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# Comparative research of Navy Voluntary Education at operational commands

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# NAVAL POSTGRADUATE SCHOOL

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# THESIS

**COMPARATIVE RESEARCH OF NAVY VOLUNTARY EDUCATION AT OPERATIONAL COMMANDS**

by

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March 2017

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The research shows overall NCPACE enrollments have been declining since 2000. Between fiscal year (FY) 2011 and FY2015, NCPACE experienced an overall annual percentage decrease of 8%. During the same period, TA experienced an overall annual percentage increase of 2%. The primary method of instruction has been shifting in the last decade. FY2014 was the first time NCPACE enrollees preferred DL to IL. The research shows the declining trend in IL course enrollment combined with a more tech-savvy generation joining the Navy requires serious thought to how the Navy Volunteer Education (VOLED) system will shift to the changing dynamic.

The conclusion of this research provides insights on the current and future dynamic involved with VOLED in the Navy and is contrary to the accepted perceptions of traditional educational paradigms and the types of learner the system intends to attract.


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# COMPARATIVE RESEARCH OF NAVY VOLUNTARY EDUCATION AT OPERATIONAL COMMANDS

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Submitted in partial fulfillment of the
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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CBA | Cost Benefit Analysis |
| CTC | Central Texas College |
| DL | Distance Learning |
| DMDC | Defense Manpower Data Center |
| DOD | Department of Defense |
| EAOS | Expiration of Active Obligated Service |
| IA | Individual Augmentee |
| IL | Instructor Led |
| MSC | Military Sealift Command |
| N14 | Department of the Navy, Research, Modeling, and Analysis |
| NCES | National Center for Education Statistics |
| NCMIS | Navy College Management Information System |
| NCP | Navy College Program |
| NCPACE | Navy College Program for Afloat College Education |
| NETC | Naval Education and Training Command |
| OPNAV N127 | Navy Education Strategy and Policy Branch |
| OPNAV N166 | Enterprise Information Management Team |
| OPNAV | Office of the Chief of Naval Operations |
| OPNAVINST | Office of the Chief of Naval Operations Instruction |
| PBL | Problem Based Learning |
| PII | Personally Identifiable Information |
| SECNAV | Secretary of the Navy |
| SOF | Student Opinion Form |
| TA | Tuition Assistance |
| UIC | Unit Identification Code |
| VOLED | Volunteer Education |

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# I. INTRODUCTION

This research examines the Navy Volunteer Education (VOLED) through comparative research to evaluate utilization of the Tuition Assistance (TA) and Navy College Program for Afloat College Education (NCPACE). This analysis is conducted at the request of Navy Education Strategy and Policy Branch (OPNAV N127). This introduction provides a framework for the examination. It provides the background of VOLED, a problem statement, the research questions, and the organizational methodology to conduct the research.

## A. BACKGROUND

The VOLED program exists within the Armed Forces. Title 10 of the U.S. Code (2007), the Armed Forces Act, is the basis for voluntary educational assistance programs for persons enlisting for active duty and was aims to encourage enlistments and reenlistments in the Armed Forces. The Secretary of Defense prescribes regulations for the administration of U.S. Code, but the secretary of each military service has jurisdiction on the establishment of education assistance programs within their respective service. This empowers each individual Service Secretary to provide VOLED programs comparable to those available to citizens outside the military, with one exception. Department of Defense Directive 1322.08E appoints authority to develop and monitor policy for VOLED within the Department of Defense (DOD) to the Under Secretary of Defense for Personnel and Readiness. This directive also requires the amount of monetary support available to each Service member for TA shall be uniform across the Military Services (Department of Defense [DOD], 2005).

In 2005, the Secretary of the Navy (SECNAV) drafted guidance establishing policy and laid the groundwork and expectations for VOLED programs within the Navy and Marine Corps (Department of Navy [DON], 2005). Although the SECNAV addressed recruitment and retention outlined in Title 10, the instruction also includes promoting a culture of continuous learning, personal growth, readiness, and job performance (Secretary of Navy [SECNAV], 2005). Diluting further the original intent of

Title 10 to use VOLED for enlistment and reenlistment, OPNAVINST 1560.9A adds VOLED as an instrumental tool in the development of the 21st century Sailor (Chief of Naval Operations [CNO], 2008). This instruction establishes many of the Navy VOLED programs and policies, to include NCPACE and TA.

In 2011, Naval Education and Training Command conducted a major revision of Navy VOLED programs. The goal was to provide operational commanders policies for the administration and management of Navy VOLED. Additionally, the Navy's College Program created an umbrella for all VOLED programs and essentially, a Sailor's "one-stop shop" for all educational needs. Under this umbrella lies the eligibility, limitations and requirements for the NCPACE and TA programs.

### 1. Tuition Assistance

Between 2011 and 2015, the Department of the Navy spent approximately $421 million funding 748,343 courses for Navy and Marine Corps enlisted members and officers under the TA program (Naval Education and Training Command [NETC], 2016). TA is the largest VOLED source of financial support provided to Sailors. TA provides 100% funding for tuition and other published fees to pursue a high school diploma or college degree at any regionally or nationally United States Department of Education accredited institutions.

#### *a. Eligibility*

TA is available to enlisted personnel and officers. Sailors on active duty and Reserve enlisted personnel on active duty for more than 120 days who have completed an education plan with a Navy education counselor are eligible for TA benefits (CNO, 2008). Naval Reserve Officers are eligible if on orders to active duty for more than two years.

#### *b. Cost Structure*

There is a fiscal year limit of 16 semester hours, 24-quarter hours or 240 clock-hours per Sailor. Tuition costs cannot exceed $250/semester hour, $166.67/quarter hour, or $16.67/clock hour (CNO, 2008). Clock hours are reserved for diploma or approved

certificate programs only. Distance learning (DL) and traditional Instructor led (IL) courses are both authorized.

#### *c. Requirements*

Every TA applications requires command authorization before it is processed. Command approval requires a member to serve on-board their first permanent duty station for at least one year, remain on active duty through the last day of class and be waived or have passed their last Physical Fitness Assessment. Other command requirements include a recommendation for advancement, that the member is not in a training status, and has not received Non-Judicial Punishment in the last six months.

Service members are required to provide grades and will be required to reimburse the TA program for any late withdrawals. Additionally, reimbursement is required for grades of "D" or lower for undergraduate level courses and "C" or lower for graduate level courses. Waivers are considered on a case-by-case basis for involuntary withdrawals, first permanent duty station, or to exceed the fiscal year cap.

### 2. Navy College Program for Afloat College Education (NCPACE)

Between 2011 and 2015, the Department of the Navy spent approximately $44 million funding 30,561 courses for Navy and Marine Corps members under the NCPACE program (B. Kun, personal communication, March 2, 2017). In accordance with OPNAVINST 1560.9A, the NCPACE program was designed to provide Sailors the ability to receive VOLED while deployed to operational ships and submarines or those assigned to overseas locations who have unit identification codes (UIC) of type 2 or type 4, some remote locations and those assigned to other specific operations (CNO, 2008). NCPACE covers 100% of the tuition costs.

#### *a. Learning Options*

NCPACE offers two different options, Distance learning (DL) or the traditional Instructor-led (IL) option. What makes the NCPACE program unique is the ability to embark faculty from Central Texas College (CTC) onboard ships to teach Sailors and Marines. CTC has the sole ability to teach the IL option at sea. However, CTC and a

consortium of eight other colleges (Coastline Community College, Dallas Colleges Online, Governors State University, Old Dominion University, Saint Leo University, Thomas Edison State University, University of Oklahoma, and Vincennes University) run the DL options. The consortium offers Sailors and Marines over 250 undergraduate and graduate level courses.

#### *b. Eligibility*

Navy personnel and embarked Marines can participate in the NCPACE program. However, embarked Marines must have sufficient time to complete the course requirements and are only eligible to participate on a space available basis (Navy College Program [NCP], n.d.). Active duty personnel onboard Military Sealift Command (MSC) are also eligible to participate. The Navy has authorized waivers for personnel who are serving as an Individual Augmentee (IA). IA Sailors must have reflecting IA status and they must be able to complete their course while on IA. IA Sailors are limited to one course per term (NCP, n.d.).

## B. PROBLEM STATEMENT

Enrollments in traditional IL courses within the Navy VOLED system (TA/ NCPACE) have been declining since 2000. The data set provided by NETC indicates that between fiscal year (FY) 2011 and FY2015, the IL method of instruction within both contracted programs experienced an annual decrease in its enrollment rate of 8.6%. During the same period, the DL method of instruction within both contracted programs experienced an annual increase in its enrollment rate of 2.4%. NCPACE has experienced declining enrollments within both methods of instruction and has experienced an overall annual percentage decrease of 8% between FY2011 and FY2015. This changing dynamic is an area of concern for those tasked with managing the various VOLED programs in the Navy, specifically those who administer policy for the NCPACE program.

NCPACE has a consortium of nine total colleges or universities that participate in either DL or IL for Navy members. Active duty member can use TA assistance for any higher education institution. When NCPACE was founded by CTC in the 1960s, correspondence courses where the standard. As time and technology, progressed, other

forms of media were implemented (floppy disc, VHS instruction, DVD, CD-ROM, fax, email, Internet, fax, etc.). However, many of those technologies have become obsolete or inefficient and the advent and speed of the Internet and social-media have become mainstays in our day-to-day world.

In the past, Internet connectivity for Sailors in remote locations or onboard ocean-going vessels was poor or non-existent. However, in recent years, the ability to connect with those back home has greatly improved. This improvement in shipboard technology has allowed Navy members to access online education resources in a way that was difficult or impossible ten years ago. Couple this with the expansion of colleges and universities offering online education as a distance learning option and one can see that older VOLED programs using outdated technology may begin to suffer from underuse.

Additionally, students may prefer to attend specific education institutions for a variety of reasons. Where NCPACE has limited academic institutions to choose from, TA affords students the luxury of choosing from a plethora of other options. This observational research intends to explain why the expansion of distance learning options at colleges and universities may be outpacing NCPACE enrollment. Included in this research will be a comparison and contrast of student performance within the TA and NCPACE programs for both DL and IL.

## C. THESIS QUESTIONS

### 1. Primary Research Question:

a. Has the expansion of various modalities associated with Navy distance learning programs contributed to a decline in NCPACE enrollment?

### 2. Secondary Research Questions:

a. Do the enrollment rates for the TA and NCPACE programs differ within each method of instruction (DL or IL)?

b. Do the enrollment rates within TA and NCPACE programs differ within rank groups?

c. Do the enrollment rates for method of instruction (DL or IL) differ within rank groups?

d. Do the completion rates for TA and NCPACE programs differ within each method of instruction (DL or IL)?

e. How well do member's score based on rank groups, contracted program (TA or NCPACE) and method of instruction (DL or IL)?

## D. ORGANIZATION

Chapter II is the Literature Review and is a synopsis of relevant research associated with VOLED programs and pedagogical and technological changes in distance education. The primary focus of research is on the appropriate background and history of both programs with a secondary focus on human capital and distance education. It also reviews the reasons why the civilian institutions, Department of Defense and the Navy promote and justify expenditure on VOLED. The chapter concludes with a critical assessment. This chapter contains three sections.

Chapter III will consist of description of variables generated from Naval Education and Training Command (NETC) data received from the Enterprise Information Management Team at OPNAV N166. The chapter will present research methodology, acknowledges risks to validity, provides predictions, and describes variable descriptions utilized for data analysis. Descriptive statistic tables offer preliminary trend analysis and provide the initial concerns with an apparent downward trend in NCPACE enrollment rates.

Chapters IV and V present the data results, summary conclusion and recommendations and further research.

# II. LITERATURE REVIEW

## A. ANALYSIS: DOES THE METHOD OF INSTRUCTION MATTER IN TA CLASSES?

A report was prepared and funded by the Department of the Navy, Director of Research, Modeling and Analysis (N14) to evaluate the Tuition Assistance program. Stephen Mehay and Elda Pema conducted the analysis and report, *Analysis of the Tuition Assistance Program: Does the Method of Instruction Matter in TA Classes*. The intentions of the report were to determine the impact of traditional classroom education and distance learning on participation, retention and promotion for Navy members who utilized the TA program. The report outlined two areas of interest: observational data associated with distance education for the TA program and multivariate statistical models used to determine retention and promotion.

### 1. Data

The data associated with the Mehay and Pema distance education report was gathered by Navy College Management Information System (NCMIS) databases via NETC. The information included 1,960,592 funded TA course enrollments for active duty personnel between FY95–FY08. For the purposes of their study, the sample was restricted to undergraduate courses, leaving 1,641,740 valid enrollments (Mehay & Pema, 2010, p. 12).

In order to develop retention and promotion models, Mehay and Pema used new recruit data generated from the Defense Manpower Data Center (DMDC) for the periods FY94 through FY07. The purpose of this data was to determine recruit demographics and reasons for separation. They also used data from NETC that included every TA funded course between FY95 through FY08. The NETC data included course name, method of delivery, course status, grades, student demographics, and completion status (Mehay & Pema, 2010, p. 39). Both sets of data used for developing models associated with retention and promotion were restricted in several ways. The restrictions focused on enlisted service members with four-year terms, undergraduate course work for first term

Sailors, and those Sailors that completed at least 36 months of service (Mehay & Pema, 2010, p. 39).

The statistical models for determine learning outcomes used the same data set from NETC that was used for the original observational models. The first statistical focus was on student learning outcomes. During the period FY95–FY08, 233,459 Sailors averaged seven TA sponsored courses during the period (Mehay & Pema, 2010, p. 47). The second statistical focus analyzed TA participation, but the sample was restricted to first term enlisted Sailors with four-year contracts. Of this, 255,749 Sailors from the original NETC data set met this condition. The other statistical retention and promotion models used the same data (Mehay & Pema, 2010, p. 50).

### 2. Statistical Observations

Findings associated with student learning outcomes between FY95–FY07 showed a steady increase in TA program participation as shown on Figure 1. The increase continued while there was an enlisted total force decrease of over 100,000 Sailors during the same period. A major observation was the change in method of instruction uses by enlisted service members. In FY95, enlisted service members used 102,668 traditional IL courses and only 44 DL courses. By FY07, DL courses had grown at an extraordinary rate and numbered 82,381. Traditional IL courses dropped to 68,953 (Mehay & Pema, 2010, p. 13).

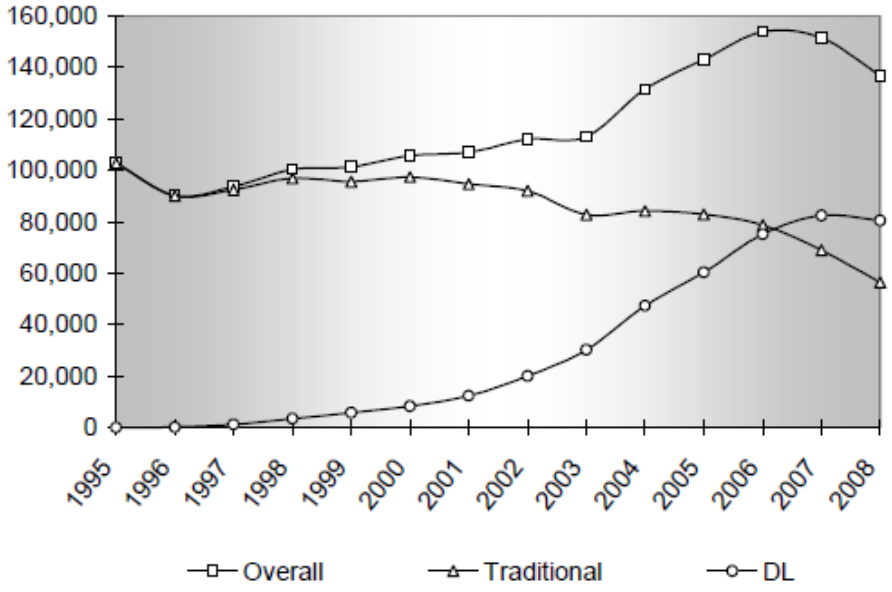


Figure 1. Undergraduate TA Courses by Fiscal Year.
Source: Mehay and Pema (2010).

Although DLs had a major increase over the 13-year period in this report, completion rates using DL and IL told a slightly different story. Traditional IL courses showed steadily higher completion rate over the observed period, while DL has been consistently lower than IL. However, the reduction in the completion gap between DL and IL may be the result of improvements in the delivery of DL coupled with greater accessibility to computers and Internet for Sailors. Evidence of this phenomenon provide in Figure 2.

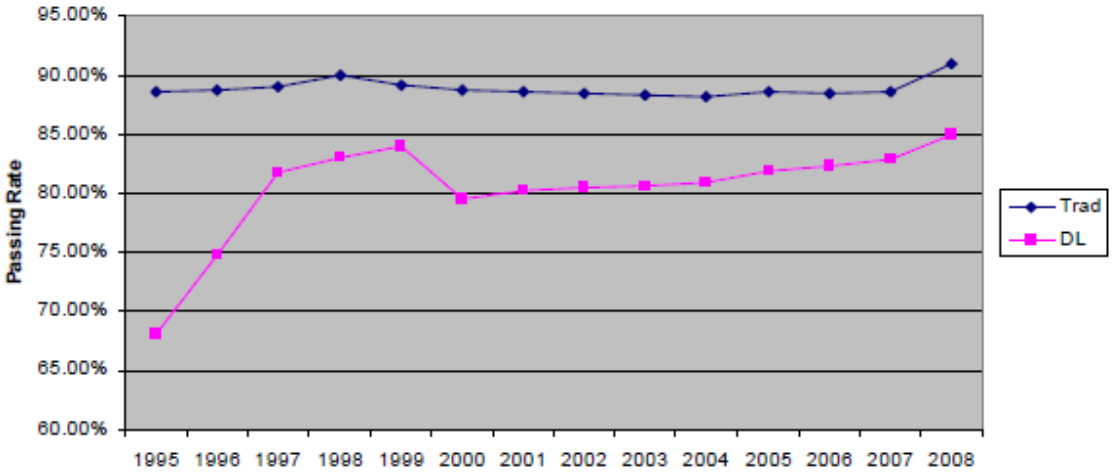


Figure 2. Completion Rates for DL and Traditional Courses.
Source: Mehay and Pema (2010).

## 3. Multivariate Models and Findings

The Mehay and Pema (2010) report uses multivariate statistical models to estimate TA participation on retention and promotion. To determine retention outcomes, Mehay and Pema created three variables to identify Sailors that stayed in past their initial four-year obligation (p. 31). The retention variables are Sailors with short-term extensions, long-term extensions, and combination of short and long-term extensions. Mehay and Pema (2010) restricted the sample to control for selection bias associated with unmeasurable skills and preferences, the model uses an average treatment effect to create a comparison group (p. 40).

Although controls were used, Mehay and Pema (2010) concede that pre-treatment differences between TA-uses are non-users may still exist. A probit retention model determines retention based on TA utilization. The authors found that TA increases the likelihood of reenlistment. Additionally, they found that passing DL courses had a larger effect on the likeliness of reenlistment. However, the opposite was true for short-term extensions. DL users were less likely to extend pass their Expiration of Active Obligated Service (EAOS) (p. 62).

The promotion model used a panel data set composed of observations from the beginning of a sailor's career until the end of their four-year contract. Unlike the

reenlistments and extensions used for the retention, promotion outcomes do not occur at fixed points and using panel data allows for control of unobserved heterogeneity. Differencing out the fixed effects over time removed the self-selection bias.

Although TA users were more likely to promote to E-5 during their first four years of service, it was limited to those who enrolled and passed courses using the DL course of instruction. The report found the promotion effect was statistically insignificant when users enrolled and passed traditional IL courses of instruction.

## B. PROBLEM-BASED LEARNING AND PEDAGOGY IN THE 21ST CENTURY

In a world constantly changing, learners are in the driver's seat. The ability to search for answers is a click away. This has had a significant impact on how individuals are learning and the challenges teachers are having with keeping up in this digital environment. Online distance education is outpacing the traditional teacher-centered pedagogy (Barber & King, 2016, p. 236). In fall 2014, one in four (28.5%) students enrolled in at least one distance education course (National Center for Education Statistics [NCES], n.d.). Of those 5,750,417 students, over half enrolled exclusively in distance education courses (NCES, n.d.).

Academic institutions are in a period of flux. The rising costs of the traditional classroom environment and the pressures to keep those classrooms full is causing educational institutions to develop new technologies and methods of teaching. Couple this with the fact that 90% of academic institutions offer some form of online distance education Barber & King, 2016, p. 235) . The additional cost to maintain a quality online program has these institutions identifying new strategies moving forward. Online education is becoming an essential part of the long-term strategy of many institutions (Barber & King, 2016, p. 236). A better understanding of the driver behind these changes leads back to the student.

The 21st century student requires a 21st century learning environment, institutions, and teachers. Rising tuition cost in traditional brick and mortar institutions and the constantly updating knowledge base has students looking for learning alternatives. Online

distance education as shifted the traditional top-down teaching approach that has dominated brick and mortar institutions. Students are taking ownership of their learning. There has been a significant shift to a student-centered learning approach (Barber & King, 2016, p. 236). Many institutions and experts in educational learning have pushed to redefine the priorities of the 21st century learner. At the top of the list are creativity, self-motivation, innovation, problem-solving and collaboration skills (Barber & King, 2016, p. 236). Students are not just looking for expertise in a specific field of study. They are looking for skills that will prepare them for the workforce. They are looking for the competencies required to be successful in their future employment.

A major concern for students is that the careers they are interested in when they start college might not exist when they finish a four-year degree. Conversely, having these competencies might prepare them for the new careers created during their time in college. Barber and King (2016) conducted a multi-phase qualitative study looking at Problem Based Learning (PBL). Characteristics of PBL focus around real world situations, group work to identify problem gaps and solutions, and an environment where educators facilitate the education process and students gather new information through self-directed learning (Barber & King, 2016, p. 236). Barber and King (2016) found PBL pedagogy helps student develop greater self-responsibility in the learning process and this in turn made the learner more creative. If the goal or moral obligation of educational institutions is to prepare students for the real world, then investing in teacher development and digital pedagogy maybe the link between rising institutional education costs and demands of the 21st century learner.

PBL pedagogy and the 21st century learner clearly align. Data supports the rapid rise in student enrollment of online education and distance education courses. The self-directed learning approach and the immediate access to new information that is available to the learner may be outpacing the traditional top-down brick and mortar institutions. As demand for PBL increases, these institutions and their faculty will have to adapt to the 21st century learner.

## C. ONLINE DISTANCE EDUCATION: TECHNOLOGICAL ADVANCES AND DIGITAL NATIVES

### 1. Improved Technology

The impact of technology on education cannot be overstated. A breakdown of Moore's Law indicates an exponential growth of transistors on integrated circuits to double every 12–24 months (Borsuk et al., 2003, p. 1). The impact of smaller processors has made computers, machines and overall computing power faster and smaller. These efficiencies are in every facet of the developed world. Military weapon systems, design, and integrated communication methods are improving every day. The improved communication systems onboard naval vessels allow Sailors the opportunity to communicate with friends, relatives, and professors when they are on the other side of the world.

A major issue with distance education is in the name itself, distance. The other issue is time. The limitations of time and distance were hindrances to completing distance education at sea. Improved technology has severely reduced or removed the limits of time and space in distance education (Renes, 2011, p. 204). Multiple sources state that online courses are here to stay and continue to outpace the growth of traditional classroom instruction (Renes, 2011, pp. 203–204).

The opportunities for non-traditional students who would otherwise have difficulty pursuing education at traditional institutions has increased. Non-traditional students who benefit from the technological advances in distance learning include; forward deployed service-members, those with physical disabilities, working students, self-directed learners, and many others (Renes, 2011, p. 204).

Educational institutions are listening. The majority of two-year and four-year postsecondary institutions offer distance education courses (Renes, 2011, p. 205). Postsecondary institutions are not just listening to the students. In many cases, their traditional brick and mortar institution are experiencing lower numbers of enrollments (Renes, 2011, p. 206). Improved technology has improved institutional online educational delivery methods. Local brick and mortar programs experiencing difficulties filling

classrooms are benefiting from the ability to tap into a national and international market. This is especially effects land-grant institutions who can educate the citizens within their state by supplementing programs with enrollments from distance education courses (Renes, 2011, p. 206).

There is no doubt technology has improved distance online education. Hundreds of studies have compared online education to face-to-face courses and there is no evidence that increased technology has taken away from instruction (Barakat et al., 2016, p. 562). However, this form of learning is not without disadvantages or challenges. There is an assumption that faculty and students adhere to a code of ethics (Barakat et al., 2016, p. 563). To prevent ethical violations, national and regional accreditation for online distance education exist to mitigate the possibility of compromised quality education (Barakat et al., 2016, p. 563).

Another major concern with distance education is attrition. Factors that possibly contribute to higher online attrition are the student's lack of self-direction, perceived ease of the course by the student, and unfamiliarity with the method of instruction for both the faculty and student. One other possible consideration for higher attrition was the lack of social cues. The emotions, facial expressions, and body language that creates interpersonal relationships gained through face-to-face communication are lost in the dark and less personal world of online education (Barakat et al., 2016, p. 563). As the exponential growth in technology continues, so do the improvements in increasing the interpersonal communication of online education.

### 2. Digital Natives and Digital Immigrants

Not only are technological improvements are shaping education, but the way younger generations are learning is also affecting education. Students in the younger generation have grown-up in a digital world. They are as skilled with a digital device as they are with pen and paper. *Digital natives* are individuals born after creation of microcomputers (Brown et al., 2016, p. 614; Hope, 2016, p. 824). With the exception of some very young Generation-Y educators, most educators are *digital immigrants* who are oblivious to language and culture of the younger generations (Brown et al., 2016, p. 616).

This difference in learning and teaching is becoming more apparent and requires attention.

Before the digital explosion, earlier generations found themselves at the library using card catalogs to find dated texts on the subjects they were studying. Many of those individuals are now teaching the younger generations and there is disconnect between the teacher and the students. Many education researchers believe the methodology of the pre-digital era educators requires revision to support the younger learners (Brown et al., 2016, p. 616). Digital immigrants are teaching "legacy" information to the digital natives. Legacy information still holds value, but this type of information is at best, base-line knowledge from the past (Brown et al., 2016, p. 616). Where it took significant time at a library weeding through texts to find this base-line knowledge, the digital native can access multiple texts on the basics of their research from their smart phone while drinking coffee and lying in a hammock on scenic overlook. The digital native seeks "future content."

For those of us with children, we hear the "why" all the time. Digital natives want to understand the basics, but find the information boring if not coupled with future content. Digital natives want to learn about the newest information, as well as how this information effects human culture and politics (Brown et al., 2016, p. 616). Digital natives want learning to be fun and interactive. Not only do they want to think "outside the box," many students want to be physically outside the box (Hope, 2016, p. 827). They have access to multiple technologies to improve their education experience and do not feel the need to learn in the traditional environment. Younger generations think and learn differently and some theorize the brain of the younger generations who have access to digital technology are physically transforming (Brown et al., 2016, p. 616).

## D. VOLED EFFECTIVENESS

The most comprehensive study on VOLED effectiveness focused on TA, NCPACE and the impact of VOLED usage on promotion and retention. Garcia and Joy (1998) completed a study that addressed the overall effectiveness of Navy VOLED. Using TA data for active-duty enlisted members who joined in FY1992 and served for at

least five years (N = 24,756) and NCPACE data from July 1995-May 1996 (N = 11,101), Garcia and Joy were able to show the impact of VOLED on promotion and retention. The impact of VOLED on promotion and retention was significant (Garcia, 1998, p. 1).

Garcia and Joy (1998) indicate a 12% increase in promotion to E-5 within the first five years of service when an enlistee has 15 college credits when compared to enlistees with no college. They also found a 35% increase to promotion to E-5 within the first five years of service when an enlistee has 60 college credits when compared to enlistees with no college (Garcia & Joy, 1998, p. 2). To eliminate individual motivation bias, the model isolated the effect of the promotion directly to VOLED (Garcia & Joy, 1998, p. 57).

The impact retention indicates a 6% increase in reenlistments when an enlistee has 15 college credits when compared to enlistees with no college (Garcia & Joy, 1998 p. 2). They also found a 24% increase in reenlistments when an enlistee has 60 college credits when compared to enlistees with no college (Garcia & Joy, 1998 p. 2).

Garcia and Joy (1998) found that all elements of VOLED were cost effective. Based on a the costs associated with replacing an enlisted service member, the study found that for every dollar spent on TA and instructor NCPACE, the Navy received two dollars in improved retention (Garcia & Joy, 1998, p. 3). In 1998, technology based PACE courses were the most expensive and the return on one dollar invested was lightly over one dollar in improved retention. A key factor from the Garcia and Joy (1998) report was the enrollment rate in NCPACE courses in 1997 was 20,200 (p.13). In 2015, the number of enrollments was 9,969 (NETC, 2016).

## E. CHAPTER SUMMARY

Based on previous studies, a marked increase in TA participation occurred between 1996 and 2008. This increase occurred even when the U.S. Navy experienced a drawdown in personnel. During this same period, TA experienced a dramatic shift in the method of instruction used by service members. In 1997, a split between traditional learning methods and distance learning methods began to emerge with distance learning methods becoming the predominate method of choice.

While the Navy VOLED system experienced changes in the method of instruction, the civilian institutions have added online distance education as a part of their long-term strategies. The rising costs of traditional brick and mortar institutions and a change in student learning approaches both groups reevaluating their relationship with one another. The speed and access to information in the 21st century has students looking for a more problem-based pedagogy focusing on old methods that relate to current and relevant topics. If distance learning participation in the Navy is an indicator for the civilian marker, then civilian institutions may want to consider aligning with the needs of the students.

Couple the obvious increasing trend in online distance learning programs within the Navy and same occurrence at civilian institutions with advances in technology and this phenomenon begins to look like more like business as usual. The *digital natives* from Generation Z and Generation Y are the majority population entering college. These students grew up or are growing up in an era where access to information is at their fingertips. The learner center approach and possible re-wiring of neural networks of the younger generation may be changing the educational institution demand signal. The costs associated with traditional brick and mortar institutions for both the institution and the learner may begin to look less appealing.

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# III. DATA AND METHODOLOGY

This chapter presents the examination method data variables used in this research. This research uses data retrieved by NETC and provided by the Navy Education Strategy and Policy Branch (N127). The data contains files on all TA and NCPACE students in IL and DL programs for FY2011–FY2014. This research uses archival data to perform a descriptive nonexperimental design to document the effectiveness of Navy VOLED programs. The data consists of 748,344 funded TA course enrollment observations and 57,897 funded NCPACE course enrollment observations. The sample was restricted for the purposes of this research to undergraduate and graduate courses for enlisted Navy personnel attached to Type 2 and Type 4 commands, leaving 142,897 completed and valid TA course enrollments and 49,945 valid NCPACE course enrollments. A Type 2 command is a commissioned deployable unit stationed within the United States and a Type 4 command is a commissioned deployable unit stationed overseas or an overseas land-based unit that requires members to deploy greater than 150 days per year as shown in Figure 3 (DON, 2007). N127 requested research to focus on Type 2 and Type 4 commands. This was done to make a comparison of operational units who enrollees had the option of method of instruction within TA or NCPACE.

| | | |
|---|---|---|
| Type 1 | Shore Duty | (a) Duty performed in United States (U.S.) (including Hawaii and Anchorage, Alaska) land-based activities where members are not required to be absent from the corporate limits of their duty station in excess of 150 days per year. (b) Long term schooling of 18 or more months. |
| Type 2 | Sea Duty | (a) Duty performed in commissioned vessels and deployable squadrons homeported in the U.S. (including Hawaii and Alaska). (b) U.S. land-based activities and embarked staffs, which require members to operate away from their duty station in excess of 150 days per year. |
| Type 3 | Overseas Remote Land-based Sea Duty | Duty performed in a land-based activity, which does not require members to be absent more than 150 days per year, but is credited as sea duty for rotational purposes only due to the relative undesirability of the geographic area. |
| Type 4 | Overseas Sea Duty | (a) Duty performed in commissioned vessels and deployable squadrons homeported overseas. (b) Overseas land-based activities and embarked staffs, which require members to operate away from their duty station in excess of 150 days per year. |
| Type 5 | Overseas Shore Duty | Duty performed in overseas land-based activities, which are credited as shore duty for rotational purposes. Members are not required to be absent from corporate limits of their duty station in excess of 150 days per year. |

Figure 3. Type Duty Assignment Codes. Source: DON (2007).

All relevant data gathered from NETC was via an institutional one-time transfer to the Naval Postgraduate School. The analysis uses Microsoft Excel, JMP, IBM SPSS statistical packages. The data file was in standard XLS format, no transposition errors were present and the data fields converted to variable names. Additional variables

accompanied the data. However, the only variables as part of the research examined are shown in Table 1. Minimal data grooming was required for the "grade variable" due to policy change requirements. The policy requirements and grading standards provided by N127 are shown in Appendix A.

Table 1. Variables and Descriptions. Adapted from NETC (2016).

| Variables | Description |
|---|---|
| Contracted VOLED program | Navy College Program for Afloat College Education or Tuition Assistance |
| Method of Instruction | Instructor-Led or Distance Learning |
| Fiscal Year | October-September 2011-2015 |
| Course Grades | "A-F" ("P" represents "Pass", Withdraw or Incomplete considered "F") |
| GPA scale | "A" (4.0), "B" (3.0), "C" (2.0), "D" (1.0), "F" (0.0) |
| Course Completion | Pass / Fail |
| Gender | Male or Female |
| Age | Years of Age |
| Age Groups | <25, 26 to 30, 31 to 35, 36 to 40 or >40 |
| Pay-Grade | E-1 to E-9 |
| Pay-Grade Groups | E-1 to E-3 (Seaman), E-4 to E-6 (Petty Officer) or E-7 to E-9 (Chief) |

## A. THESIS DESIGN

The intention of this descriptive nonexperimental design is not to explicitly find causation. The purpose is to document the characteristics of the phenomenon associated with Navy VOLED program enrollment from FY2011–FY2014. This design method takes place ex-post facto without influence or intrusion of the independent variable and allows for the naturally occurring relationships of the variables. The courses examined are between FY2011–FY2014 within the TA and NCPACE programs and their respective method of instruction (DL or IL). Additionally, an analysis of course completion and rank group comparisons within contracted VOLED program and method of instruction is accomplished. The descriptive statistics for contracted VOLED program and method of instruction are shown in Table 2.

Table 2. Descriptive Statistics (VOLED Program / Method of Instruction). Adapted from NETC (2016).

| *TA = 1 / NCPACE = 0* | | *DL = 1 / IL = 0* | |
|---|---|---|---|
| Mean | 0.74100559 | Mean | 0.685421226 |
| Standard Error | 0.0009976 | Standard Error | 0.001057411 |
| Median | 1 | Median | 1 |
| Mode | 1 | Mode | 1 |
| Standard Deviation | 0.438083669 | Standard Deviation | 0.464349101 |
| Sample Variance | 0.191917301 | Sample Variance | 0.215620087 |
| Kurtosis | -0.789384673 | Kurtosis | -1.362193328 |
| Skewness | -1.100283379 | Skewness | -0.798636838 |
| Range | 1 | Range | 1 |
| Minimum | 0 | Minimum | 0 |
| Maximum | 1 | Maximum | 1 |
| Sum | 142897 | Sum | 132178 |
| Count | 192842 | Count | 192842 |

The descriptive statistics for course completion and GPA scale are shown in Table 3.

Table 3. Descriptive Statistics (Course Completion / GPA Scale). Adapted from NETC (2016).

| *Pass=1 / Fail=0* | | *GPA Scale* | |
|---|---|---|---|
| Mean | 0.857671047 | Mean | 2.87012684 |
| Standard Error | 0.000795623 | Standard Error | 0.003002731 |
| Median | 1 | Median | 3 |
| Mode | 1 | Mode | 4 |
| Standard Deviation | 0.349388116 | Standard Deviation | 1.318612841 |
| Sample Variance | 0.122072055 | Sample Variance | 1.738739826 |
| Kurtosis | 2.19201347 | Kurtosis | 0.085103423 |
| Skewness | -2.047435161 | Skewness | -1.106010995 |
| Range | 1 | Range | 4 |
| Minimum | 0 | Minimum | 0 |
| Maximum | 1 | Maximum | 4 |
| Sum | 165395 | Sum | 553481 |
| Count | 192842 | Count | 192842 |

The descriptive statistics for each individual Rank Group (Seaman/Petty Officer/ Chief) are shown in Table 4.

Table 4. Descriptive Statistics (Individual Rank Groups). Adapted from NETC (2016).

| *Seaman* | | *Petty Officer* | |
|---|---|---|---|
| Mean | 0.131174744 | Mean | 0.736437083 |
| Standard Error | 0.000768762 | Standard Error | 0.001003253 |
| Median | 0 | Median | 1 |
| Mode | 0 | Mode | 1 |
| Standard Deviation | 0.337592242 | Standard Deviation | 0.440566127 |
| Sample Variance | 0.113968522 | Sample Variance | 0.194098512 |
| Kurtosis | 2.774501205 | Kurtosis | -0.847941151 |
| Skewness | 2.185056619 | Skewness | -1.07334414 |
| Range | 1 | Range | 1 |
| Minimum | 0 | Minimum | 0 |
| Maximum | 1 | Maximum | 1 |
| Sum | 25296 | Sum | 142016 |
| Count | 192842 | Count | 192842 |

| *Chief* | |
|---|---|
| Mean | 0.132388173 |
| Standard Error | 0.00077177 |
| Median | 0 |
| Mode | 0 |
| Standard Deviation | 0.338913175 |
| Sample Variance | 0.11486214 |
| Kurtosis | 2.706235304 |
| Skewness | 2.169379459 |
| Range | 1 |
| Minimum | 0 |
| Maximum | 1 |
| Sum | 25530 |
| Count | 192842 |

The primary research question guiding this thesis is the following: Has the expansion of various modalities associated with Navy distance learning programs

contributed to a decline in NCPACE enrollment? An analysis of other contracted programs (TA) and instructional methods may provide insight on the effectiveness of distance learning versus traditional instructor-led education. An evaluation of the results will allow program managers to investigate possible areas of improvement within the Navy's VOLED programs. The secondary thesis questions, variables and statistical tests are shown in Table 5.

Table 5. Variables and Statistical Tests.

| Secondary Research Question | Variables | Threats to Validity | Statistical Test | Hypothesis |
|---|---|---|---|---|
| 1. Do the enrollment rates for the TA and NCPACE programs differ within each method of instruction (DL or IL)? | VOLED program (TA or NCPACE), enrollment rate, and method of instruction (DL or IL). These variables will indicate total enrollment rate. | *Subject Characteristics (socioeconomics)<br>*Extraneous Variable<br>*Maturation<br>*Interaction (institutional delivery)<br>*Location | *Contingency Tables<br>*Descriptive Statistics<br>*Chi Square<br>*Ad hoc | Null |
| 2. Do the enrollment rates within TA and NCPACE programs differ within rank groups? | VOLED program, rank groups (E-1 to E-3), (E-4 to E-5) and (E-7 to E-9) and enrollment rate. These variables will indicate enrollment rates between enlisted rank groups | *Subject Characteristics (socioeconomics)<br>*Extraneous Variable<br>*Maturation<br>*Interaction (institutional delivery)<br>*Location | *Contingency Tables<br>*Descriptive Statistics<br>*Chi Square<br>*Ad hoc | Null |
| 3. Do the enrollment rates for method of instruction (DL or IL) differ within rank groups? | Rank groups (E-1 to E-3), (E-4 to E-5) and (E-7 to E-9), method of instruction and enrollment rate. These variables will indicate enrollment rates between enlisted rank groups based on method of instruction. | *Subject Characteristics (socioeconomics)<br>*Extraneous Variable<br>*Maturation<br>*Interaction (institutional delivery)<br>*Location | *Contingency Tables<br>*Descriptive Statistics<br>*Chi Square<br>*Ad hoc | Null |
| 4. Do the completion rates for TA and NCPACE programs differ within each method of instruction (DL or IL)? | VOLED program, completion rate (Pass or Fail), and method of instruction (DL or IL). These variables will indicate total completion rate. | *Subject Characteristics (socioeconomics)<br>*Extraneous Variable<br>*Maturation<br>*Interaction (institutional delivery)<br>*Location | *Contingency Tables<br>*Descriptive Statistics<br>*Chi Square<br>*Ad hoc | Null |
| 5. How well do member's score based on rank groups, contracted program (TA or NCPACE) and method of instruction (DL or IL)? | VOLED program, rank groups (E-1 to E-3), (E-4 to E-5) and (E-7 to E-9) and course grades (A to F). These variables will indicate academic performance between various rank groups. | *Subject Characteristics (socioeconomics)<br>*Extraneous Variable<br>*Maturation<br>*Interaction (institutional delivery)<br>*Location | *Contingency Tables<br>*t-test<br>*OLS Regression<br>*Pearson's Correlation | Null |

## B. DESCRIPTIVE STATISTICS TABLES

This section provides an initial look at the trends associated with Navy VOLED program between FY2011–FY2015. The method of instruction (DL/IL) to both of the Navy VOLED programs analyzed in this research (TA/NCPACE) are shown in Figure 4. The trend has been a steady increase in DL and steady decline in IL enrollments during this period.

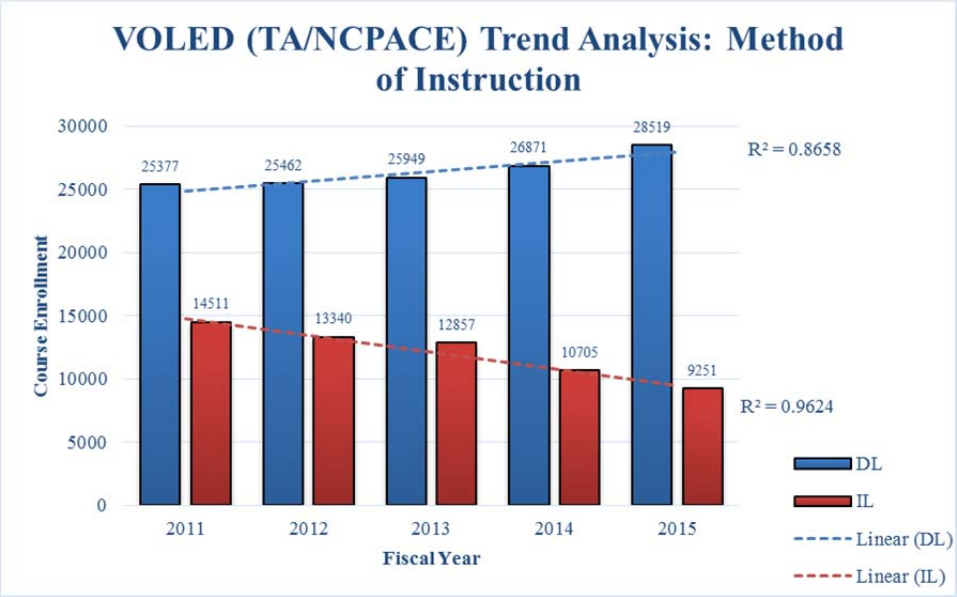


Figure 4. Yearly Method of Instruction Enrollments for VOLED. Adapted from NETC (2016).

The method of instruction (DL/IL) and the Tuition Assistance (TA) program are compared in Figure 5. A gradual declining trend in IL enrollments within the TA program is apparent during this period, but there has been steady increasing trend in DL enrollments within the same period.

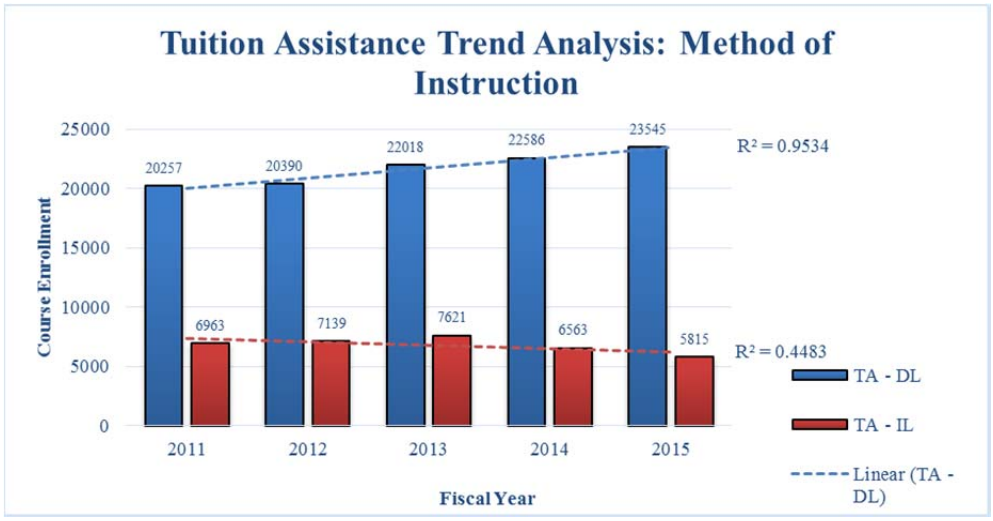


Figure 5. Yearly Method of Instruction Enrollments for TA. Adapted from NETC (2016).

A comparison of method of instruction (DL/IL) and the Navy College Program for Afloat College Education (NCPACE) program are shown in Figure 6. A gradual declining trend in DL enrollments within the TA program is apparent during this period, but there has been sharp decreasing trend in IL enrollments within the same period.

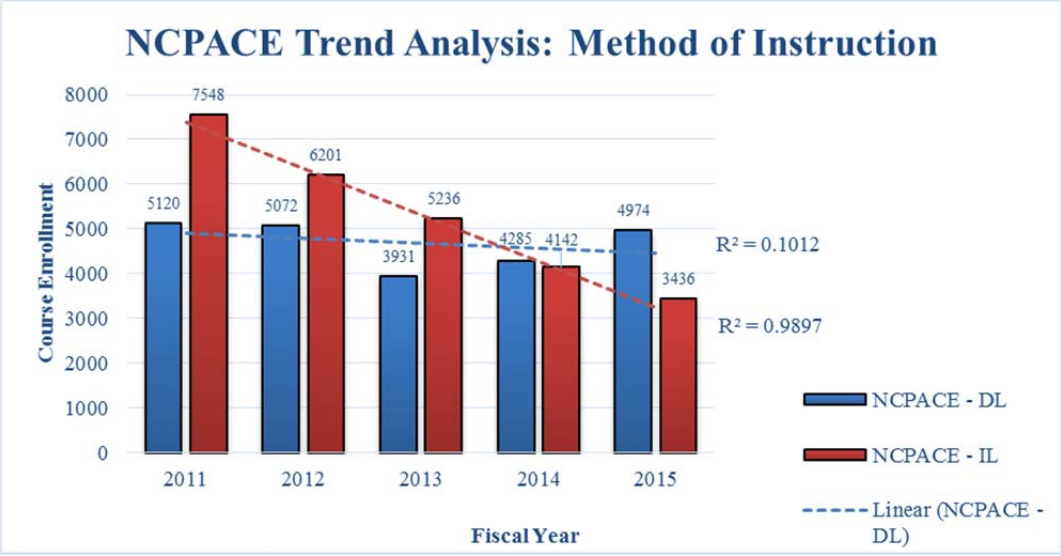


Figure 6. Yearly Method of Instruction Enrollments for NCPACE. Adapted from NETC (2016).

A comparison of enrollments by rank groups within the TA program. Seaman (E-1 to E-3), Petty Officer (E-4 to E-6) and Chief Petty Officer (E-7 to E-9) differentiate the three rank groups are shown in Figure 7. The most noticeable aspect of this data is the amount of enrollments that fall within the ranks E-4 to E-6. This rank group is more than twice as large as the other two rank groups combined. The trend associated with the Petty Officer rank group is of a steady yearly increase. The trend associate with the Chief Petty Officer rank group has remained relatively constant over the same period. There has been a gradual declining trend associated within the Seaman rank group.

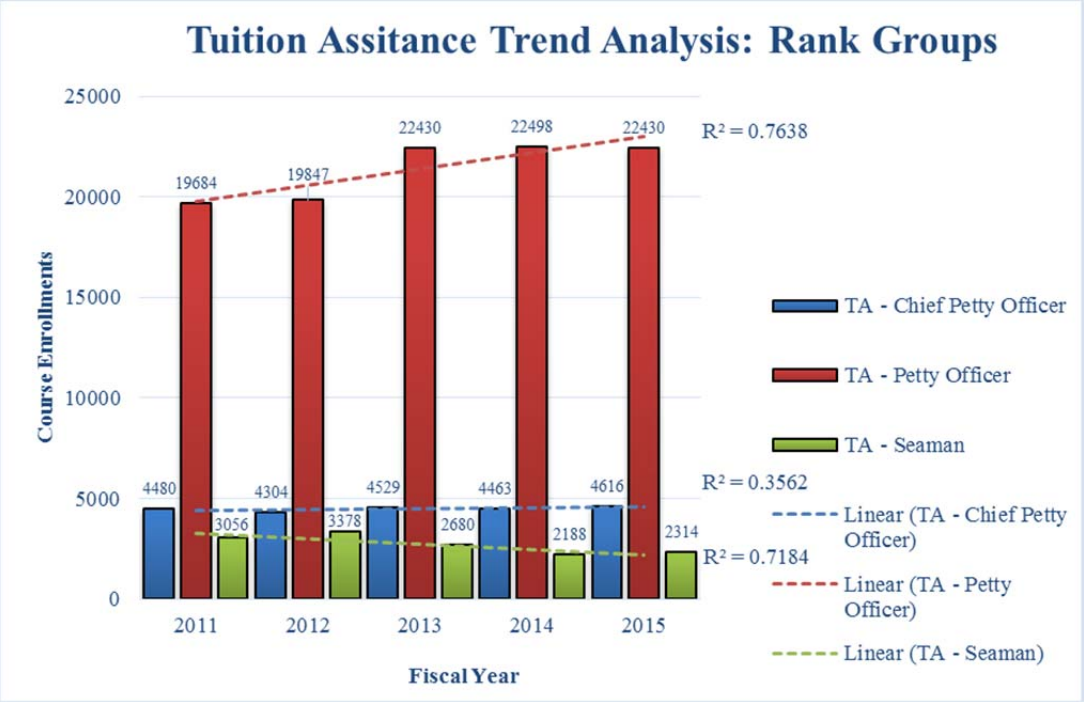


Figure 7. Yearly Rank Group Enrollment for TA.
Adapted from NETC (2016).

A comparison of enrollments by rank groups within the NCPACE program are shown in Figure 8. Seaman (E-1 to E-3), Petty Officer (E-4 to E-6) and Chief Petty Officer (E-7 to E-9) differentiate the three rank groups. The same noticeable trend within ranks E-4 to E-6 regarding overall enrollment size exists. However, the trend associated

with the Petty Officer rank group is of a moderate yearly decrease in enrollments. This decrease mirrors the similar trend in the Seaman rank group and represents the significant decline in overall NCPACE enrollments. The trend associate with the Chief Petty Officer rank group has remained relatively constant over the same period, although small in comparison (approx. 5%-7% of total enrollments).

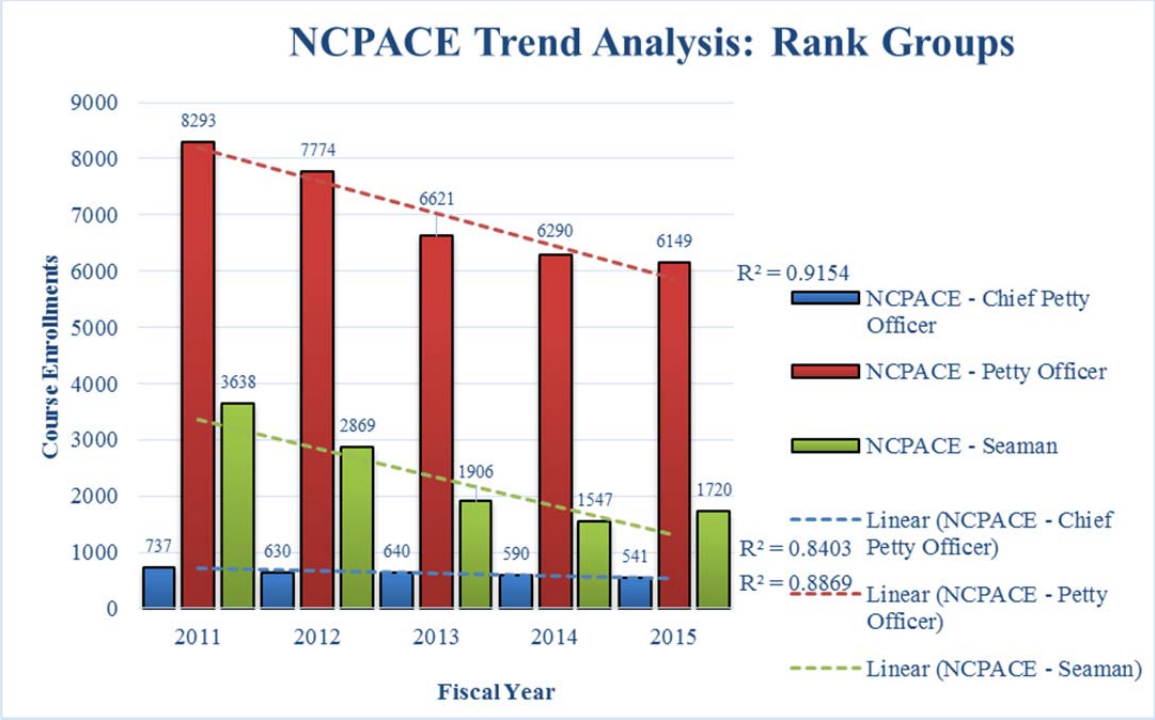


Figure 8. Yearly Rank Group Enrollment for NCPACE. Adapted from NETC (2016).

## C. PRIVACY CONSIDERATIONS

To safeguard human subject privacy, all necessary Personally Identifiable Information (PII) data fields were omitted IAW the Privacy Act of 1974 prior to receipt of data from NETC. PII is any information that aids to distinguish or trace an individual's identity. All DOD personnel and institutions are responsible for the safeguarding of PII.

## D. CHAPTER SUMMARY

This chapter summarizes data, presents research methodology, acknowledges risks to validity, provides predictions, and describes variable descriptions utilized for data analysis. Descriptive statistic tables provide preliminary trend analysis and these tables provide the initial concerns with an apparent downward trend in NCPACE enrollment rates. This actual data tends to support the foregone conclusion made by many policymakers and is the reason the research was requested. The following chapters present the data results, summary conclusion and recommendations for this research.

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# IV. RESULTS

The objective of this analysis is to develop a body of knowledge through a comparison of enrollments within TA and NCPACE and the method of instruction (DL/ IL) at type 2 and type 4 commands. A restatement of the secondary research questions and the associated null hypothesis accompanies the results. The analytical comparisons, hypothesis determination and differences existing between VOLED programs identified:

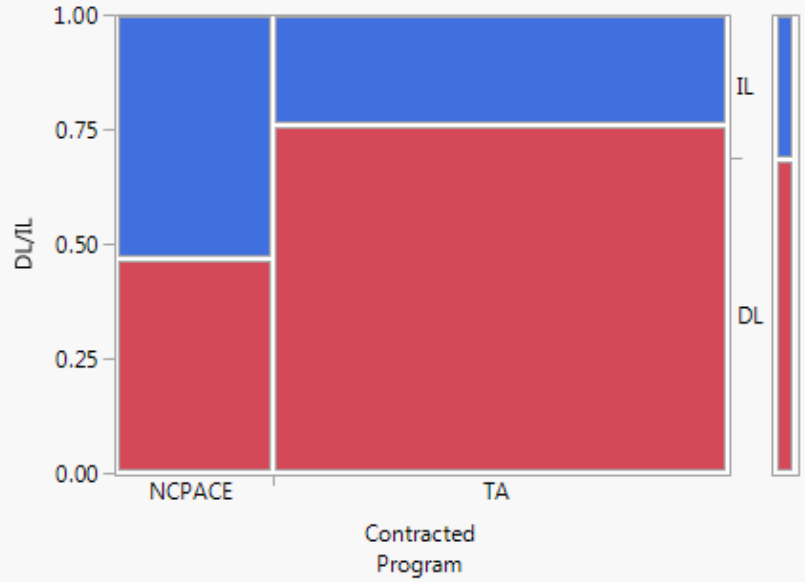
**A.** Do the enrollment rates for the TA and NCPACE programs differ within each method of instruction (DL or IL)? Null Hypothesis: There are no differences in enrollment rates between method of instruction (DL or IL) and Navy VOLED program (TA or NCPACE). The raw data associated with Appendix B further examined each fiscal year and a consolidation of the entire period. For the purposes of the results analysis, the total period (FY11-FY15) is the primary focus of discussion, unless specific phenomena across time-periods warrants discussion.

We use the full sample (N) of 192,842 observations. Of those enrolled in NCPACE, 46.8% used the DL option. In contrast, of those enrolled in TA, 76.1% used the DL option. Of those enrolled in NCPACE, 53.2% used the IL option. In contrast, of those enrolled in TA, 23.9% used the IL option. The results of the Pearson's Chi-Square test indicates a p-value of less than .001, which provides very strong evidence to reject the null hypothesis. Results shown in Table 6.

Table 6. NCPACE and TA Enrollment by Method of Instruction. Adapted from NETC (2016).

**Contingency Analysis of DL/IL By Contracted Program**

**Mosaic Plot**




**Contingency Table**

| Contracted Program | Count / Total % / Col % / Row % | DL | IL | Total |
|---|---|---|---|---|
| NCPACE | | 23382 | 26563 | 49945 |
| | | 12.12 | 13.77 | 25.90 |
| | | 17.69 | 43.79 | |
| | | 46.82 | 53.18 | |
| TA | | 108796 | 34101 | 142897 |
| | | 56.42 | 17.68 | 74.10 |
| | | 82.31 | 56.21 | |
| | | 76.14 | 23.86 | |
| Total | | 132178 | 60664 | 192842 |
| | | 68.54 | 31.46 | |

**Tests**

| N | DF | -LogLike | RSquare (U) |
|---|---|---|---|
| 192842 | 1 | 7044.8052 | 0.0587 |

| Test | ChiSquare | Prob>ChiSq |
|---|---|---|
| Likelihood Ratio | 14089.61 | <.0001* |
| Pearson | 14755.98 | <.0001* |

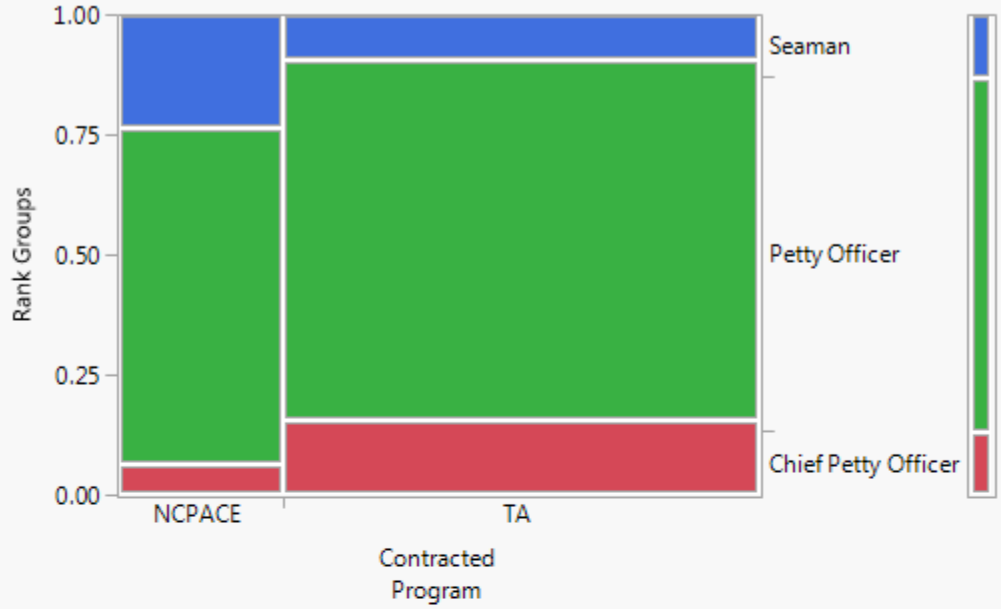
**B.** Do the enrollment rates within TA and NCPACE programs differ within rank groups? Null Hypothesis: There is no difference in enrollments rates for TA and NCPACE within rank groups. The raw data associated with Appendix C further examined each fiscal year and a consolidation of the entire period. For the purposes of the results analysis, the total period (FY11-FY15) is the primary focus of discussion, unless specific phenomena across time-periods warrants discussion.

We use the full sample (N) of 192,842 observations. The results indicate that among course enrollments in NCPACE, 23.4% were in the Seaman category (E1 to E3) as opposed to 9.5% in TA. Among course enrollments in the Petty Officer category (E-4 to E-6), 24.7% used NCPACE. In contrast, the Petty Officer category used the TA program, 75.3%. Finally, among course enrollments in the Chief Petty Officer category (E-7 to E-9), 12.3% used NCPACE. In contrast, the Chief Petty Officer category used the TA program, 87.7%. The results of the Pearson's Chi-Square test indicates a p-value of less than .001, which provides very strong evidence to reject the null hypothesis. Based on the results, there is a statistically significant relationship between the variables. Results shown in Table 7.

Table 7. Rank Group by Contracted VOLED Program.
Adapted from NETC (2016).

**Contingency Analysis of Rank Groups By Contracted Program**

**Mosaic Plot**




**Contingency Table**

Rank Groups

| Contracted Program | Count / Total % / Col % / Row % | Chief Petty Officer | Petty Officer | Seaman | Total |
|---|---|---|---|---|---|
| NCPACE | | 3138 | 35127 | 11680 | 49945 |
| | | 1.63 | 18.22 | 6.06 | 25.90 |
| | | 12.29 | 24.73 | 46.17 | |
| | | 6.28 | 70.33 | 23.39 | |
| TA | | 22392 | 106889 | 13616 | 142897 |
| | | 11.61 | 55.43 | 7.06 | 74.10 |
| | | 87.71 | 75.27 | 53.83 | |
| | | 15.67 | 74.80 | 9.53 | |
| Total | | 25530 | 142016 | 25296 | 192842 |
| | | 13.24 | 73.64 | 13.12 | |

**Tests**

| N | DF | -LogLike | RSquare (U) |
|---|---|---|---|
| 192842 | 2 | 3887.8585 | 0.0265 |

| Test | ChiSquare | Prob>ChiSq |
|---|---|---|
| Likelihood Ratio | 7775.717 | <.0001* |
| Pearson | 7981.459 | <.0001* |

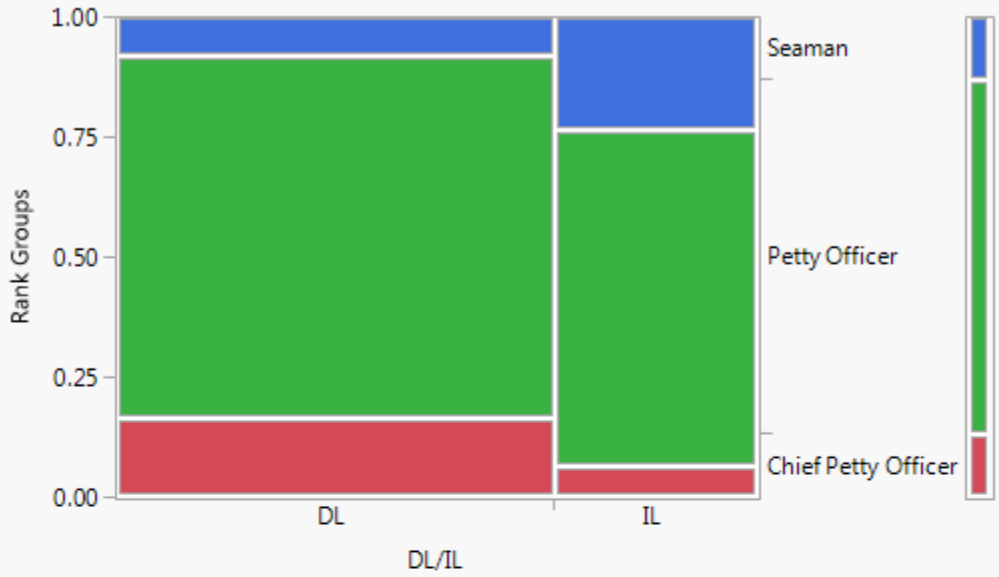
**C.** Do the enrollment rates for method of instruction (DL or IL) differ within rank groups? Null Hypothesis: There is no difference in enrollments rates for method of instruction (DL or IL) within rank groups. The raw data associated with Appendix D further examined each fiscal year and a consolidation of the entire period. For the purposes of the results analysis, the total period (FY11-FY15) is the primary focus of discussion, unless specific phenomena across time-periods warrants discussion.

We use the full sample (N) of 192,842 observations. The results indicate that among course enrollments in the Seaman category (E-1 to E-3), 43.2% used the DL method of instruction. In contrast, the Seaman category used the IL method of instruction, 56.8%. Among course enrollments in the Petty Officer category (E-4 to E-6), 70.2% used the DL method of instruction. In contrast, the Petty Officer category used the IL method of instruction, 29.8%. Finally, among course enrollments in the Chief Petty Officer category (E-7 to E-9), 84.3% used the DL method of instruction. In contrast, the Chief Petty Officer category used the IL method of instruction, 15.7%. The results of the Pearson's Chi-Square test indicates a p-value of less than .001, which provides very strong evidence to reject the null hypothesis. Based on the results, there is a statistically significant relationship between the variables. Results shown in Table 8.

Table 8. Method of Instruction by Rank Group.
Adapted from NETC (2016).

**Contingency Analysis of Rank Groups By DL/IL**

**Mosaic Plot**




**Contingency Table**

Rank Groups

| Count<br>Total %<br>Col %<br>Row % | Chief Petty Officer | Petty Officer | Seaman | Total |
|---|---|---|---|---|
| DL | 21518 | 99741 | 10919 | 132178 |
| | 11.16 | 51.72 | 5.66 | 68.54 |
| | 84.29 | 70.23 | 43.16 | |
| | 16.28 | 75.46 | 8.26 | |
| IL | 4012 | 42275 | 14377 | 60664 |
| | 2.08 | 21.92 | 7.46 | 31.46 |
| | 15.71 | 29.77 | 56.84 | |
| | 6.61 | 69.69 | 23.70 | |
| Total | 25530 | 142016 | 25296 | 192842 |
| | 13.24 | 73.64 | 13.12 | |

DL/IL

**Tests**

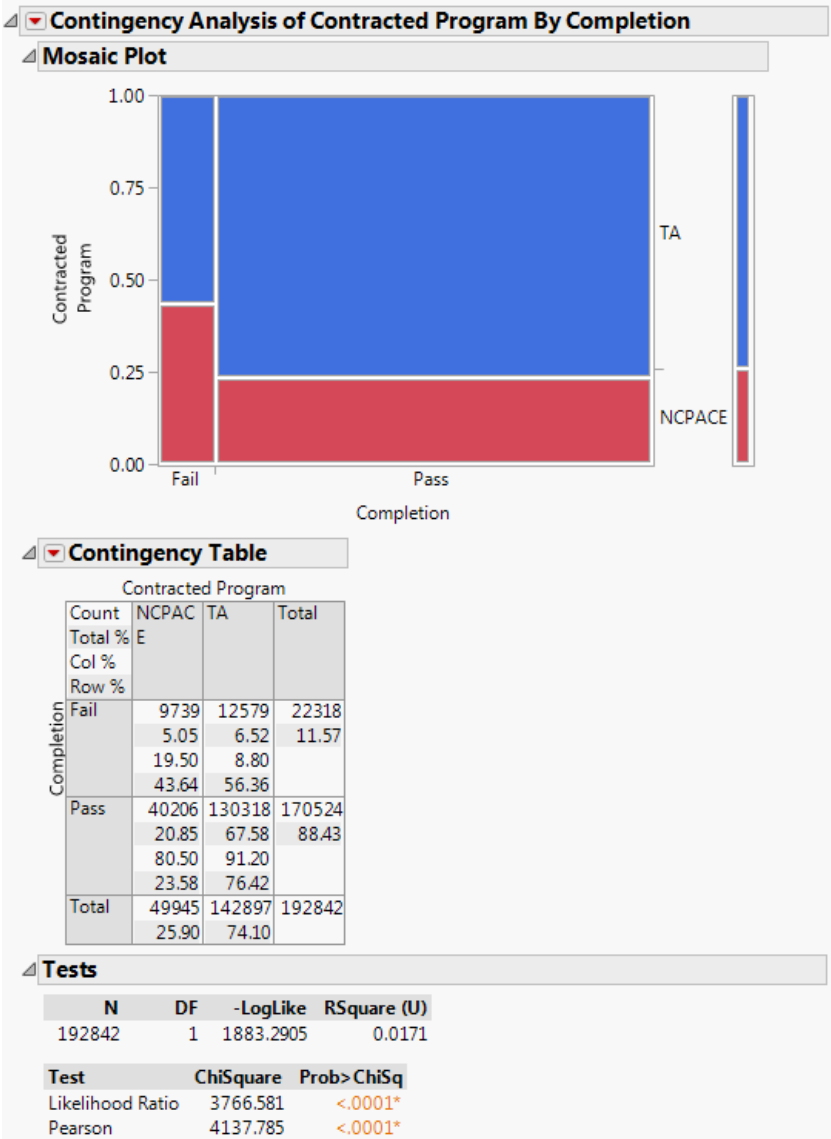
| N | DF | -LogLike | RSquare (U) |
|---|---|---|---|
| 192842 | 2 | 5214.4053 | 0.0356 |

| Test | ChiSquare | Prob>ChiSq |
|---|---|---|
| Likelihood Ratio | 10428.81 | <.0001* |
| Pearson | 10677.99 | <.0001* |

**D.** Do the completion rates for TA and NCPACE programs differ within each method of instruction (DL or IL)? Null Hypothesis: There is no difference in completion rates for the TA and NCPACE programs or within method of instruction (DL or IL). The raw data associated with Appendix E further examined each fiscal year and a consolidation of the entire period. This question compares completion rate to contracted program and completion rate to method of instruction and requires two separate explanations. For the purposes of the results analysis, the total period (FY11-FY15) is the primary focus of discussion, unless specific phenomena across time-periods warrants discussion.

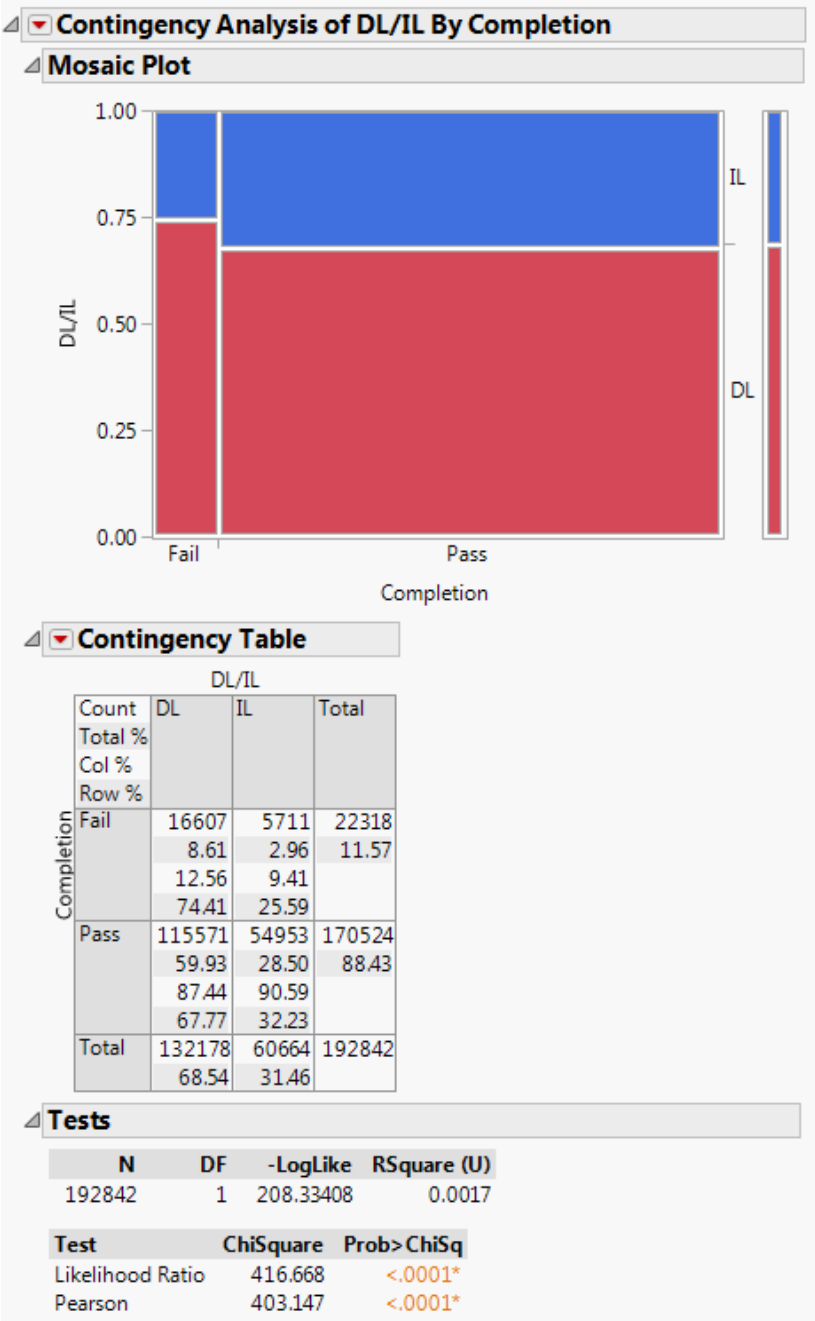
We use the full sample (N) of 192,842 observations. The results indicate that among enrollments utilizing NCPACE, 80.5% completed coursework. In contrast, 19.5% failed to complete coursework within the NCPACE program. Among enrollments utilizing TA, 91.2% completed coursework. In contrast, 8.8% failed to complete coursework with the TA program. The results of the Pearson's Chi-Square test indicates a p-value of less than .001, which provides very strong evidence to reject the null hypothesis. Based on the results, there is a statistically significant relationship between the variables. Results shown in Table 9.

Table 9. Completion Rate by Contracted VOLED Program. Adapted from NETC (2016).




The results indicate that among enrollments utilizing the DL method of instruction, 87.4% completed coursework. In contrast, 12.6% failed to complete coursework when using the DL method of instruction. Among enrollments utilizing IL method of instruction TA, 90.6% completed coursework. In contrast, 9.4% failed to complete coursework when using the IL method of instruction. Results shown in Table 10.

Table 10. Completion Rate by Method of Instruction.
Adapted from NETC (2016).




**E.** Do sailor's grades (GPA scale) vary by rank groups, contracted program (TA or NCPACE) or method of instruction (DL or IL)? Null Hypothesis: There is no difference in grade performance based on rank groups, contracted program (TA or

NCPACE) or method of instruction (DL or IL). The raw data associated with secondary thesis question 5 is shown in Appendix F.

We construct an ordinary least squares regression model with grade score as a function of rank, VOLED program, and method of instruction. The results are shown in Table 11.

All independent variables are highly statistically significant. For the contracted program, NCPACE has a coefficient of -0.33. This means that, all else equal, NCPACE enrollments are correlated with grades that are lower by nearly 1/3 of a letter grade, relative to TA enrollments. In addition, all else equal, taking a class via the DL method is correlated with a grade that is 0.13 points lower, relative to IL. The positive coefficients for both rank groups shown indicates that enrollments with higher-ranking Sailors are correlated with higher grades relative to junior Sailors.

Results of the multiple linear regression model indicate a low adjusted R-Square (.065). The three independent variables (rank groups, contracted program, and method of instruction) only explain 6.5% of the variation in the dependent variable (grade performance) However, the overall model is statistically significant. The F-statistic has an overall p-value of 0.00 and is well below .01 for the 99% confidence levels.

Table 11. Summary of Fit and Regression Parameter Estimates. Adapted from NETC (2016).

| | |
|---|---|
| RSquare | 0.065432 |
| RSquare Adj | 0.065413 |
| Root Mean Square Error | 1.274756 |
| Mean of Response | 2.870127 |
| Observations (or Sum Wgts) | 192842 |

| Term | Estimate | Std Error | t Ratio | Prob>\|t\| |
|---|---|---|---|---|
| Intercept | 2.7369756 | 0.004268 | 641.30 | <.0001* |
| Rank Groups[Chief Petty Officer] | 0.2934682 | 0.006222 | 47.17 | <.0001* |
| Rank Groups[Petty Officer] | 0.0361998 | 0.004404 | 8.22 | <.0001* |
| Contracted Program[NCPACE] | -0.327918 | 0.003486 | -94.06 | <.0001* |
| DL/IL[DL] | -0.127212 | 0.003313 | -38.39 | <.0001* |

## A. CHAPTER SUMMARY

The model for question one provides evidence of a statistically significant difference exists between enrollments and method of instruction (DL/IL) for both contracted VOLED programs (TA/NCPACE). A statistically significant difference between enrollments rates and rank groups for both contracted VOLED programs occurred within every time-period between FY2011 and FY2015. The model for question two provides evidence of a statistically significant difference between enrollments and rank groups for both contracted VOLED programs (TA/NCPACE). A statistically significant difference between enrollments rates and rank groups for both contracted VOLED programs occurred within every time-period between FY2011 and FY2015. The model for question three provides evidence of a statistically significant difference between enrollments and rank groups for both methods of instruction (DL/IL). A statistically significant difference between enrollments rates and rank groups for both methods of instruction occurred within every time-period between FY2011 and FY2015.

The models for question four provide evidence of a statistically significant difference exists between enrollments resulting in course completion and both contracted VOLED programs (TA/NCPACE). The same statistically significance difference exists between enrollments resulting in course completion and method instruction (DL/IL). A statistically significant difference for both models occurred within every time-period between FY2011 and FY2015.

The regression model for question five provides statistically significant evidence of a relationship between contracted VOLED program (TA/NCPACE), method of instruction, and rank groups on overall grade performance. Each variable on grade performance yields a statistically significant coefficient at the 99% confidence level and thus the model is highly reliable. However, the low R-squared indicates only a small relationship on overall grade performance and using only these three variables to predict performance would not be advantageous.

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# V. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research is to evaluate if NCPACE enrollment has experienced a decline by an expansion of various modalities and to evaluate areas of improvement within Navy VOLED. This chapter will consist of summary conclusions, an interpretation of findings, and recommendations for further research.

## A. SUMMARY

The primary research question asked if the expansion of various modalities associated with Navy distance learning programs contributed to a decline in NCPACE enrollment. The short answer is yes. NCPACE has experienced a decline in overall enrollments while other modalities have experienced an increase in overall enrollments. However, does this make the NCPACE an ineffective or outdated program for Sailors attached to Type 2 and Type 4 commands? Maybe.

A benefit of this research is provide observational trends within the two most utilized VOLED programs in the Department of the Navy. These trends only provide a snapshot of analysis over a specific period with specific variables. It is up to policymakers to utilize current and past research to make decisions to ensure program improvement. The following section provides the conclusions and recommendations for each of the secondary research questions. This analysis provides the body of evidence to make a determination on the primary research question.

## B. CONCLUSION AND RECOMMENDATIONS

### 1. Do the Enrollment Rates for TA and NCPACE Differ by Method of Instruction (IL or DL)?

Secondary research question one focused on the differences between each method of instruction (DL/IL) and enrollment rates for each contracted VOLED program. The results of the Pearson's Chi-Square test indicates a value of 14755, an adequate expected count, one degree of freedom and a p-value of 0.00. This equates to a p-value of less than

.001 which provides very strong evidence to reject the null hypothesis and that the two variables (method of instruction and contracted program) are independent.

### *a. Conclusion*

It is clear that DL courses in the TA program indicated consistently higher enrollments rates than IL courses. The same observation for DL courses in the NCPACE program indicated lower overall enrollment rates than IL. However, the trend between FY2011 and FY2015 indicated IL course enrollment consistently decreased within both contracted VOLED program between these periods. In FY2014, DL course enrollment overtook IL course enrollments and the increasing trend continued in FY2015.

Secondary research question one findings implied yearly and overall DL course enrollments within the TA program promotes higher enrollment rates. The overall data during the observed period indicates IL enrollment rates were higher than DL enrollment rates, the yearly trend shows a clear shift to the DL method of instruction. Post FY2015 trend analysis will help to determine if DL will continue to be the primary method of instruction choice for Sailors.

### *b. Recommendation*

The average age of enrollments during the observation period was 29 years old. This correlates to an average birth year between 1982 and 1986. Millennials are anyone born after 1980. This indicates the majority of the enrollees grew up using the Internet and had access to other forms of advancing technology. These enrollees are digital natives and as the years advance, this technology savvy learner phenomenon will continue. Couple this with advances in shipboard technology and communication and DL may continue to be the primary method of instruction. Further trend analysis may confirm this theory. This is only one metric of many needed for policy change. At some point, it may be necessary for policymakers to weigh the costs of the IL method within Navy contracted VOLED programs.

### 2. Do the Enrollment Rates for TA and NCPACE Differ within Rank Groups?

Secondary research question two focused on the differences between rank groups and enrollment rates for each contracted VOLED program. The results of the Pearson's Chi-Square test indicates a value of 7981, an adequate expected count, two degrees of freedom and a p-value of 0.00. This equates to a p-value of less than .001 which provides very strong evidence to reject the null hypothesis and that the two variables (rank groups and contracted program) are independent.

#### *a. Conclusion*

It is clear that Petty Officer (E-4 to E-6) enrollments in the TA program indicated consistently higher enrollments rates than both Seaman (E-1 to E-3) and Chief (E-7 to E-9) enrollments, combined. The same observation for the NCPACE program indicated a similar result for the TA program. However, for both programs between FY2011 and FY2015 indicates an increasing trend in Petty Officer enrollment and a decreasing trend in Seaman enrollments. Chief enrollments have remained relatively constant for both programs.

#### *b. Recommendation*

The increasing mid-grade enlisted enrollments and the decreasing junior-grade enrollments may be a result of stricter policies regarding enrollment eligibility. Additionally, the greater latitude given to operational commanders to emphasize and approve a balance between professional career progression, warfare qualification and volunteer education may help shift junior Sailors priorities. Sailors may be putting VOLED off until proving themselves as naval professionals. Recommend next fleet survey on VOLED to include service member thoughts on balancing military VOLED with career milestones (i.e., qualifications). Because VOLED is a recruiting and retention tool, any policies targeting specific rank groups to reduce program cost may have unintended effects on initial and first-term reenlistment.

### 3. Do the Enrollment Rates for Method of Instruction (IL or DL) Differ within Rank Groups?

Secondary research question three focused on the differences between rank groups and enrollment rates for each method in instruction (DL/IL). The results of the Pearson's Chi-Square test indicates a value of 10677, an adequate expected count, two degrees of freedom and a p-value of 0.00. This equates to a p-value of less than .001 which provides very strong evidence to reject the null hypothesis and that the two variables (rank groups and contracted program) are independent.

#### *a. Conclusion*

It is clear that Petty Officer (E-4 to E-6) and Chief (E-7 to E-9) rank groups have consistently higher enrollments within the DL method of instruction. Both rank groups showed an increasing trend in DL enrollment and an inverse relationship for IL enrollments during the period. Total Seaman (E-1 to E-3) rank group enrollments showed a preference for the IL method of instruction. However, similar to the other two rank groups, the trend shifted from an IL preference to a DL preference during the observed period. DL overtook IL preference in FY2015 for the Seaman rank group.

#### *b. Recommendation*

Enrollments are experiencing an obvious shift away from IL, in favor of DL within every rank group. This trend could also be a result of improved shipboard technology and communication. A counter-argument to the digital native theory shows in this result, as more Seaman rank group preferred the IL method of instruction. Although this was the case as a whole, the trend and eventual shift to DL during the period still supports the digital native theory. Additionally, the option to take DL or IL is available to for both contracted programs (TA and NCPACE). However, NCPACE supports the IL method of instruction when service members actually deploy. The overall and consistent decreasing enrollment trend in IL should have policymakers weighing the costs of NCPACE IL courses. However, those identifying return-on-investment of IL courses should be careful not to exclude other harder to quantify benefits of IL courses (i.e., recruitment tool).

### 4. Do the Completion Rates for TA and NCPACE Differ by Method of Instruction (IL or DL)?

Secondary research question four focused on the differences between each method of instruction (DL/IL) and completion rates for each contracted VOLED program (TA/NCPACE). The results of the Pearson's Chi-Square test comparing completion rates to method of instruction indicates a value of 403 and the results of the Pearson's Chi-Square test comparing completion rates to contracted VOLED program indicates a value of 4138. Both comparisons had an adequate expected count, one degree of freedom and a p-value of 0.00. This equates to a p-value of less than .001 for both comparisons, which provides very strong evidence to reject both null hypothesis, and that all variables are independent. Based on the results, there is a statistically significant relationship between both sets of variables.

#### *a. Conclusion*

It is clear IL courses indicate consistently higher completion rates (91%) when compared to DL courses (87%). Although the trend is steady across the period of observation, only four percentage points separate the two methods of instruction. The comparison of completion rates within contracted VOLED program indicates a visibly higher completion rate for the TA program (91%) compared to the NCPACE program (81%). The completion rate trend for both programs remained relatively consistent between FY2011 and FY2015.

Completion rates provide an indicator for program performance. Traditional IL courses have historically provided higher completion rates when compared to DL methods. However, the delta between the two methods has been slowly decreasing over time. The 81% completion rate for the NCPACE program indicates that inefficiencies within this contracted VOLED program may exist.

#### *b. Recommendation*

The higher completion rate for the TA program could be a result of personal course ownership and financial responsibility. The TA program requires enrollees to

reimburse Navy College for failing to complete courses. In contrast, failing to complete or pass a NCPACE course does not result in reimbursement on the part of the member.

As mentioned in Chapter I, enrollees have the opportunity to choose from a significantly greater portfolio of colleges and universities when using TA. This freedom to choose may also provide additional buy-in when enrolling in courses. Recommend next fleet survey on VOLED to include service member thoughts on individual motivation factors for choosing a particular contracted VOLED program or method of instruction. Another recommendation would be to create and require an, internal to Navy College, end-of-course Student Opinion Form (SOF) that addresses similar data or reasons for not completing a course.

### 5. How Well Do Member's Score Based on Rank Groups, Contracted Program (TA or NCPACE) and Method of Instruction (DL or IL)?

Secondary research question five provides statistically significant evidence of a relationship between contracted VOLED program (TA/NCPACE), method of instruction, and rank groups on overall grade performance.

#### *a. Conclusion*

The relationship is statistically significant and indicates TA enrollees tend to achieve higher grades compared to NCPACE. Higher performance also occurs within higher rank groups and enrollees who choose IL over DL as their method of instruction. As mentioned, while the relationships appear statistically significant, r, the low R-square associated with this model would provide poor predicative power on grade performance.

#### *b. Recommendation*

In order to create a more predicative model, recommend Navy College collect extensive demographic data on service members. Variables that may improve performance predictability would be high school GPA, race, ASVAB scores, and regional data. The intentions of this secondary research question was to provide a basic insight into the variables that could correlate to grade performance. However, the primary focus of this research was to determine if NCPACE was experiencing a decline in enrollment

due to various modalities and to evaluate areas of improvement within this program. Although this predicative model may help to identify possible efficiencies on how to improve grade performance, the larger issue at hand is to determine if NCPACE is still a cost effective and viable option in the Navy VOLED system.

## C. FURTHER RESEARCH

A key factor to VOLED program performance is controlling and measuring current, past and future metrics to assure desired results. Desired outcomes require clearly defined and prioritized performance indicators. The internal mechanisms that assist in achieving the desired external outcomes are through program processes, policies, and the resources such as funding, people and time that provide the output metric.

Based on the research results, it is apparent DL has surpasses traditional IL as the primary method of instruction within both contracted VOLED programs. An in-depth analysis and history of communication and technological advances onboard ship may provide the data necessary to correlate the proliferation of DL enrollments within the Navy VOLED system. Additionally, a similar analysis of shore-based commands will establish a baseline of findings in order to determine if all Type Duty assignment codes have experienced the same phenomenon.

The continued declining NCPACE enrollment rate needs addressing. To ensure proper fiscal stewardship, recommend an in-depth Cost Benefit Analysis (CBA) of the NCPACE program. If the program continues to underperform, at what point do the costs of operating the program outweigh the benefits. A predictive cut-off point will allow policymakers to consider possible alternative programs, make corrective actions to improve NCPACE efficiency, or dissolve the program entirely.

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# APPENDIX A. NAVY COLLEGE VOLED GRADING STANDARDS

| | ***FY11*** | ***FY11*** | ***FY12-14*** |
|---|---|---|---|
| **Grades** | **Undergrad** | **Grad** | **Undergrad** |
| A | Passing | Passing | Passing |
| B | Passing | Passing | Passing |
| C | Passing | Passing | Passing |
| D | Passing | Passing | Passing |
| E | Passing | Passing | Passing |
| F | Failure | Failure | Failure |
| FN | Failure | Failure | Failure |
| I | Incomplete | Incomplete | Incomplete |
| N | Failure | Failure | Failure |
| NC | Failure | Failure | Failure |
| Null | Pending | Pending | Pending |
| W | Personal Withdrawal (failure) | Personal Withdrawal (failure) | Personal Withdrawal (failure) |
| WX | Duty Withdrawal (failure) | Duty Withdrawal (failure) | Duty Withdrawal (failure) |
| | ***FY12-14*** | ***FY15*** | ***FY15*** |
| **Grades** | **Grad** | **Undergrad** | **Grad** |
| A | Passing | Passing | Passing |
| B | Passing | Passing | Passing |
| C | Passing | Fail | Passing |
| D | Fail | Fail | Fail |
| E | Passing | Passing | Passing |
| F | Failure | Failure | Failure |
| FN | Failure | Failure | Failure |
| I | Incomplete | Incomplete | Incomplete |
| N | Failure | Failure | Failure |
| NC | Failure | Failure | Failure |
| Null | Pending | Pending | Pending |
| W | Personal Withdrawal (failure) | Personal Withdrawal (failure) | Personal Withdrawal (failure) |
| WX | Duty Withdrawal (failure) | Duty Withdrawal (failure) | Duty Withdrawal (failure) |

Adapted from NETC (2016).

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# APPENDIX B. FULL MODEL ENROLLMENT RATE CHI-SQUARED TEST, DIFFERENCES BETWEEN CONTRACTED PROGRAM AND METHOD OF INSTRUCTION

| Case Processing Summary | | | | | | |
|---|---|---|---|---|---|---|
| | Cases | | | | | |
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Contracted Program * DL/IL * Fiscal Year | 192842 | 1.0 | 0 | .0 | 192842 | 1.0 |

Contracted Program * DL/IL * Fiscal Year Crosstabulation

| | | | | DL/IL | | |
|---|---|---|---|---|---|---|
| Fiscal Year | | | | DL | IL | Total |
| 2011 | Contracted Program | NCPACE | Count | 5120 | 7548 | 12668 |
| | | | Expected Count | 8059.5 | 4608.5 | 12668.0 |
| | | | % within Contracted Program | 40% | 60% | 100% |
| | | | % within DL/IL | 20% | 52% | 32% |
| | | | % of Total | 13% | 19% | 32% |
| | | TA | Count | 20257 | 6963 | 27220 |
| | | | Expected Count | 17317.5 | 9902.5 | 27220.0 |
| | | | % within Contracted Program | 74% | 26% | 100% |
| | | | % within DL/IL | 80% | 48% | 68% |
| | | | % of Total | 51% | 17% | 68% |
| | Total | | Count | 25377 | 14511 | 39888 |
| | | | Expected Count | 25377.0 | 14511.0 | 39888.0 |
| | | | % within Contracted Program | 64% | 36% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 64% | 36% | 100% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2012 | Contracted Program | NCPACE | Count | 5072 | 6201 | 11273 |
| | | | Expected Count | 7397.4 | 3875.6 | 11273.0 |
| | | | % within Contracted Program | 45% | 55% | 100% |
| | | | % within DL/IL | 20% | 46% | 29% |
| | | | % of Total | 13% | 16% | 29% |
| | | TA | Count | 20390 | 7139 | 27529 |
| | | | Expected Count | 18064.6 | 9464.4 | 27529.0 |
| | | | % within Contracted Program | 74% | 26% | 100% |
| | | | % within DL/IL | 80% | 54% | 71% |
| | | | % of Total | 53% | 18% | 71% |
| | Total | | Count | 25462 | 13340 | 38802 |
| | | | Expected Count | 25462.0 | 13340.0 | 38802.0 |
| | | | % within Contracted Program | 66% | 34% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 66% | 34% | 100% |
| 2013 | Contracted Program | NCPACE | Count | 3931 | 5236 | 9167 |
| | | | Expected Count | 6129.8 | 3037.2 | 9167.0 |
| | | | % within Contracted Program | 43% | 57% | 100% |
| | | | % within DL/IL | 15% | 41% | 24% |
| | | | % of Total | 10% | 13% | 24% |
| | | TA | Count | 22018 | 7621 | 29639 |
| | | | Expected Count | 19819.2 | 9819.8 | 29639.0 |
| | | | % within Contracted Program | 74% | 26% | 100% |
| | | | % within DL/IL | 85% | 59% | 76% |
| | | | % of Total | 57% | 20% | 76% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Count | 25949 | 12857 | 38806 |
| | | | Expected Count | 25949.0 | 12857.0 | 38806.0 |
| | | | % within Contracted Program | 67% | 33% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 67% | 33% | 100% |
| 2014 | Contracted Program | NCPACE | Count | 4285 | 4142 | 8427 |
| | | | Expected Count | 6026.2 | 2400.8 | 8427.0 |
| | | | % within Contracted Program | 51% | 49% | 100% |
| | | | % within DL/IL | 16% | 39% | 22% |
| | | | % of Total | 11% | 11% | 22% |
| | | TA | Count | 22586 | 6563 | 29149 |
| | | | Expected Count | 20844.8 | 8304.2 | 29149.0 |
| | | | % within Contracted Program | 77% | 23% | 100% |
| | | | % within DL/IL | 84% | 61% | 78% |
| | | | % of Total | 60% | 17% | 78% |
| | Total | | Count | 26871 | 10705 | 37576 |
| | | | Expected Count | 26871.0 | 10705.0 | 37576.0 |
| | | | % within Contracted Program | 72% | 28% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 72% | 28% | 100% |
| 2015 | Contracted Program | NCPACE | Count | 4974 | 3436 | 8410 |
| | | | Expected Count | 6350.1 | 2059.9 | 8410.0 |
| | | | % within Contracted Program | 59% | 41% | 100% |
| | | | % within DL/IL | 17% | 37% | 22% |
| | | | % of Total | 13% | 9% | 22% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | TA | Count | 23545 | 5815 | 29360 |
| | | | Expected Count | 22168.9 | 7191.1 | 29360.0 |
| | | | % within Contracted Program | 80% | 20% | 100% |
| | | | % within DL/IL | 83% | 63% | 78% |
| | | | % of Total | 62% | 15% | 78% |
| | Total | | Count | 28519 | 9251 | 37770 |
| | | | Expected Count | 28519.0 | 9251.0 | 37770.0 |
| | | | % within Contracted Program | 76% | 24% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 76% | 24% | 100% |
| Total | Contracted Program | NCPACE | Count | 23382 | 26563 | 49945 |
| | | | Expected Count | 34233.4 | 15711.6 | 49945.0 |
| | | | % within Contracted Program | 47% | 53% | 100% |
| | | | % within DL/IL | 18% | 44% | 26% |
| | | | % of Total | 12% | 14% | 26% |
| | | TA | Count | 108796 | 34101 | 142897 |
| | | | Expected Count | 97944.6 | 44952.4 | 142897.0 |
| | | | % within Contracted Program | 76% | 24% | 100% |
| | | | % within DL/IL | 82% | 56% | 74% |
| | | | % of Total | 56% | 18% | 74% |
| | Total | | Count | 132178 | 60664 | 192842 |
| | | | Expected Count | 132178.0 | 60664.0 | 192842.0 |
| | | | % within Contracted Program | 69% | 31% | 100% |
| | | | % within DL/IL | 100% | 100% | 100% |
| | | | % of Total | 69% | 31% | 100% |

**Chi-Square Tests**

| Fiscal Year | | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|---|
| 2011 | Pearson Chi-Square | 4318.459 | 1 | .000 | | |
| | Continuity Correctionb | 4316.990 | 1 | .000 | | |
| | Likelihood Ratio | 4249.585 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 39888 | | | | |
| 2012 | Pearson Chi-Square | 2996.897 | 1 | .000 | | |
| | Continuity Correctionb | 2995.608 | 1 | .000 | | |
| | Likelihood Ratio | 2912.908 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38802 | | | | |
| 2013 | Pearson Chi-Square | 3116.965 | 1 | .000 | | |
| | Continuity Correctionb | 3115.548 | 1 | .000 | | |
| | Likelihood Ratio | 2979.796 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38806 | | | | |
| 2014 | Pearson Chi-Square | 2276.569 | 1 | .000 | | |
| | Continuity Correctionb | 2275.261 | 1 | .000 | | |
| | Likelihood Ratio | 2130.894 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37576 | | | | |
| 2015 | Pearson Chi-Square | 1566.359 | 1 | .000 | | |
| | Continuity Correctionb | 1565.221 | 1 | .000 | | |
| | Likelihood Ratio | 1452.046 | 1 | .000 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37770 | | | | |
| Total | Pearson Chi-Square | 14755.982 | 1 | .000 | | |
| | Continuity Correctionb | 14754.623 | 1 | .000 | | |
| | Likelihood Ratio | 14089.610 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 192842 | | | | |

**Symmetric Measures**

| Fiscal Year | | | Value | Approx. Sig. | | |
|---|---|---|---|---|---|---|
| 2011 | Nominal by Nominal | Phi | -.329 | .000 | | |
| | | Cramer's V | .329 | .000 | | |
| | N of Valid Cases | | 39888 | | | |
| 2012 | Nominal by Nominal | Phi | -.278 | .000 | | |
| | | Cramer's V | .278 | .000 | | |
| | N of Valid Cases | | 38802 | | | |
| 2013 | Nominal by Nominal | Phi | -.283 | .000 | | |
| | | Cramer's V | .283 | .000 | | |
| | N of Valid Cases | | 38806 | | | |
| 2014 | Nominal by Nominal | Phi | -.246 | .000 | | |
| | | Cramer's V | .246 | .000 | | |
| | N of Valid Cases | | 37576 | | | |
| 2015 | Nominal by Nominal | Phi | -.204 | .000 | | |
| | | Cramer's V | .204 | .000 | | |
| | N of Valid Cases | | 37770 | | | |
| Total | Nominal by Nominal | Phi | -.277 | .000 | | |
| | | Cramer's V | .277 | .000 | | |
| | N of Valid Cases | | 192842 | | | |

Adapted from NETC (2016).

# APPENDIX C. FULL MODEL ENROLLMENT RATE CHI-SQUARED TEST, DIFFERENCES BETWEEN CONTRACTED PROGRAM AND RANK GROUPS

| Case Processing Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cases | | | | | | |
| | Valid | | Missing | | Total | | |
| | N | Percent | N | Percent | N | Percent | |
| Contracted Program * SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) * Fiscal Year | 192842 | 100% | 0 | .0 | 192842 | 100% | |

**Contracted Program * SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) * Fiscal Year Crosstabulation**

| | | | | SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | | | |
|---|---|---|---|---|---|---|---|
| Fiscal Year | | | | Chief Petty Officer | Petty Officer | Seaman | Total |
| 2011 | Contracted Program | NCPACE | Count | 737 | 8293 | 3638 | 12668 |
| | | | Expected Count | 1656.9 | 8885.2 | 2125.9 | 12668.0 |
| | | | % within Contracted Program | 6% | 65% | 29% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 14% | 30% | 54% | 32% |
| | | | % of Total | 2% | 21% | 9% | 32% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | TA | Count | 4480 | 19684 | 3056 | 27220 |
| | | | Expected Count | 3560.1 | 19091.8 | 4568.1 | 27220.0 |
| | | | % within Contracted Program | 16% | 72% | 11% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 86% | 70% | 46% | 68% |
| | | | % of Total | 11% | 49% | 8% | 68% |
| | Total | | Count | 5217 | 27977 | 6694 | 39888 |
| | | | Expected Count | 5217.0 | 27977.0 | 6694.0 | 39888.0 |
| | | | % within Contracted Program | 13% | 70% | 17% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 70% | 17% | 100% |
| 2012 | Contracted Program | NCPACE | Count | 630 | 7774 | 2869 | 11273 |
| | | | Expected Count | 1433.5 | 8024.6 | 1814.9 | 11273.0 |
| | | | % within Contracted Program | 6% | 69% | 25% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 13% | 28% | 46% | 29% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % of Total | 2% | 20% | 7% | 29% |
| | | TA | Count | 4304 | 19847 | 3378 | 27529 |
| | | | Expected Count | 3500.5 | 19596.4 | 4432.1 | 27529.0 |
| | | | % within Contracted Program | 16% | 72% | 12% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 87% | 72% | 54% | 71% |
| | | | % of Total | 11% | 51% | 9% | 71% |
| | Total | | Count | 4934 | 27621 | 6247 | 38802 |
| | | | Expected Count | 4934.0 | 27621.0 | 6247.0 | 38802.0 |
| | | | % within Contracted Program | 13% | 71% | 16% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 71% | 16% | 100% |
| 2013 | Contracted Program | NCPACE | Count | 640 | 6621 | 1906 | 9167 |
| | | | Expected Count | 1221.1 | 6862.6 | 1083.3 | 9167.0 |
| | | | % within Contracted Program | 7% | 72% | 21% | 100% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 12% | 23% | 42% | 24% |
| | | | % of Total | 2% | 17% | 5% | 24% |
| | | TA | Count | 4529 | 22430 | 2680 | 29639 |
| | | | Expected Count | 3947.9 | 22188.4 | 3502.7 | 29639.0 |
| | | | % within Contracted Program | 15% | 76% | 9% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 88% | 77% | 58% | 76% |
| | | | % of Total | 12% | 58% | 7% | 76% |
| | Total | | Count | 5169 | 29051 | 4586 | 38806 |
| | | | Expected Count | 5169.0 | 29051.0 | 4586.0 | 38806.0 |
| | | | % within Contracted Program | 13% | 75% | 12% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 75% | 12% | 100% |
| 2014 | Contracted Program | NCPACE | Count | 590 | 6290 | 1547 | 8427 |
| | | | Expected Count | 1133.2 | 6456.2 | 837.6 | 8427.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within Contracted Program | 7% | 75% | 18% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 12% | 22% | 41% | 22% |
| | | | % of Total | 2% | 17% | 4% | 22% |
| | | TA | Count | 4463 | 22498 | 2188 | 29149 |
| | | | Expected Count | 3919.8 | 22331.8 | 2897.4 | 29149.0 |
| | | | % within Contracted Program | 15% | 77% | 8% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 88% | 78% | 59% | 78% |
| | | | % of Total | 12% | 60% | 6% | 78% |
| | Total | | Count | 5053 | 28788 | 3735 | 37576 |
| | | | Expected Count | 5053.0 | 28788.0 | 3735.0 | 37576.0 |
| | | | % within Contracted Program | 13% | 77% | 10% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 77% | 10% | 100% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2015 | Contracted Program | NCPACE | Count | 541 | 6149 | 1720 | 8410 |
| | | | Expected Count | 1148.3 | 6363.5 | 898.2 | 8410.0 |
| | | | % within Contracted Program | 6% | 73% | 20% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 10% | 22% | 43% | 22% |
| | | | % of Total | 1% | 16% | 5% | 22% |
| | | TA | Count | 4616 | 22430 | 2314 | 29360 |
| | | | Expected Count | 4008.7 | 22215.5 | 3135.8 | 29360.0 |
| | | | % within Contracted Program | 16% | 76% | 8% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 90% | 78% | 57% | 78% |
| | | | % of Total | 12% | 59% | 6% | 78% |
| | Total | | Count | 5157 | 28579 | 4034 | 37770 |
| | | | Expected Count | 5157.0 | 28579.0 | 4034.0 | 37770.0 |
| | | | % within Contracted Program | 14% | 76% | 11% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 14% | 76% | 11% | 100% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total | Contracted Program | NCPACE | Count | 3138 | 35127 | 11680 | 49945 |
| | | | Expected Count | 6612.1 | 36781.4 | 6551.5 | 49945.0 |
| | | | % within Contracted Program | 6% | 70% | 23% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 12% | 25% | 46% | 26% |
| | | | % of Total | 2% | 18% | 6% | 26% |
| | | TA | Count | 22392 | 106889 | 13616 | 142897 |
| | | | Expected Count | 18917.9 | 105234.6 | 18744.5 | 142897.0 |
| | | | % within Contracted Program | 16% | 75% | 10% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 88% | 75% | 54% | 74% |
| | | | % of Total | 12% | 55% | 7% | 74% |
| | Total | | Count | 25530 | 142016 | 25296 | 192842 |
| | | | Expected Count | 25530.0 | 142016.0 | 25296.0 | 192842.0 |
| | | | % within Contracted Program | 13% | 74% | 13% | 100% |
| | | | % within SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 74% | 13% | 100% |

**Chi-Square Tests**

| Fiscal Year | | Value | df | Asymp. Sig. (2-sided) | | | |
|---|---|---|---|---|---|---|---|
| 2011 | Pearson Chi-Square | 2382.143 | 2 | .000 | | | |
| | Likelihood Ratio | 2375.600 | 2 | .000 | | | |
| | N of Valid Cases | 39888 | | | | | |
| 2012 | Pearson Chi-Square | 1508.676 | 2 | .000 | | | |
| | Likelihood Ratio | 1546.599 | 2 | .000 | | | |
| | N of Valid Cases | 38802 | | | | | |
| 2013 | Pearson Chi-Square | 1191.095 | 2 | .000 | | | |
| | Likelihood Ratio | 1146.791 | 2 | .000 | | | |
| | N of Valid Cases | 38806 | | | | | |
| 2014 | Pearson Chi-Square | 1115.607 | 2 | .000 | | | |
| | Likelihood Ratio | 1063.130 | 2 | .000 | | | |
| | N of Valid Cases | 37576 | | | | | |
| 2015 | Pearson Chi-Square | 1389.651 | 2 | .000 | | | |
| | Likelihood Ratio | 1325.676 | 2 | .000 | | | |
| | N of Valid Cases | 37770 | | | | | |
| Total | Pearson Chi-Square | 7981.459 | 2 | .000 | | | |
| | Likelihood Ratio | 7775.717 | 2 | .000 | | | |
| | N of Valid Cases | 192842 | | | | | |

**Symmetric Measures**

| Fiscal Year | | | Value | Approx. Sig. | | | |
|---|---|---|---|---|---|---|---|
| 2011 | Nominal by Nominal | Phi | .244 | .000 | | | |
| | | Cramer's V | .244 | .000 | | | |
| | N of Valid Cases | | 39888 | | | | |
| 2012 | Nominal by Nominal | Phi | .197 | .000 | | | |
| | | Cramer's V | .197 | .000 | | | |
| | N of Valid Cases | | 38802 | | | | |
| 2013 | Nominal by Nominal | Phi | .175 | .000 | | | |
| | | Cramer's V | .175 | .000 | | | |
| | N of Valid Cases | | 38806 | | | | |
| 2014 | Nominal by Nominal | Phi | .172 | .000 | | | |
| | | Cramer's V | .172 | .000 | | | |
| | N of Valid Cases | | 37576 | | | | |
| 2015 | Nominal by Nominal | Phi | .192 | .000 | | | |
| | | Cramer's V | .192 | .000 | | | |
| | N of Valid Cases | | 37770 | | | | |
| Total | Nominal by Nominal | Phi | .203 | .000 | | | |
| | | Cramer's V | .203 | .000 | | | |
| | N of Valid Cases | | 192842 | | | | |

Adapted from NETC (2016).

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# APPENDIX D. FULL MODEL ENROLLMENT RATE CHI-SQUARED TEST, DIFFERENCES BETWEEN METHOD OF INSTRUCTION AND RANK GROUPS

| Case Processing Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cases | | | | | | |
| | Valid | | Missing | | Total | | |
| | N | Percent | N | Percent | N | Percent | |
| DL/IL * SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) * Fiscal Year | 192842 | 100% | 0 | .0 | 192842 | 100% | |

**DL/IL * SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) * Fiscal Year Crosstabulation**

| | | | | SN/PO/CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | | | |
|---|---|---|---|---|---|---|---|
| Fiscal Year | | | | Chief Petty Officer | Petty Officer | Seaman | Total |
| 2011 | DL/IL | DL | Count | 4284 | 18505 | 2588 | 25377 |
| | | | Expected Count | 3319.1 | 17799.1 | 4258.8 | 25377.0 |
| | | | % within DL/IL | 17% | 73% | 10% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 82% | 66% | 39% | 64% |
| | | | % of Total | 11% | 46% | 6% | 64% |
| | | IL | Count | 933 | 9472 | 4106 | 14511 |
| | | | Expected Count | 1897.9 | 10177.9 | 2435.2 | 14511.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 6% | 65% | 28% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 18% | 34% | 61% | 36% |
| | | | % of Total | 2% | 24% | 10% | 36% |
| | Total | | Count | 5217 | 27977 | 6694 | 39888 |
| | | | Expected Count | 5217.0 | 27977.0 | 6694.0 | 39888.0 |
| | | | % within DL/IL | 13% | 70% | 17% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 70% | 17% | 100% |
| 2012 | DL/IL | DL | Count | 4094 | 18666 | 2702 | 25462 |
| | | | Expected Count | 3237.7 | 18125.0 | 4099.3 | 25462.0 |
| | | | % within DL/IL | 16% | 73% | 11% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 83% | 68% | 43% | 66% |
| | | | % of Total | 11% | 48% | 7% | 66% |
| | | IL | Count | 840 | 8955 | 3545 | 13340 |
| | | | Expected Count | 1696.3 | 9496.0 | 2147.7 | 13340.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 6% | 67% | 27% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 17% | 32% | 57% | 34% |
| | | | % of Total | 2% | 23% | 9% | 34% |
| | Total | | Count | 4934 | 27621 | 6247 | 38802 |
| | | | Expected Count | 4934.0 | 27621.0 | 6247.0 | 38802.0 |
| | | | % within DL/IL | 13% | 71% | 16% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 71% | 16% | 100% |
| 2013 | DL/IL | DL | Count | 4282 | 19817 | 1850 | 25949 |
| | | | Expected Count | 3456.4 | 19426.0 | 3066.6 | 25949.0 |
| | | | % within DL/IL | 17% | 76% | 7% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 83% | 68% | 40% | 67% |
| | | | % of Total | 11% | 51% | 5% | 67% |
| | | IL | Count | 887 | 9234 | 2736 | 12857 |
| | | | Expected Count | 1712.6 | 9625.0 | 1519.4 | 12857.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 7% | 72% | 21% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 17% | 32% | 60% | 33% |
| | | | % of Total | 2% | 24% | 7% | 33% |
| | Total | | Count | 5169 | 29051 | 4586 | 38806 |
| | | | Expected Count | 5169.0 | 29051.0 | 4586.0 | 38806.0 |
| | | | % within DL/IL | 13% | 75% | 12% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 75% | 12% | 100% |
| 2014 | DL/IL | DL | Count | 4288 | 20842 | 1741 | 26871 |
| | | | Expected Count | 3613.5 | 20586.6 | 2670.9 | 26871.0 |
| | | | % within DL/IL | 16% | 78% | 6% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 85% | 72% | 47% | 72% |
| | | | % of Total | 11% | 55% | 5% | 72% |
| | | IL | Count | 765 | 7946 | 1994 | 10705 |
| | | | Expected Count | 1439.5 | 8201.4 | 1064.1 | 10705.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 7% | 74% | 19% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 15% | 28% | 53% | 28% |
| | | | % of Total | 2% | 21% | 5% | 28% |
| | Total | | Count | 5053 | 28788 | 3735 | 37576 |
| | | | Expected Count | 5053.0 | 28788.0 | 3735.0 | 37576.0 |
| | | | % within DL/IL | 13% | 77% | 10% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 77% | 10% | 100% |
| 2015 | DL/IL | DL | Count | 4570 | 21911 | 2038 | 28519 |
| | | | Expected Count | 3893.9 | 21579.2 | 3046.0 | 28519.0 |
| | | | % within DL/IL | 16% | 77% | 7% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 89% | 77% | 51% | 76% |
| | | | % of Total | 12% | 58% | 5% | 76% |
| | | IL | Count | 587 | 6668 | 1996 | 9251 |
| | | | Expected Count | 1263.1 | 6999.8 | 988.0 | 9251.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 6% | 72% | 22% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 11% | 23% | 49% | 24% |
| | | | % of Total | 2% | 18% | 5% | 24% |
| | Total | | Count | 5157 | 28579 | 4034 | 37770 |
| | | | Expected Count | 5157.0 | 28579.0 | 4034.0 | 37770.0 |
| | | | % within DL/IL | 14% | 76% | 11% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 14% | 76% | 11% | 100% |
| Total | DL/IL | DL | Count | 21518 | 99741 | 10919 | 132178 |
| | | | Expected Count | 17498.8 | 97340.8 | 17338.4 | 132178.0 |
| | | | % within DL/IL | 16% | 75% | 8% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 84% | 70% | 43% | 69% |
| | | | % of Total | 11% | 52% | 6% | 69% |
| | | IL | Count | 4012 | 42275 | 14377 | 60664 |
| | | | Expected Count | 8031.2 | 44675.2 | 7957.6 | 60664.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within DL/IL | 7% | 70% | 24% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 16% | 30% | 57% | 31% |
| | | | % of Total | 2% | 22% | 7% | 31% |
| | Total | | Count | 25530 | 142016 | 25296 | 192842 |
| | | | Expected Count | 25530.0 | 142016.0 | 25296.0 | 192842.0 |
| | | | % within DL/IL | 13% | 74% | 13% | 100% |
| | | | % within SN/PO/ CPO (E-1 to E-3=Seaman, E-4 to E-6=Petty Officer, E-7 to E-9=Chief Petty Officer) | 100% | 100% | 100% | 100% |
| | | | % of Total | 13% | 74% | 13% | 100% |

**Chi-Square Tests**

| Fiscal Year | | Value | df | Asymp. Sig. (2-sided) | | | |
|---|---|---|---|---|---|---|---|
| 2011 | Pearson Chi-Square | 2649.767 | 2 | .000 | | | |
| | Likelihood Ratio | 2651.093 | 2 | .000 | | | |
| | N of Valid Cases | 39888 | | | | | |
| 2012 | Pearson Chi-Square | 2091.078 | 2 | .000 | | | |
| | Likelihood Ratio | 2088.660 | 2 | .000 | | | |
| | N of Valid Cases | 38802 | | | | | |
| 2013 | Pearson Chi-Square | 2075.692 | 2 | .000 | | | |
| | Likelihood Ratio | 2039.651 | 2 | .000 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | N of Valid Cases | 38806 | | | | | |
| 2014 | Pearson Chi-Square | 1589.620 | 2 | .000 | | | |
| | Likelihood Ratio | 1526.220 | 2 | .000 | | | |
| | N of Valid Cases | 37576 | | | | | |
| 2015 | Pearson Chi-Square | 1861.935 | 2 | .000 | | | |
| | Likelihood Ratio | 1753.901 | 2 | .000 | | | |
| | N of Valid Cases | 37770 | | | | | |
| Total | Pearson Chi-Square | 10677.990 | 2 | .000 | | | |
| | Likelihood Ratio | 10428.811 | 2 | .000 | | | |
| | N of Valid Cases | 192842 | | | | | |

**Symmetric Measures**

| Fiscal Year | | | Value | Approx. Sig. | | | |
|---|---|---|---|---|---|---|---|
| 2011 | Nominal by Nominal | Phi | .258 | .000 | | | |
| | | Cramer's V | .258 | .000 | | | |
| | N of Valid Cases | | 39888 | | | | |
| 2012 | Nominal by Nominal | Phi | .232 | .000 | | | |
| | | Cramer's V | .232 | .000 | | | |
| | N of Valid Cases | | 38802 | | | | |
| 2013 | Nominal by Nominal | Phi | .231 | .000 | | | |
| | | Cramer's V | .231 | .000 | | | |
| | N of Valid Cases | | 38806 | | | | |
| 2014 | Nominal by Nominal | Phi | .206 | .000 | | | |
| | | Cramer's V | .206 | .000 | | | |
| | N of Valid Cases | | 37576 | | | | |
| 2015 | Nominal by Nominal | Phi | .222 | .000 | | | |
| | | Cramer's V | .222 | .000 | | | |
| | N of Valid Cases | | 37770 | | | | |
| Total | Nominal by Nominal | Phi | .235 | .000 | | | |
| | | Cramer's V | .235 | .000 | | | |
| | N of Valid Cases | | 192842 | | | | |

Adapted from NETC (2016).

# APPENDIX E. FULL MODEL COMPLETION RATE CHI-SQUARED TEST, DIFFERENCES BETWEEN CONTRACTED PROGRAM AND METHOD OF INSTRUCTION

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Contracted Program * Completion * Fiscal Year | 192842 | 100% | 0 | 0% | 192842 | 100% |
| DL/IL * Completion * Fiscal Year | 192842 | 100% | 0 | 0% | 192842 | 100% |

## Contracted Program * Completion * Fiscal Year

**Crosstab**

| | | | | Completion | | |
|---|---|---|---|---|---|---|
| Fiscal Year | | | | Fail | Pass | Total |
| 2011 | Contracted Program | NCPACE | Count | 2588 | 10080 | 12668 |
| | | | Expected Count | 1549.2 | 11118.8 | 12668.0 |
| | | | % within Contracted Program | 20% | 80% | 100% |
| | | | % within Completion | 53% | 29% | 32% |
| | | | % of Total | 6% | 25% | 32% |
| | | TA | Count | 2290 | 24930 | 27220 |
| | | | Expected Count | 3328.8 | 23891.2 | 27220.0 |
| | | | % within Contracted Program | 8% | 92% | 100% |
| | | | % within Completion | 47% | 71% | 68% |
| | | | % of Total | 6% | 63% | 68% |
| | Total | | Count | 4878 | 35010 | 39888 |
| | | | Expected Count | 4878.0 | 35010.0 | 39888.0 |
| | | | % within Contracted Program | 12% | 88% | 100% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |
| 2012 | Contracted Program | NCPACE | Count | 2152 | 9121 | 11273 |
| | | | Expected Count | 1317.2 | 9955.8 | 11273.0 |
| | | | % within Contracted Program | 19% | 81% | 100% |
| | | | % within Completion | 47% | 27% | 29% |
| | | | % of Total | 6% | 24% | 29% |
| | | TA | Count | 2382 | 25147 | 27529 |
| | | | Expected Count | 3216.8 | 24312.2 | 27529.0 |
| | | | % within Contracted Program | 9% | 91% | 100% |
| | | | % within Completion | 53% | 73% | 71% |
| | | | % of Total | 6% | 65% | 71% |
| | Total | | Count | 4534 | 34268 | 38802 |
| | | | Expected Count | 4534.0 | 34268.0 | 38802.0 |
| | | | % within Contracted Program | 12% | 88% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |
| 2013 | Contracted Program | NCPACE | Count | 1616 | 7551 | 9167 |
| | | | Expected Count | 973.3 | 8193.7 | 9167.0 |
| | | | % within Contracted Program | 18% | 82% | 100% |
| | | | % within Completion | 39% | 22% | 24% |
| | | | % of Total | 4% | 19% | 24% |
| | | TA | Count | 2504 | 27135 | 29639 |
| | | | Expected Count | 3146.7 | 26492.3 | 29639.0 |
| | | | % within Contracted Program | 8% | 92% | 100% |
| | | | % within Completion | 61% | 78% | 76% |
| | | | % of Total | 6% | 70% | 76% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Count | 4120 | 34686 | 38806 |
| | | | Expected Count | 4120.0 | 34686.0 | 38806.0 |
| | | | % within Contracted Program | 11% | 89% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 11% | 89% | 100% |
| 2014 | Contracted Program | NCPACE | Count | 1394 | 7033 | 8427 |
| | | | Expected Count | 875.5 | 7551.5 | 8427.0 |
| | | | % within Contracted Program | 17% | 83% | 100% |
| | | | % within Completion | 36% | 21% | 22% |
| | | | % of Total | 4% | 19% | 22% |
| | | TA | Count | 2510 | 26639 | 29149 |
| | | | Expected Count | 3028.5 | 26120.5 | 29149.0 |
| | | | % within Contracted Program | 9% | 91% | 100% |
| | | | % within Completion | 64% | 79% | 78% |
| | | | % of Total | 7% | 71% | 78% |
| | Total | | Count | 3904 | 33672 | 37576 |
| | | | Expected Count | 3904.0 | 33672.0 | 37576.0 |
| | | | % within Contracted Program | 10% | 90% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 10% | 90% | 100% |
| 2015 | Contracted Program | NCPACE | Count | 1989 | 6421 | 8410 |
| | | | Expected Count | 1087.0 | 7323.0 | 8410.0 |
| | | | % within Contracted Program | 24% | 76% | 100% |
| | | | % within Completion | 41% | 20% | 22% |
| | | | % of Total | 5% | 17% | 22% |
| | | TA | Count | 2893 | 26467 | 29360 |
| | | | Expected Count | 3795.0 | 25565.0 | 29360.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | % within Contracted Program | 10% | 90% | 100% |
| | | | % within Completion | 59% | 80% | 78% |
| | | | % of Total | 8% | 70% | 78% |
| | Total | | Count | 4882 | 32888 | 37770 |
| | | | Expected Count | 4882.0 | 32888.0 | 37770.0 |
| | | | % within Contracted Program | 13% | 87% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 13% | 87% | 100% |
| Total | Contracted Program | NCPACE | Count | 9739 | 40206 | 49945 |
| | | | Expected Count | 5780.2 | 44164.8 | 49945.0 |
| | | | % within Contracted Program | 19% | 81% | 100% |
| | | | % within Completion | 44% | 24% | 26% |
| | | | % of Total | 5% | 21% | 26% |
| | | TA | Count | 12579 | 130318 | 142897 |
| | | | Expected Count | 16537.8 | 126359.2 | 142897.0 |
| | | | % within Contracted Program | 9% | 91% | 100% |
| | | | % within Completion | 56% | 76% | 74% |
| | | | % of Total | 7% | 68% | 74% |
| | Total | | Count | 22318 | 170524 | 192842 |
| | | | Expected Count | 22318.0 | 170524.0 | 192842.0 |
| | | | % within Contracted Program | 12% | 88% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |

**Chi-Square Tests**

| Fiscal Year | | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|---|
| 2011 | Pearson Chi-Square | 1162.948 | 1 | .000 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Continuity Correctionb | 1161.829 | 1 | .000 | | |
| | Likelihood Ratio | 1087.603 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 39888 | | | | |
| 2012 | Pearson Chi-Square | 844.266 | 1 | .000 | | |
| | Continuity Correctionb | 843.254 | 1 | .000 | | |
| | Likelihood Ratio | 781.750 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38802 | | | | |
| 2013 | Pearson Chi-Square | 621.778 | 1 | .000 | | |
| | Continuity Correctionb | 620.811 | 1 | .000 | | |
| | Likelihood Ratio | 561.870 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38806 | | | | |
| 2014 | Pearson Chi-Square | 441.672 | 1 | .000 | | |
| | Continuity Correctionb | 440.820 | 1 | .000 | | |
| | Likelihood Ratio | 400.739 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37576 | | | | |
| 2015 | Pearson Chi-Square | 1105.669 | 1 | .000 | | |
| | Continuity Correctionb | 1104.444 | 1 | .000 | | |
| | Likelihood Ratio | 980.603 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37770 | | | | |
| Total | Pearson Chi-Square | 4137.785 | 1 | .000 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Continuity Correctionb | 4136.740 | 1 | .000 | | |
| | Likelihood Ratio | 3766.581 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 192842 | | | | |

**Symmetric Measures**

| Fiscal Year | | | Value | Approx. Sig. | | |
|---|---|---|---|---|---|---|
| 2011 | Nominal by Nominal | Phi | .171 | .000 | | |
| | | Cramer's V | .171 | .000 | | |
| | N of Valid Cases | | 39888 | | | |
| 2012 | Nominal by Nominal | Phi | .148 | .000 | | |
| | | Cramer's V | .148 | .000 | | |
| | N of Valid Cases | | 38802 | | | |
| 2013 | Nominal by Nominal | Phi | .127 | .000 | | |
| | | Cramer's V | .127 | .000 | | |
| | N of Valid Cases | | 38806 | | | |
| 2014 | Nominal by Nominal | Phi | .108 | .000 | | |
| | | Cramer's V | .108 | .000 | | |
| | N of Valid Cases | | 37576 | | | |
| 2015 | Nominal by Nominal | Phi | .171 | .000 | | |
| | | Cramer's V | .171 | .000 | | |
| | N of Valid Cases | | 37770 | | | |
| Total | Nominal by Nominal | Phi | .146 | .000 | | |
| | | Cramer's V | .146 | .000 | | |
| | N of Valid Cases | | 192842 | | | |

## DL/IL * Completion * Fiscal Year

**Crosstab**

| Fiscal Year | | | | Completion | | Total |
|---|---|---|---|---|---|---|
| | | | | Fail | Pass | |
| 2011 | DL/IL | DL | Count | 3248 | 22129 | 25377 |
| | | | Expected Count | 3103.4 | 22273.6 | 25377.0 |
| | | | % within DL/IL | 13% | 87% | 100% |
| | | | % within Completion | 67% | 63% | 64% |
| | | | % of Total | 8% | 55% | 64% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | IL | Count | 1630 | 12881 | 14511 |
| | | | Expected Count | 1774.6 | 12736.4 | 14511.0 |
| | | | % within DL/IL | 11% | 89% | 100% |
| | | | % within Completion | 33% | 37% | 36% |
| | | | % of Total | 4% | 32% | 36% |
| | Total | | Count | 4878 | 35010 | 39888 |
| | | | Expected Count | 4878.0 | 35010.0 | 39888.0 |
| | | | % within DL/IL | 12% | 88% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |
| 2012 | DL/IL | DL | Count | 3387 | 22075 | 25462 |
| | | | Expected Count | 2975.2 | 22486.8 | 25462.0 |
| | | | % within DL/IL | 13% | 87% | 100% |
| | | | % within Completion | 75% | 64% | 66% |
| | | | % of Total | 9% | 57% | 66% |
| | | IL | Count | 1147 | 12193 | 13340 |
| | | | Expected Count | 1558.8 | 11781.2 | 13340.0 |
| | | | % within DL/IL | 9% | 91% | 100% |
| | | | % within Completion | 25% | 36% | 34% |
| | | | % of Total | 3% | 31% | 34% |
| | Total | | Count | 4534 | 34268 | 38802 |
| | | | Expected Count | 4534.0 | 34268.0 | 38802.0 |
| | | | % within DL/IL | 12% | 88% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |
| 2013 | DL/IL | DL | Count | 2987 | 22962 | 25949 |
| | | | Expected Count | 2755.0 | 23194.0 | 25949.0 |
| | | | % within DL/IL | 12% | 88% | 100% |
| | | | % within Completion | 73% | 66% | 67% |
| | | | % of Total | 8% | 59% | 67% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | IL | Count | 1133 | 11724 | 12857 |
| | | | Expected Count | 1365.0 | 11492.0 | 12857.0 |
| | | | % within DL/IL | 9% | 91% | 100% |
| | | | % within Completion | 28% | 34% | 33% |
| | | | % of Total | 3% | 30% | 33% |
| | Total | | Count | 4120 | 34686 | 38806 |
| | | | Expected Count | 4120.0 | 34686.0 | 38806.0 |
| | | | % within DL/IL | 11% | 89% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 11% | 89% | 100% |
| 2014 | DL/IL | DL | Count | 3049 | 23822 | 26871 |
| | | | Expected Count | 2791.8 | 24079.2 | 26871.0 |
| | | | % within DL/IL | 11% | 89% | 100% |
| | | | % within Completion | 78% | 71% | 72% |
| | | | % of Total | 8% | 63% | 72% |
| | | IL | Count | 855 | 9850 | 10705 |
| | | | Expected Count | 1112.2 | 9592.8 | 10705.0 |
| | | | % within DL/IL | 8% | 92% | 100% |
| | | | % within Completion | 22% | 29% | 28% |
| | | | % of Total | 2% | 26% | 28% |
| | Total | | Count | 3904 | 33672 | 37576 |
| | | | Expected Count | 3904.0 | 33672.0 | 37576.0 |
| | | | % within DL/IL | 10% | 90% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 10% | 90% | 100% |
| 2015 | DL/IL | DL | Count | 3936 | 24583 | 28519 |
| | | | Expected Count | 3686.3 | 24832.7 | 28519.0 |
| | | | % within DL/IL | 14% | 86% | 100% |
| | | | % within Completion | 81% | 75% | 76% |
| | | | % of Total | 10% | 65% | 76% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | IL | Count | 946 | 8305 | 9251 |
| | | | Expected Count | 1195.7 | 8055.3 | 9251.0 |
| | | | % within DL/IL | 10% | 90% | 100% |
| | | | % within Completion | 19% | 25% | 24% |
| | | | % of Total | 3% | 22% | 24% |
| | Total | | Count | 4882 | 32888 | 37770 |
| | | | Expected Count | 4882.0 | 32888.0 | 37770.0 |
| | | | % within DL/IL | 13% | 87% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 13% | 87% | 100% |
| Total | DL/IL | DL | Count | 16607 | 115571 | 132178 |
| | | | Expected Count | 15297.2 | 116880.8 | 132178.0 |
| | | | % within DL/IL | 13% | 87% | 100% |
| | | | % within Completion | 74% | 68% | 69% |
| | | | % of Total | 9% | 60% | 69% |
| | | IL | Count | 5711 | 54953 | 60664 |
| | | | Expected Count | 7020.8 | 53643.2 | 60664.0 |
| | | | % within DL/IL | 9% | 91% | 100% |
| | | | % within Completion | 26% | 32% | 31% |
| | | | % of Total | 3% | 28% | 31% |
| | Total | | Count | 22318 | 170524 | 192842 |
| | | | Expected Count | 22318.0 | 170524.0 | 192842.0 |
| | | | % within DL/IL | 12% | 88% | 100% |
| | | | % within Completion | 100% | 100% | 100% |
| | | | % of Total | 12% | 88% | 100% |

**Chi-Square Tests**

| Fiscal Year | | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|---|
| 2011 | Pearson Chi-Square | 21.096 | 1 | .000 | | |
| | Continuity Correctionb | 20.951 | 1 | .000 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Likelihood Ratio | 21.323 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 39888 | | | | |
| 2012 | Pearson Chi-Square | 187.699 | 1 | .000 | | |
| | Continuity Correctionb | 187.244 | 1 | .000 | | |
| | Likelihood Ratio | 196.207 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38802 | | | | |
| 2013 | Pearson Chi-Square | 65.982 | 1 | .000 | | |
| | Continuity Correctionb | 65.698 | 1 | .000 | | |
| | Likelihood Ratio | 67.878 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 38806 | | | | |
| 2014 | Pearson Chi-Square | 92.822 | 1 | .000 | | |
| | Continuity Correctionb | 92.461 | 1 | .000 | | |
| | Likelihood Ratio | 97.278 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37576 | | | | |
| 2015 | Pearson Chi-Square | 79.339 | 1 | .000 | | |
| | Continuity Correctionb | 79.021 | 1 | .000 | | |
| | Likelihood Ratio | 82.965 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 37770 | | | | |
| Total | Pearson Chi-Square | 403.147 | 1 | .000 | | |
| | Continuity Correctionb | 402.839 | 1 | .000 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Likelihood Ratio | 416.668 | 1 | .000 | | |
| | Fisher's Exact Test | | | | .000 | .000 |
| | N of Valid Cases | 192842 | | | | |

**Symmetric Measures**

| Fiscal Year | | | Value | Approx. Sig. | | |
|---|---|---|---|---|---|---|
| 2011 | Nominal by Nominal | Phi | .023 | .000 | | |
| | | Cramer's V | .023 | .000 | | |
| | N of Valid Cases | | 39888 | | | |
| 2012 | Nominal by Nominal | Phi | .070 | .000 | | |
| | | Cramer's V | .070 | .000 | | |
| | N of Valid Cases | | 38802 | | | |
| 2013 | Nominal by Nominal | Phi | .041 | .000 | | |
| | | Cramer's V | .041 | .000 | | |
| | N of Valid Cases | | 38806 | | | |
| 2014 | Nominal by Nominal | Phi | .050 | .000 | | |
| | | Cramer's V | .050 | .000 | | |
| | N of Valid Cases | | 37576 | | | |
| 2015 | Nominal by Nominal | Phi | .046 | .000 | | |
| | | Cramer's V | .046 | .000 | | |
| | N of Valid Cases | | 37770 | | | |
| Total | Nominal by Nominal | Phi | .046 | .000 | | |
| | | Cramer's V | .046 | .000 | | |
| | N of Valid Cases | | 192842 | | | |

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# APPENDIX F. FULL SAMPLE GRADE PERFORMANCE, BY RANK GROUPS, CONTRACTED PROGRAM AND METHOD OF INSTRUCTION

**Variables Entered/Removedb**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | Rank Groups, TA/ NCPACE group (TA=1,NCPACE=0), DL/IL groups (DL=1,IL=0) | . | Enter |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .255 | .065 | .065 | 1.275 |

**ANOVAb**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 21829.678 | 3 | 7276.559 | 4476.327 | .000 |
| | Residual | 313470.649 | 192838 | 1.626 | | |
| | Total | 335300.327 | 192841 | | | |

**Coefficientsa**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.934 | .012 | | 160.483 | .000 |
| | TA/NCPACE group (TA=1,NCPACE=0) | .658 | .007 | .218 | 94.355 | .000 |
| | DL/IL groups (DL=1,IL=0) | -.251 | .007 | -.089 | -38.001 | .000 |
| | Rank Groups | .310 | .006 | .121 | 52.901 | .000 |

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