awarded. Using contract dollars awarded would appear to be the best cost driver identified that is both available and quantifiable.

(8) Human Resources

The Human Resources Department is responsible for initiating all civilian personnel actions at NPS. Human Resources plays a role in hiring, terminating, promoting, re-assigning, civilian personnel within NPS. Human Resources provides support for all four product lines at NPS. Human Resources costs will be allocated on the basis of civilian FTE.

(9) Facilities

The Facilities director is the NPS liaison for naval facilities and the resident officer in charge of construction. Facilities costs are a common cost among all four production departments. Facilities are an overhead cost and should be allocated to every production department. The parametric approach is a common standard to allocate or project facilities costs. Since this data is not readily available, full-time equivalent would be a suitable alternative. The Facilities director costs will be allocated based on FTE and supports all four product lines.

(10) Office of General Counsel

The Naval Postgraduate School Office of General Counsel is responsible for all NPS legal requirements. It provides legal advice to NPS leadership. The Office of General Counsel provides support for all four product lines at NPS. Office of General Counsel is an overhead cost for all NPS activities. The allocation of the General Counsel costs will be based on the number of FTE personnel. The rationale is that the Office of General Counsel is used by all four product lines, and the number of persons in each product line is a sound cost driver to allocate costs.

(11) Inspector General

The Naval Postgraduate School Inspector General is responsible for reviewing cases for fraud, waste, and abuse within the Naval Postgraduate School. The role of the

NPS Inspector General includes auditing, investigations, inspections, internal reviews, assessments, and inquiries (Administration Resources, n.d.). The investigative function of the inspector general's office is not bound by the product lines. The NPS Inspector General extends to all NPS product lines and activities. These costs will be allocated to the product lines using FTE personnel.

(12) Public Affairs Office

The Public Affairs Office is responsible for reviewing the release of NPS information to the public. This is an institutional cost which relates to all NPS mission areas and is an overhead cost. All Public Affairs costs will be allocated to education, Training and professional development, research, and other sponsored activities on the basis of FTE personnel.

(13) Protocol

The Protocol Office is responsible for planning, coordinating, and implementing visits from elected officials, U.S. military flag officers, Senior Executive Service members, and foreign military officers according to their NPS website (Administration Resources, n.d.). These services are available for all product lines at the Naval Postgraduate School. The costs for running the Protocol Office will be an overhead cost. The Protocol Office costs will be allocated on the basis of FTE personnel.

(14) Flag Admin

The Flag Administration Office is in support of the President. The office is responsible for reviewing, revising, creating, and disseminating instructions and standard operating procedures at the will of the NPS President. Flag Administration costs will be allocated amongst all NPS product lines on the basis of FTE personnel.

(15) Safety Office

The Safety Office is responsible for safety procedures, policies, and regulation within NPS. The current Safety Office now encompasses the Research Safety Office. Since both offices have merged into a single unit, there is no longer an ability to easily allocate costs to each product line. The Safety Office is an institutional cost which

supports all four product lines at NPS. It is an overhead cost to the Naval Postgraduate School. The allocation of Safety Office costs will be based on the number of FTE personnel.

(16) Security Manager

The Security Manager is responsible for security inspection, the security of all classified material at NPS, security investigations, and security clearance according to their mission statement (Administration Resources, n.d.). The Security Office provides foreign travel guidance for all NPS personnel. The Security Manager is an overhead cost which supports all four product lines at NPS. The allocation of the Security Manager will be based on the number of FTE personnel.

(17) President

The Naval Postgraduate School President's Office is part of the executive administration responsible for oversight of all four product lines at NPS. The costs to operate the NPS President's Office are overhead to all four NPS product lines. The Chief of Staff is included as part of the President's Office. Costs for the NPS President's Office will be allocated to all four product lines by the number of FTE personnel.

(18) Provost

The Provost is responsible for all four product lines, similar to the NPS president. The Provost's costs are overhead costs for all NPS product lines. Costs for the Provost will be allocated by the number of FTE personnel. The provost responsibility center can be combined with the president, since both are considered executive administration.

D. PRODUCTION DEPARTMENT COSTS

The production department costs are those costs which can be logically connected to a single product. For this thesis, we define production department costs as costs tied to only one Naval Postgraduate School product line. This infers that production department costs must be mutually exclusive to one of the four product lines NPS has to offer. The Research and Sponsored Programs Office was previously identified as supporting the research product line unequivocally. However, it should be noted that RSPO provides

some level of support to programs which are not exclusively research. Due to the limitations of the financial data, generalizations and/or assumptions are made to complete this report in a reasonable time frame. For this reason, the cost of RSPO will be included as a production department cost, not a service department cost.

The production department cost outlined in this section is the residual costs after the service department costs were identified. This field includes programs, projects, and activities which could not definitively be linked to a service department, or were directly linked to product lines. Examples include the United States Partnership for Peace Training and Education Center (USPTC). Although the USPTC was a Naval Postgraduate School Provost initiative, the program is closely tied to training and education. For this reason, it was appropriate to use the sub-fund code to distinguish the program's training and education costs. The same process was used for various other programs at the Naval Postgraduate School. The following section will break down what is encompassed in production department costs and other general information.

1. Education Instruction Department Costs

The education instruction department instruction costs are in direct support of the education product line. Direct civilian labor, military labor, and non-labor are the three main expense categories. Education for credit is tracked by the accounting systems using the JON structure and sub-fund codes. Actual military labor costs are not available at NPS for review and are often calculated using published military composite rates. Military costs will be omitted from the costing model and are a topic for future research, as discussed in Chapter V.

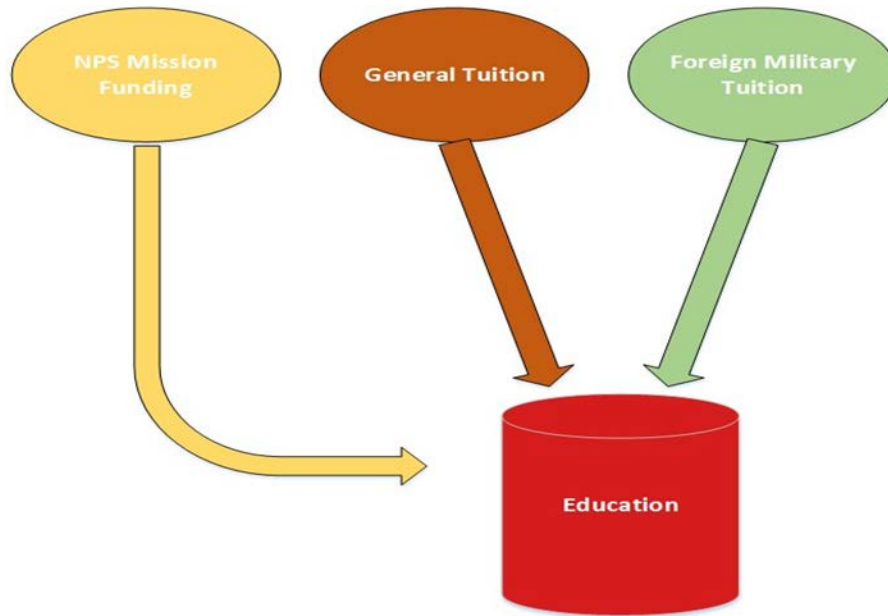


Figure 3. Education Resources. This figure shows the sources of funding for education at the Naval Postgraduate School.

(1) Civilian Labor for Education

Faculty labor and staff support are two forms of direct civilian labor in support of education. Faculty labor costs for instruction are also known as direct teach. Next, other labor costs are assigned to academic department. These costs are costs for civilian staff labor and non-teaching faculty. Lab technicians and staff support are included in the in the “other” category. The direct civilian labor for education could be traced back to the academic department. Civilian labor costs are traced in NPS financial systems using object class codes and expense elements. The expense element for civilian labor is designated by a “U” in both FASTDATA and STARS. Fringe benefits are rates are included in the same expense element as civilian labor, and were not separated. All civilian benefits are charged against the Naval Postgraduate School’s O&M funds which are exclusively in the education product line.

(2) Military Labor for Education

The Hicks, Hunter, and San Miguel thesis makes the assumption that all military officers are dedicated entirely to instruction (1991, p. 59). The Naval Postgraduate School has military officers and enlisted personnel to support various functions. I contend

that there are military officers in the academic departments who should be considered another form of support. For example, there are military deans in the schools who do not teach students in addition to officers with a hand in research. The non-teaching military officers in the departments are categorized as military staff.

The military officers that provide instruction for education are included in this section as direct military instruction. The officer's rank is then used to calculate his/her salary and benefits, using the Undersecretary of Defense (Comptroller) military composite rates (Roth, 2012, p. 3). Currently, information is not readily available to tie military labor to departments and product lines.

For purposes of allocating costs to academic departments on the basis of instruction, all military staff and faculty are omitted from the ABC model. Incorporating the cost of military staff and faculty in an activity-based costing model is listed as a possible topic for future research.

(3) Non-Labor for Education

Non-labor costs are reported in the FASDATA and KFS financial systems by academic department. Non-labor costs include various expense element categories including: equipment, supplies, printing, purchased services, fuel, etc. Non-labor costs include contracted labor under purchased services, due to the inorganic nature of contracted personnel.

2. Training

Training and professional development are those activities in which students attend courses and trainings that do not award credit for education as described by accreditation standards set forth by boards such as WASC. Training courses are provided for various blends of civilian and military students. Figure 4 shows the funding source types actively used to pay for training and development. The types in no particular order are: NPS mission funding, general tuition, foreign military tuition, and reimbursable mobile education teams.

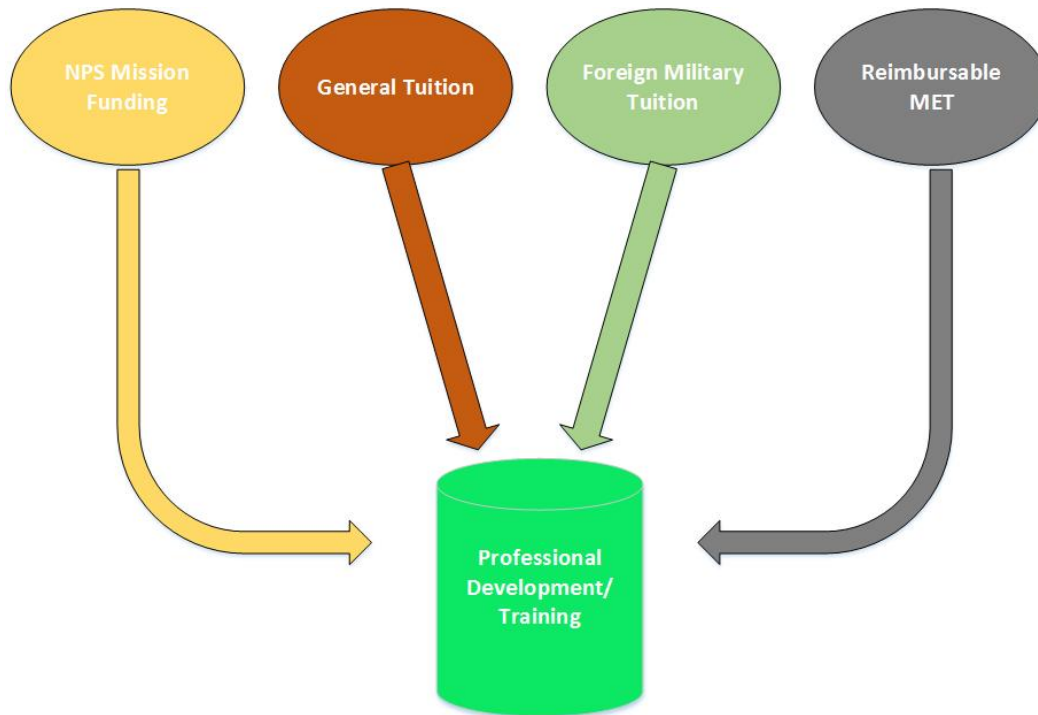


Figure 4. Training Resources. This figure shows the sources of funding for training and professional development at the Naval Postgraduate School.

(1) Civilian Labor for Training

Civilian labor costs for training or professional development are identified by the sub-fund code and expense element in KFS, FASTDATA, and STARS. Civilian costs may include labor for instructors, administrative staff, and management. Labor cost categories include course maintenance, course creation, course instruction, administrative staff support, and management activities. Civilian labor omits contracted labor used for professional development and training courses. Contracted labor is accounted for in the non-labor section for training. Training and professional development is provided by programs like DRMI, International Defense Acquisition Resource Management, and CCMR.

(2) Non-Labor for Training

Non-labor costs are used for the development and delivery of training or professional development. This may include travel, per diem, fuel, supplies, equipment, and contracted services. Non-labor expenses differ greatly with varying training environments and locations. Training is provided in various locations including on-site at the Naval Postgraduate School, neighboring facilities and commands, and even in foreign countries. Contractors paid under the expense element for contracted services are included with non-labor for training due to their inorganic nature. Contracted personnel may be used to facilitate training, develop courses, or other administrative activities. Contractors may be utilized in the capacity of a guest speaker or as the prime training facilitator.

(3) Military Labor for Training

Military labor for training includes military support for professional development and training courses taught at NPS in resident courses or abroad by distance learning. Information regarding military assignments with respect to product lines within NPS is not readily available. For purposes of allocating military support costs to training and professional development, all military staff and faculty are omitted from the ABC model. Incorporating the cost of military support in an activity-based costing model is listed as a possible topic for future research.

3. Research

Research is a product line to capture all reimbursable research including Navy sponsored research. Research was previously defined as a scientific search for knowledge to solve new or existing problems (NPS, n.d.a, p. 1). Research includes various activities such as student thesis support, independent study, cooperative research and development agreements, and conferences. The funding sources include NPS mission funding and reimbursable research, as seen in Figure 5.

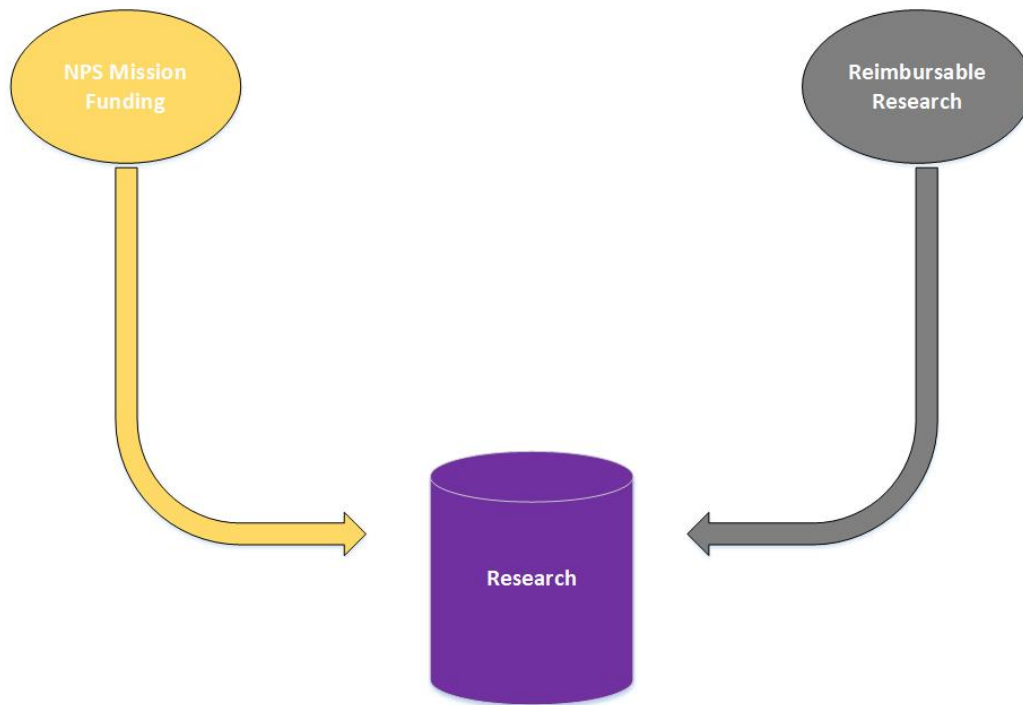


Figure 5. Research Resources. This figure shows the sources of funding for research at the Naval Postgraduate School.

(1) Civilian Labor for Research

Civilian labor for research will include labor charged to reimbursable JONs in support of research. Civilian labor costs for research include lab technicians, staff support, principal investigators, research assistants, and research faculty. Labor costs assigned to the Research Sponsored Programs Office are included in this category.

(2) Non-Labor for Research

Direct materials required for research are categorized as non-labor costs for research. This would include research related travel costs, equipment, supplies, fuel, contracts, transportation, and various other categories. Note that contracted labor costs are categorized as service contracts by the accounting system.

(3) Military Labor for Research

All military personnel traced to academic departments supporting research are military labor support for research. This includes lab technicians, staff, and research

assistants. Information regarding military assignments with respect to NPS product lines is not readily available. For purposes of allocating military support costs to research, all military staff and faculty are omitted from the ABC model. Incorporating the cost of military support in an activity-based costing model is a possible topic for future research.

4. Other Sponsored Activities

Other sponsored activities are those activities which are not classified as either education for credit, training and professional development, or research. Examples of other sponsored activities within the Naval Postgraduate School include the U.S. Army Training and Doctrine Command, Center on Contemporary Conflict, and the Science, Mathematics & Research for Transformation program. These funding sources are routinely reimbursable other sponsored activities, as seen in Figure 6.

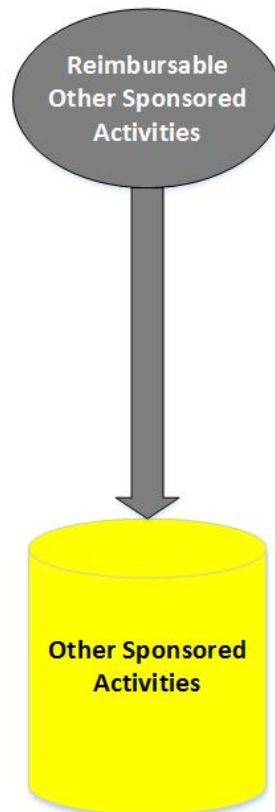


Figure 6. Other Sponsored Activities Resources. This figure shows the sources of funding for other sponsored activities at the Naval Postgraduate School.

(1) Civilian Labor for Other Sponsored Activities

Civilian labor costs for other sponsored activities are pooled together from activities and programs which are not affiliated with education for academic credit, training and professional development, or research. This may include administrative functions that reside at the Naval Postgraduate School.

(2) Non-Labor for Other Sponsored Activities

Non-labor for other sponsored activities includes costs for equipment, supplies, travel, service contracts, utilities, and other expenses.

(3) Military Labor for Other Sponsored activities

Military labor in support of other sponsored activities is defined as the added costs for military personnel assigned to other sponsored activities. The DOD military composite rate and military rank are used in the calculation for military personnel. Information regarding military assignments with respect to product lines within NPS is not readily available. For purposes of allocating military support costs to other sponsored activities, all military staff and faculty are omitted from the ABC model. Incorporating the cost of military support in an activity-based costing model is listed as a possible topic for future research in Chapter V.

THIS PAGE INTENTIONALLY LEFT BLANK

III. NAVAL POSTGRADUATE SCHOOL ACTIVITY-BASED COSTING MODEL

This chapter discusses issues and limitations of the Naval Postgraduate School activity-based costing model. This is followed by the aggregate costs pools and allocations to the Naval Postgraduate School product lines. Finally, the summary illustrates the effect of the allocations to each product line in dollars.

A. MODELING ISSUES AND LIMITATIONS

This section reviews the issues and limitations of the Naval Postgraduate School ABC model, including: financial data, relevant range, military personnel, service department support, capital equipment, and contracted support. This is a list of the most problematic issues and limitations of the model, not a comprehensive list of all possible issues.

(1) Financial Data

This model is limited by the accuracy of the data available given the current financial procedures and accounting practices. Accuracy of the financial data could not be verified due to time constraints. The value in using auditing techniques such as randomly sampling to test the accuracy of accounting information is reviewed as a topic for future research.

(2) Relevant Range

The model is limited to developing a methodical approach to capture marginal or average costs inside the relevant range. The relevant range is where cost patterns can be expected to be reasonably accurate (Hilton et al., 2008, p. 55). Generally, the relevant range describes the relationship between fixed and variable costs. While total variable costs increase for every unit of output, total fixed costs are believed to remain unchanged. However, as we increase the number of units produced significantly, we will notice some fixed costs increase. This rise in fixed costs is in part due to capacity constraints.

An example at NPS would be an influx to the number of students attending graduate programs. If the number of students increases slightly, it is very likely the only additional costs incurred would be faculty, a variable cost to the number of students. However, if there is a large increase in the number of students, it is possible that additional educational technicians, administrative department staff, and/or overhead support staff will be required.

(3) Military Personnel

Full descriptions for military service members assigned to NPS are not currently available in a format to support ABC. It is difficult to assign military members to production or service departments when a number of these service members have temporary assignments across the base to support various product lines. Some military personnel rotate to various assignments within the Naval Postgraduate School, making it difficult to connect people to a specific effort or function.

(4) Service Department Support

This direct ABC model assumes no associated costs, or any level of support between service departments. This assumes that a service department such as the CIO does not provide any functional or administrative support to the Comptroller or any other service department. This can be of great concern if any service department uses a disproportionate amount of resources to support another service department. This simplification ignores support provided from one service department to another as previously stated.

(5) Capital Equipment

This model does not distinguish between capital equipment in respect to the operations within the Naval Postgraduate School. This means that equipment costs using O&M funding is grouped with other capital expenses and depreciation is not factored in. Capital equipment with a useful life greater than 1 year are charged completely within the first year. The costs are then attributed to the products using ABC or full absorption costing. Due to time and data limitations, these categories were not broken down any further.

(6) Contracted Support

This model ignores contractor support in calculations for Full-Time Equivalents, or the ability to substitute federal employees with contractors. Because NPS is able to hire federal employees and/or contractors for various functions, allocations may be skewed when using the full-time equivalent cost driver. The ability to subsidize federal employees with contractors may be seen as a weakness that can be exploited by management to artificially reduce the cost of one or more products offered by the Naval Postgraduate School.

B. COST POOL ALLOCATIONS TO PRODUCTION DEPARTMENTS

Now we take the previously categorized service department costs, and consolidate them into cost pools. We can logically consolidate service department costs that benefit the same corresponding product lines and have identical cost drivers. The end result of the consolidation is four cost pools; one indirect cost pool and three overhead cost pools. Each cost pool represents the sum of collected costs for the listed departments. The cost pool dollar figure is then allocated proportionately to each product line according to the cost driver.

1. Cost Pool 1: Indirect

The costs attributed to the Dean of Students and Academic Affairs total \$4,665,517. The total costs for both departments are indirect costs of the education and professional development product line. Figure 7 depicts the total cost allocated to professional development and education using the budget execution as the cost driver. Nearly \$3,413,762 is allocated to education and roughly \$1,251,755 is allocated to training and professional development. Research and other sponsored activities are not allocated any costs because neither service department provides them support.

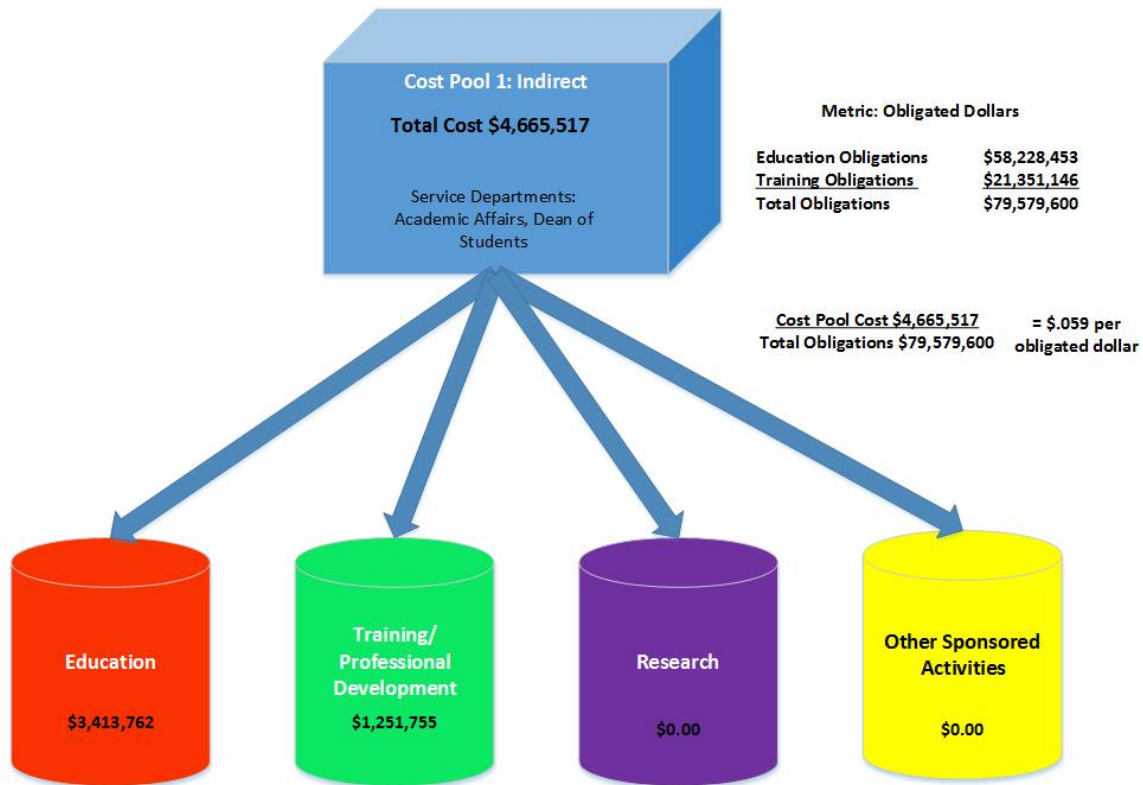


Figure 7. Cost Pool 1. Shows the total cost of Indirect service departments including Dean of Students and Academic Affairs. Illustrates the allocation of costs from the forementioned service departments to Education and Professional Development.

2. Cost Pool 2: Overhead

The General & Administrative Cost Pool 2 is comprised of the NPS Comptroller Department costs. The number of dollars obligated will be used as the cost driver. The allocation amongst all four product lines will be based on the number of dollars spent within each production department, withholding any execution by any service department. Figure 8 illustrates the allocation of the Comptroller Department costs totaling just under \$6M, among all four product lines. This includes costs for accounting, budgeting, timekeeping, travel, funds receipt, and the Comptroller's office.

The steps required to find out how much cost to allocate to each product line begins with the total for Cost Pool 2 at \$5,792,612. Next, we total the dollar figure for our cost driver, Obligations/Expenditures, which come to \$312,936,224. Then we

subtract the obligations of all identified service departments which totaled \$37,932,402. The total obligations remaining amount to \$274,548,596. Finally, we can calculate the cost for every dollar obligated by dividing Cost Pool 2 (\$5,792,612) by the total obligations (\$274,548,596), which gives us the average cost per obligated dollar at nearly \$0.0211 or 2.11%.

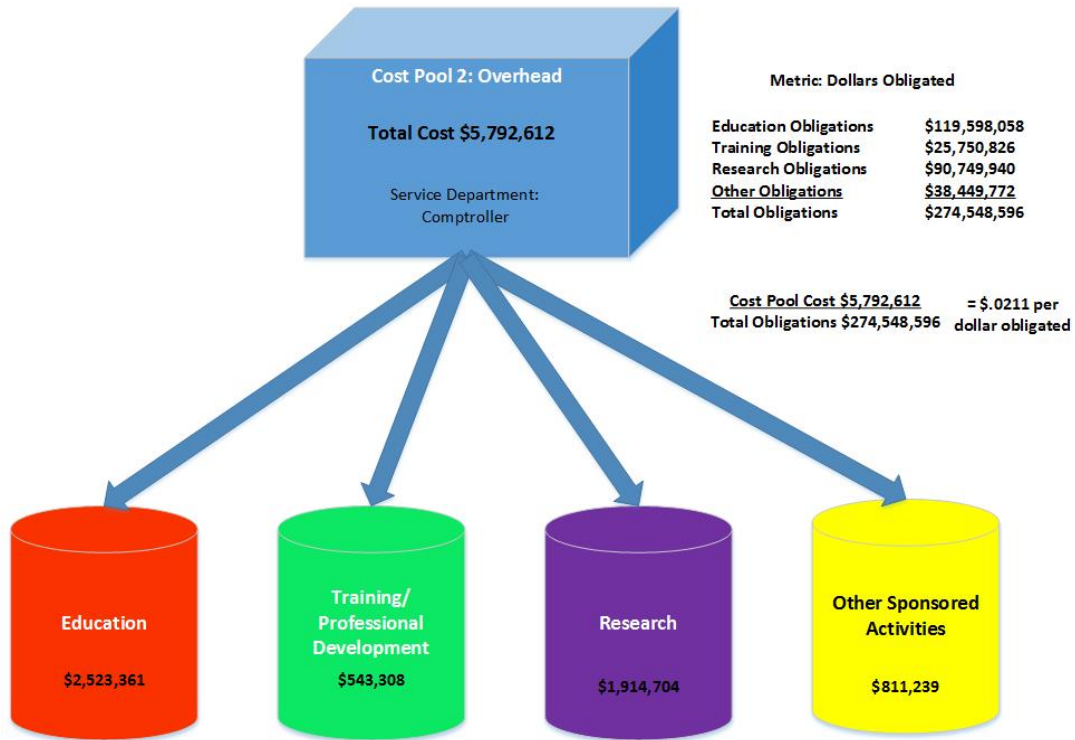


Figure 8. Cost Pool 2. Shows the total cost of Overhead service department Comptroller. Illustrates the allocation of costs from the Comptroller service department to Education, Professional Development, Research, and Other Sponsored Activities.

We can then allocate the Comptroller costs to each product line by multiplying the number of obligations in each product, with the average cost per dollar obligated (\$.0211). The results of this allocation are listed in each colored bucket in Figure 8. We conclude that the education product line accounts for the largest allocation of cost at nearly \$2.5 million, closely followed by Research at approximately \$2 million.

3. Cost Pool 3: Overhead

The General & Administrative Cost Pool 3 includes Contracting and Logistics Management costs. The amount of contracted support required by each production department is the cost driver. The total cost for Contracting and Logistics Management was calculated to be \$3,035,898. The total amount of contracting support for FY 2013 came out to \$102,252,035, which consists of \$87,639,665 for contracted support and \$14,612,370 in credit card support. Once we remove the contracted support for all identified service departments, the residual amount of obligations is estimated to be \$76,022,111 in dollars for FY 2013 as seen in Figure 9.

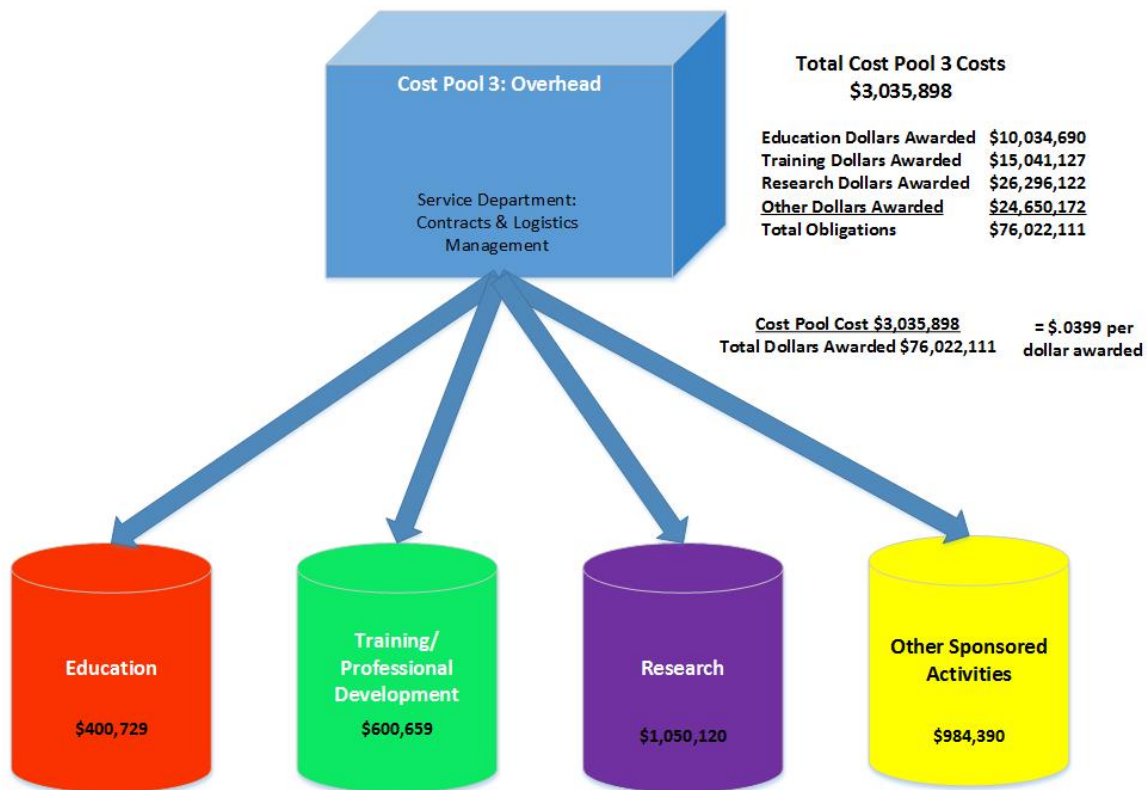


Figure 9. Cost Pool 3. Shows the total cost of the Contracting and Logistics Management overhead service department. This figure illustrates the allocation of costs from Contracting and Logistics Management to Education, Professional Development, Research, and Other Sponsored Activities.

The total cost of the Contracting and Logistics Management was \$3,035,898. Using the cost of the Contracting & Logistics Management office and dividing it by the total dollar value of contracts support withholding service departments, we find the administrative cost of the CLM office to be approximately 3.99%. Using this information we allocate all CLM costs to the product lines accordingly.

If we multiply the number of “contract” dollars awarded in each product line by 3.99%, we can allocate the CLM costs proportionately. The result is that the largest portion of support went to research, which was allocated just over \$1M. Other sponsored activities was a close second, at just under \$1M. Figure 9 illustrates this allocation to all four product lines.

4. Cost Pool 4: Overhead

Since most of the overhead service department costs have identical cost drivers, combining their costs into a single cost pool is appropriate. Cost Pool 4 will include previously defined service departments using FTE as allocation base. This cost pool includes: Office of General Counsel, Inspector General, Public Affairs Office, Protocol, Flag Administration, Safety Office, Security Manager, Human Resources Office, President, and Provost.

The total cost for cost pool four was calculated at \$24,438,375. Full-time equivalent in the production departments are the cost drivers; the number of FTEs in all production departments is estimated to be 857 (SLDCADA, 2014). Using this information we calculate the average overhead cost per FTE by dividing Cost Pool 4 by 857. The result is an average cost of \$28,515 per production department FTE as seen by the calculations in Figure 10.

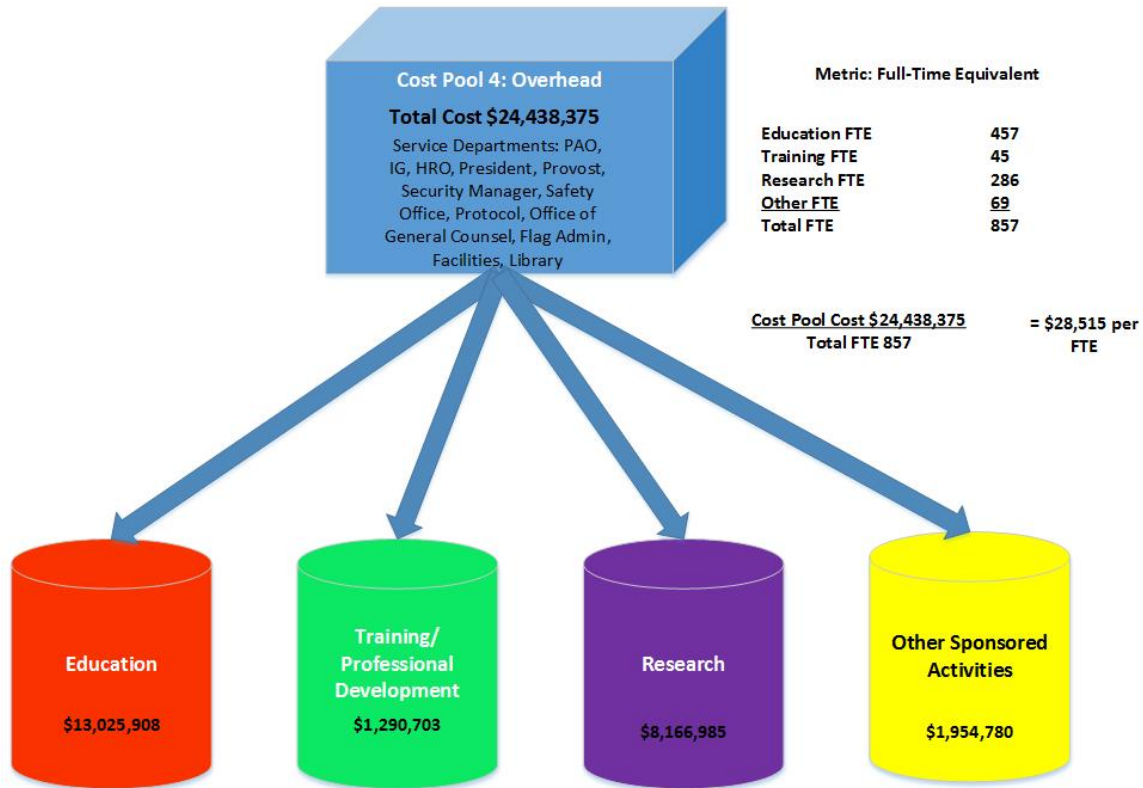


Figure 10. Cost Pool 4. Shows the total cost of overhead service departments including PAO, IG, HRO, President, Provost, Security Manager, Safety Office, Protocol Office, Office of General Counsel, Flag Admin, Facilities, and the Library. This figure illustrates the allocation of costs from the previously mentioned service departments to Education, Professional Development, Research, and Other Sponsored Activities.

C. SUMMARY

The result of the allocation of each cost pool is visible in Table 2. The total cost pool column illustrates all costs for the service departments included within it. The total cost of all identified service departments was estimated to be \$37,932,402 in FY 2013. Once the costs were allocated back to the product lines, we were able to compare and contrast the outcome of the model. The result was that a majority of the costs were allocated to the education product at roughly \$19,363,760. The second largest cost allocation was research at nearly \$11,131,808. Finally, training and other sponsored programs were closely allocated \$3,686,424 and \$3,750,409 respectively.

Table 2. Product Allocation: newly calculated product line allocation.

Cost Pool	Cost	Education	Training	Research	Other
Cost Pool 1: Indirect	\$ 4,665,517	\$ 3,413,762	\$ 1,251,755	\$ -	\$ -
Cost Pool 2: Overhead	\$ 5,792,612	\$ 2,523,361	\$ 543,308	\$ 1,914,704	\$ 811,239
Cost Pool 3: Overhead	\$ 3,035,898	\$ 400,729	\$ 600,659	\$ 1,050,120	\$ 984,390
Cost Pool 4: Overhead	\$ 24,438,375	\$ 13,025,908	\$ 1,290,703	\$ 8,166,985	\$ 1,954,780
Total Allocation	\$ 37,932,402	\$ 19,363,760	\$ 3,686,424	\$ 11,131,808	\$ 3,750,409

THIS PAGE INTENTIONALLY LEFT BLANK

IV. TOTAL PRODUCT LINE COSTS

This chapter reviews and compares the total product line costs as allocated in the previous chapter. Following the total product line financial comparison, the average cost per student is calculated on an annual basis. A comparison is made with similar graduate programs accompanied by caveats to such comparisons.

A. PRODUCT LINE COMPARISON

The product line costs are calculated by taking the total production department costs and combining them with the allocated costs from the cost pools. The cost pools contain all the service departments' costs, regardless of source. Using this method, we are able to arrive at a product line cost for education, research, training and professional development, and other sponsored activities.

The total product line costs can be seen in Figure 11. Using the four product lines, we can interpret the estimated level of effort respective to each Naval Postgraduate School product line in FY 2013 dollars. Education was the single largest product of NPS with an estimated cost of \$138,961,819, closely followed by research at nearly \$101,881,748. Other sponsored activities fell behind research at approximately \$42,200,181. Professional development and training had the smallest cost of all NPS product lines at \$29,437,250.

The cost for the professional development and training, research, and other sponsored activities will be set aside at this point, since the thesis is focused on education. The usefulness of these figures or derivatives thereof is noted as a possible topic for future research.

Total Product Line Costs After Allocations



*Figures rounded to nearest dollar

Figure 11. Total Product Line Cost. The chart shows the total costs allocated to each of the NPS product lines.

B. AVERAGE COST PER STUDENT YEAR

In order to calculate the average cost per student in a given fiscal year, two components are required. The first is the total cost to educate the students, which came to nearly \$139M. Secondly, we must gauge the equivalent number of full-time students that attended NPS education programs. NPS submits an annual report to the Naval Education and Training Command with the calculated student load under the designation President's Budget 24 also known as the PB-24. For FY 2013, the student load for the Naval Postgraduate School according to the PB-24 was 4,438 (Professional Military Education Schools, 2013). This figure includes DOD, Federal and international students.

In order to calculate the average cost per student year, we divide the total cost for education (\$138M) by the student load (4,438). The result is an average cost of nearly \$31,312 per year, per student in FY 2013.

(1) Similar Graduate Programs

Similar graduate programs at other institutions were reviewed to provide some perspective. Two programs from two different institutions were selected based on proximity to account for economic factors in localities. The MBA and graduate engineering programs at San Jose State University (SJSU) and Stanford were chosen. There is a caveat: comparing graduate program tuition would ignore the numerous factors which could change the tuition rates such as variable pricing and program length.

For reference, the average annual resident tuition for a Stanford MBA student is approximately \$70,480 in academic year 2013 (Stanford, Table 1). The same student attending Stanford's graduate engineering curriculum is estimated to cost roughly \$58,180 in tuition. Similar graduate programs at San Jose State University were calculated to be \$13,903 and \$8,569 respectively (SJSU, Table 3).

Consequently, Stanford's MBA program costs almost two and a quarter times more than the Naval Postgraduate School's MBA program as calculated by the activity-based costing model. Additionally, the Naval Postgraduate School's MBA program cost more than two and a quarter times that of San Jose State University's MBA program.

(2) Price Abnormalities

It is important to note that the price for a student's tuition is not directly aligned with an educational institution costs to provide the resources required for graduate programs. Some colleges have substantial endowments, while others are non-existent. For this reason, the printed tuition price on college websites is not always equivalent to the cost. Nonetheless, using these college tuition prices as references provides insight to where the Naval Postgraduate School stands using the activity-based costing model.

(3) Naval Postgraduate School Pricing Policy

NPS graduate education programs prices differ based on varying length, but are identical on an annual basis. This translates to the method in which NPS pricing structure was formed. Any two distinct 18-month graduate programs will be priced alike, regardless of the field of study. Similarly, an 18-month program would cost half that of a program lasting 36 months. Testing the assumption that all NPS graduate education programs have similar costs is not part of this model, and would be suggested as a possible topic for future research.

V. CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses the conclusions of using ABC in the Naval Postgraduate School and the suitability of such a model. Conclusions are followed by recommendations and topics for future research.

A. CONCLUSIONS

Using the activity-based costing model created in Figure 11, NPS is able to establish a baseline for costs associated with product lines, service departments, and production departments. It is important to note the dissimilarities between average and marginal cost per student for vital pricing and cost recovery. Using this information, NPS can track changes in cost and program growth to better suit the NPS mission.

If the cost drivers and the methods are agreeable among senior management at the Naval Postgraduate School, this activity-based costing model will help answer an increasingly important question. What is the average cost of education at the Naval Postgraduate School? Using an activity-based costing model and various financial systems at our disposal, we are able to calculate an answer. The average cost per student year is \$31,312. Using this information, we can derive the cost of numerous education programs at NPS, with varying lengths.

B. RECOMMENDATIONS

Recommendations include instilling a set of accounting standards to support the tracking and auditing of costs by product line. Once the integrity of the accounts can be validated, this ABC model can be a valuable instrument to calculate pricing for each product produced by the Naval Postgraduate School.

C. TOPICS FOR FUTURE RESEARCH

This section is comprised of possible topics for future research which were revealed throughout the process of this thesis which are believed to be closely related and of great importance to creating a beneficial activity-based costing model for the Naval Postgraduate School.

(1) Activity-Based Costing Using Step Method

While assessing financial system capabilities within NPS, the importance of identifying internal support became clear. Further studies may focus on expanding an activity-based costing model, to include internal support. Using the step allocation method, support between service departments could be recognized and calculated to contrast the direct allocation method. Recognizing the support service departments provide each other would enable management to trace interdependencies accurately.

(2) Military Personnel Costs

Military personnel costs require further examination to determine an acceptable allocation method. Currently, military assigned to NPS are categorized as staff or academic support. Additional research is needed to tie military costs to the four NPS product lines.

(3) Calculating Overhead and Indirect Rates for All Product Lines

This activity-based costing model is useful for allocating costs to all four NPS product lines. This thesis only uses the product totals for the education product line. The total product line costs for research, professional development, and other sponsored activities are not utilized. The Naval Postgraduate School assigned overhead on the basis of direct government and contracted labor hours for FY 2013 (Nickles, 2012). Assigning overhead on the basis of program dollars may be an alternative. This information may be used to craft varied overhead or indirect rates for each product line.

NPS could more accurately recover indirect and/or overhead costs by using separate rates, in contrast with one rate for all product lines. This would reduce the likelihood of one product line subsidizing another.

APPENDIX A. JOB ORDER NUMBER STRUCTURE

1ST Character of Job Order	1ST Character of Job Order Description	2nd Character of Job Order	2nd Character of Job Order Description
TYPE		Dept	
A	Reimb Statistical Receipt	0	No Change
B	Direct Research (DFR/NFR/RIP)		
C	Citidirect CC Document	1	No Change
D	Direct Mission/Education (For Credit)		
E	Direct Mission Professional Development/Training (Not for Credit)	2	No Change
F	Reimb FMT		
G	Gift Funds	3	No Change
H	Direct Other Activities		
J	Reimb Professional Development/Training (Not for Credit)	4	Research
K	Reimb Education (For Credit)	J	National Security Institute
L	Labor Fringe	K	Cebrowski
M	Reimb METS	V	MOVES
N	Direct IMET Infrastructure	W	CIRPAS -- Center
P	Reimb Student Stipends	X	FX PROGRAM -- Center
Q	Reimb Other Sponsored Activities	T	UNDETERMINED -- Center
R	Reimb Research	Y	Meyer Institute
S	Citidirect CC DPCOM	Z	Research Sponsored Programs Office
T	Interim		
U	Direct Congressional Adds	5	No Change
V			
W		6	Graduate School of Operational and Information Sciences (GSOIS)
X	Reimb Indirect Overhead (Collection)	C	Compter Sciences
Y	Reimb Indirect Overhead (SL)	D	Defense Analysis
Z	Reimb Indirect Overhead (PI)	F	Information Sciences
		N	Operations Research
		7	Graduate School of Engineering and Applied Science (GSEAS)
		A	Applied Math
		E	Electrical and Computer Engineering
		G	Space Systems Academic Group
		L	Meteorology
		M	Mechanical Engineering
		P	Physics
		Q	Oceanography
		S	Systems Engineering
		U	Undersea Warfare
		8	Graduate School of Business and Public Poicy (GSBPP)
		9	SIGS
		B	CCMR
		H	National Security Affairs
		R	DRMI
		T	International Programs
		10	No Change

<p>Examples: Research for Physics: RPxxx Research for Mechanical Engineering: RMxxx SL For Defense Analysis: YDxSL PI for Meteorology: ZLxxx</p>
--

Figure 12. JON Structure with Description (from Paul Effinger, 2012).

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. KFS SUB-FUND CODES

26 items retrieved, displaying all items.

Return Value	Sub-Fund Group Code	Description	Sub-Fund Group Type Code	Fund Group Code	Wage Indicator	Financial Reporting Sort Code	Active Indicator	Budget Adjustment Restriction Code
return value	20	Direct (OMN)	N	20	Yes	0D	Yes	N
return value	21	Direct Research (DFR/NFR/RIP)	N	20	Yes	0R	Yes	N
return value	22	To be deactivated-previous ELO/CEE	N	20	No	0E	Yes	N
return value	23	Direct Education (not in 20)	N	20	No	0K	Yes	N
return value	24	To be deactivated (T-JON prior to fdg)	N	20	Yes	0T	Yes	N
return value	25	Direct Other Sponsored Activities	N	20	No	0Q	Yes	N
return value	26	Congressional adds	N	20	Yes	0U	Yes	N
return value	27	IMET	N	20	Yes	0N	Yes	N
return value	28	To be deactivated - RSEP	N	20	No	0H	Yes	N
return value	29	To be deactivated-old Indirect collection	N	20	No	0X	Yes	A
return value	2J	Direct Professional Development(ELO/CEE)	N	20	No	0J	Yes	N
return value	30	OPN	N	30	No	03	Yes	N
return value	40	Direct RDTE	N	40	No	04	Yes	N
return value	50	Direct Gift	N	50	No	05	Yes	N
return value	60	Direct ORF	N	60	No	06	Yes	N
return value	90	Recharge Revenue	N	90	No	90	Yes	N
return value	91	Research	N	90	Yes	9R	Yes	N
return value	92	FMT	N	90	Yes	9F	Yes	N
return value	93	Education, Sponsored(for Credit)	N	90	Yes	9K	Yes	N
return value	94	METS	N	90	Yes	9M	Yes	N
return value	95	Other Sponsored Activities	N	90	Yes	9Q	Yes	N
return value	96	To be deactivated - PHD Stipends	N	90	Yes	9P	Yes	N
return value	97	Indirect SL	N	90	No	9Y	Yes	N
return value	98	Indirect PI BP	N	90	Yes	9Z	Yes	N
return value	99	Indirect Collection	N	90	No	9X	Yes	N
return value	9J	Professional Development not for credit	N	90	Yes	9J	Yes	N

Export options: [CSV](#) | [spreadsheet](#) | [XML](#)

Figure 13. Sub-fund Codes in KFS with Descriptions (from KFS Database, 2014).

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

- Administration Resources. n.d. [Online directory of NPS administration]. Retrieved June 2014 from <http://intranet.nps.edu/Administration.htm>
- Defense Resource Management Institute. (2012). *Unit cost: A financial management tool for today & tomorrow*. Monterey, CA: Naval Postgraduate School
- Department of the Navy. (2012, March 30). *Naval Postgraduate School mission and functions* (OPNAV Instruction 5450.210D). Washington, DC: Author.
- Hicks, W. S., Hunter, J. F., & San Miguel, J. G. (1991). *Unit costing at the Naval Postgraduate School*. Monterey, CA: Naval Postgraduate School.
- Hilton, R.W., Maher, M.W., Selto, F.H. (2008). *Cost management: Strategies for business decisions*. New York, NY: McGraw-Hill Irwin
- Naval Postgraduate School. (n.d.a). *General categories of research, instruction and other sponsored activities* [Memorandum]. Monterey, CA: Author. Retrieved from <http://intranet.nps.edu/ResAdmin/SPPGM-12-20.pdf>
- Naval Postgraduate School. (n.d.b). Research at NPS [Brochure]. n.d. Retrieved June 26, 2014, from http://edocs.nps.edu/npspubs/institutional/newsletters/NPS_Research/2006/Poster.pdf
- Nickles, C. (2012, July 18). *FY13 indirect cost recovery rates* [Memorandum]. Monterey, CA: Vice President, Finance & Administration. Retrieved from http://intranet.nps.edu/ResAdmin/FY13/FY13_Indirect_Cost_Recovery_Rates-18July2012.pdf
- Deputy Secretary of Defense. (2002, September 3) *DoD Executive Agent* (DOD Directive 5101.1). Washington, DC: Author.
- Professional Military Education Schools. (2013). [Unpublished annual report PB-24]. Retrieved from personal communication with Ray Alexander.
- Roth, J.P. (2012, April 9). *FY 2013 Department of Defense (DOD) military personnel composite standard pay and reimbursement rates* [Memorandum]. Washington, DC: Office of the Under Secretary of Defense.
- San Jose State University: Cost of attendance. (n.d.) Retrieved February 26, 2015, from http://www.sjsu.edu/faso/Applying/Cost_of_Attendance/
- SLDCADA Database. (2014, February). [Unpublished raw data of total civilian labor hours]. Retrieved July 22, 2014, from personal communication with Annie Pierce.

- Stanford: Tuition and Fees. n.d. Retrieved February 26, 2015, from http://studentaffairs.stanford.edu/registrar/students/tuition-fees_12-13
- STARS database. (2014, February). [Unpublished raw data of complete annual document Listing]. Retrieved November 10, 2014.
- Walton, D. W., and Young, J. K.(1992). *Development of a unit cost model for the AFIT program*. M.S. thesis. Air Force Institute of Technology, Wright-Patterson AFB, Ohio.
- Western Association of Schools and Colleges. (2014, June 20). *How to become accredited* [Manual]. Retrieved from <https://wascsenior.box.com/shared/static/lmogpr9etew9brgwo92i.pdf>

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California