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AN ANALYSIS OF THE NAVY'S VOLUNTARY EDUCATION

by

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March 2007

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Some of the potential benefits of VOLED on sailors include improving their ability to cross-rate, improving their chances of advancement in their current rating, lowering their demotion rates and, possibly, improving reenlistment. Higher retention benefits the Navy by reducing the replacement costs for new recruits. While there is debate about the impact of VOLED on retention, the VOLED program is a service that is actively sought out by sailors, which suggests that it improves sailor satisfaction with the Navy

The study concludes that additional funding should be given to the VOLED program based on the potential benefits to the Navy and the likely increase of usage in the future. A study should be commissioned in the Navy to statistically assess the quantifiable effects of the Navy's VOLED program.

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AN ANALYSIS OF THE NAVY'S VOLUNTARY EDUCATION PROGRAM

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Some of the potential benefits of VOLED on sailors include improving their ability to cross-rate, improving their chances of advancement in their current rating, lowering their demotion rates and, possibly, improving reenlistment. Higher retention benefits the Navy by reducing the replacement costs for new recruits. While there is debate about the impact of VOLED on retention, the VOLED program is a service that is actively sought out by sailors, which suggests that it improves sailor satisfaction with the Navy

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I. INTRODUCTION

A. INTRODUCTION

The United States military has been struggling with the issue of educating its members since the conception of the Army and Navy. Spending on education versus other operational inputs is a difficult trade off and one that is not close to being balanced. However, as technology advances, the need for educated service members increases. In the Navy the question of education for enlisted service members and the funding for that education is an important current policy issue. Recently, for example, the Navy mandated that all Chief Petty Officers must have an Associate Degree or higher in order to advance to Senior Chief Petty Officer by year 2011.[1] Advanced education will not disappear from the deck plates and funding that advanced education will continue to be a difficult policy issue.

In modern times, the federal government has consistently funded some sort of education for service members. The Rehabilitation Act of 1919 provided educational assistance to veterans who were disabled in World War I. At the end of World War II, the United States enacted the Servicemen's Readjustment Act of 1944, called the G. I. Bill of Rights. This program was followed by the Veterans Educational Assistance Program (VEEP) program, which offered continuing education benefits to Vietnam veterans. Currently, the Montgomery G. I. Bill (MGIB),

[1] Navy Personnel Command, Bureau of Naval Personnel, Reference Library, Messages,NAVADMIN 203/05 DTG 191320Z AUG 05.

which was instituted in 1985, provides up to 36 months of educational assistance that can be used by both active duty service members and veterans.[2] The above programs are by enlarge utilized by service members after they leave active duty.

The Department of Defense funds the attainment of advanced education and the Navy captures those funds through the Voluntary Education Program (VOLED). VOLED is a program for service members on active duty who want to gain an advanced education. This program has been under scrutiny for the last few years. The armed forces has tried to estimate the return on investment (ROI) to determine the economic returns to the service for the money that is spent on education programs each year. Several analyses have been conducted, including an analysis of the ROI, but the results have not been consistent.

B. BACKGROUND

Code 2007 Title 10, U. S. code is the authorization for payment of tuition for off duty training or education. Funds are distributed from the U.S. government to the individual service chiefs in order to fund the continuing education programs. VOLED is based on Department of Defense (DOD) Instructions that has been issued to implement Code 2007. Department of Defense Instruction (DODINST) 1322.25 dated February 5, 1997 states that "Members of the Armed Forces serving on active duty shall be afforded the

[2] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 1.

opportunity to complete their high school education, earn an equivalency diploma, improve their academic skills or level of literacy, enroll in vocational and technical schools, receive college credit for military training and experience in accordance with the American Council on Education's guide to the evaluation of nontraditional learning experiences in the armed forces, take tests to earn college credit and, and enroll in post-secondary education programs that lead to associates, bachelor's and graduate degrees. Service Members costs to participate in Voluntary Education Programs shall be reduced through financial support, including tuition assistance that is administered uniformly across the Services."[3]

From that guidance, the Department of the Navy issued the Secretary of the Navy Instruction (SECNAVINST) 1560.4 series which established the Navy's VOLED Program. The current version of this series is SECNAVINST 1560.4A dated December 1, 2005. This instruction directs the Chief of Naval Operations (CNO) and the Commandant of the Marine Corps (CMC) to carry out the DOD continuing education program. The Secretary of the Navy directs the CNO and CMC to "Ensure that sufficient fiscal, facilities, and staffing support is provided to carry out requirements of this instruction, including, but not limited to, a worldwide network of education centers, trained staff to provide educational counseling, adequate facilities, and funding for tuition assistance and academic skills programs."[4] The CNO

[3] Department of Defense Instruction 1322.25 dated February 5, 1997, p. 2.

[4] Secretary of the Navy Instruction 1560.4A dated December 1, 2005, p. 3.

has delegated administration of the VOLED program to the Naval Education and Training Command (NETC), and provided specific guidance to the Chief of Naval Personnel (CNP).

Department of the Navy, Office of the Chief of Naval Operations (OPNAV) Instruction 1560.9 dated April 4, 1988 outlines the CNO direction and explains how the Navy will implement the DOD policy. The essential components of the Navy's VOLED program are Tuition Assistance (TA), Program for Afloat College Education (PACE), Academic Skills and Navy Campus. Additionally the instruction outlines responsibilities of the Chief of Naval Education and Training and the Deputy CNO with regard to continuing education.[5]

C. VOLUNTARY EDUCATION

The first component of the VOLED program is the TA Program, which enables sailors to reduce the expenses of receiving off duty education at accredited colleges, universities and other schools.[6] TA is the largest part of the VOLED program accounting for 71 percent of VOLED funding.[7] Currently the TA program pays 100 percent of tuition costs for a High School diploma or for an equivalency certificate (GED). For courses at other educational levels, there is a fiscal year cap of 16 semester hours, 24 quarter hours, 240 clock hours or 24 continuing education units. Tuition and fees will be funded

[5] Chief of Naval Operations Instruction 1560.9 dtd April 4, 1988, p. 2.

[6] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:8, April 1998.

[7] This figure was provided by CTR CPD in Pensacola, FL, March 2007.

by the Navy $250.00 per semester hour, $166.67 per quarter hour, $16.67 per clock hour, $166.67 per continuing education unit. Funding is provided in advance, unless the add-drop period has passed. In these cases, service members are not reimbursed for costs incurred.[8]

TA is available to all enlisted personnel and officers on active duty, and to enlisted Naval Reservists ordered to active duty for at least 120 days. For Naval Reserve Officers, activation for two years or more is required. The program also requires that the service member remain on active duty during the duration of the course, and that the final grades of the course be provided to the Navy.[9]

If the course grade is a Withdraw (W) or Fail (F), then the service member must reimburse the Navy. The program does not pay for books or other course materials such as CD roms. Enlisted personnel do not incur an additional service commitment when using TA; however, Officers must remain on active duty for two years after the completion of the last course funded by the TA Program.[10] This obligation can be served concurrently with other obligations such as the Surface Warfare Junior Officer bonus.

The second component of the VOLED system is the Program for Afloat College Education (PACE). This program is targeted at sailors on a sea duty rotation (to include squadrons) and in remote locations. Sailors can attend courses tuition free, only incurring the price of books and

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[8] Naval War College, Tuition Assistance, www.navycollege.navy.mil/tuition/ta2.html (last accessed March 2007).

[9] Ibid.

[10] Ibid.

course materials. PACE offers college courses for credit, as well as remedial modules in English, Language Arts, Reading, Math and Basic Science. To determine appropriate placement in the PACE system, the Armed Forces Vocational Aptitude Battery Test (ASVAB) score is used as well as previous college experience.[11] Instruction delivery for the PACE program is either via an electronic method, such as a CD course, or via an instructor who is embarked onboard the Naval vessel.

Academic Skills Learning Centers provide shore-based sailors with the same basic classes (with no college credit) for the remedial modules. The mission of the Centers is to provide sailors with basic skills remediation, increasing their knowledge and preparing them for college classes.[12]

The final VOLED component is Navy Campus. This facility exists to give sailors individual counseling about their academic careers, and to provide a road map to earn a GEB diploma or a degree (Associate, Bachelor, or Graduate). Navy Campus also administers the ACT, SAT, CLEP, and DANTES exams to sailors.[13]

The Navy has advanced to the internet and introduced the SMART transcript program. This program outlines sailors' career paths for their rating and converts those training experiences into potential college credit via a college who participates in the Service Members Opportunity

[11] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:11, April 1998.

[12] Ibid., p. 11.

[13] Ibid., p. 12.

College (SOC) Degree Program. Both of these programs, SOC and Smart Transcript, are outside of the scope of this study but are worth noting.

The VOLED Program as a whole must be reviewed periodically to ensure that the program is still accomplishing its mission as well as to "document the impact of VOLED programs on personnel and commands."[14] Also, funding for the program must be balanced against other Navy programs so the Navy can allocate its resources where they will yield the highest return. Historically, the Tuition Assistance Program has drawn the most attention as it is the most widely used part of the VOLED program.

Recently there have been four studies conducted to analyze ROI on the VOLED and/or TA programs: (1) A Center of Naval Analysis (CNA) study Effectiveness of the Voluntary Education Program authored by Federico E. Garcia, Ernest H. Joy and David Reese published in 1998; (2) an article from Economics of Education Review entitled "Does Employer-financed General Training Pay? Evidence from the U. S. Navy", authored by Federico Garcia, Jeremy Arkes and Robert Trost published in 2002, (3) a RAND Corporation study, Tuition Assistance Usage and First Term Military Retention; authored by Richard Buddin and Kanika Kapur in 2001, and (4) a study by the United States Army Research Institute for the Behavioral and Social Sciences, Impact of the Army Continuing Education System (ACES) on Soldier Retention and

[14] Secretary of Navy Instruction 1540.4A dated December 1, 2005, p. 4.

Performance: Data Analyses authored by Paul J. Sticha, Timothy A. Dall, Kristina Handy, Javier Espinosa, Paul F. Hogan, Mark C. Young published in 2003.

D. THESIS QUESTIONS AND SCOPE

To answer the research questions, prior studies will be reviewed and their results applied to the current situation to access what changes, if any, need to be made to current policy. The primary research question of this thesis is: "What is the economic return on the Navy's Voluntary Education Program (especially TA)?" The analysis in this thesis concentrates on the TA program but also discusses the other programs which make up the entire VOLED program. TA is the program that is the most controversial within all the studies, it is common to all services, and it accounts for the majority of funds spent on VOLED.

The second research question is: "What is the impact of TA on a sailor's career?" This study will review the information and draw conclusions from the literature in order to discover the true impact on a sailor's career.

The Third question is "What does a review of the literature indicate about the effects of the VOLED program?" Are the effects of Voluntary Education far reaching and force shaping, or is this just another quality of life program?

E. ORGANIZATION OF THE THESIS

Chapter II reviews the prior statistical studies of the Voluntary Education Programs. Chapter III compares the study designs of the statistical studies. Chapter IV

describes the Next Generation emerging in the Navy and the present status of their opportunity to gain advanced education from civilian universities. Chapter V summarizes all reviewed work, emphasizing the commonalities. Chapter VI presents conclusions drawn from the reviewed works.

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II. PRIOR STUDIES OF THE VOLUNTARY EDUCATION PROGRAM

A. THE CENTER FOR NAVAL ANALYSIS VOLED STUDY

CNA commissioned a study to evaluate the VOLED system. That study, Effectiveness of the Voluntary Education Program, was authored by Federico E. Garcia, Ernest H. Joy and David Reese and published in 1998. The questions the study concentrated on were: What is the impact of participating in VOLED on the career and promotion probabilities of individual sailors? What is the impact on sailor retention? Is VOLED cost effective? Finally, what policies would enhance the VOLED system?[15]

1. Data

The CNA built an educational history file for active-duty enlisted sailors covering the period August 1992 through March 1997. Garcia et al. noted that the Navy does not have a centralized database for student records, so they constructed their own database from the information provided from several commands.[16]

Information TA was constructed from 510,000 records obtained from the Navy Campus Management Information System (NCMIS), maintained by NETPDTC.[17] Central Texas College provided 63,000 records on participants in the Instructor PACE program. Information was provided by Middlesex

[15] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:2-4, April 1998.

[16] Ibid., p. 15.

[17] Ibid.

Research Center on 22,000 participants in the Technology Pace program.[18] No information was available on the Academic Skills Learning Centers.[19] Finally, 20,200 records were obtained on sailors who had attended orientation briefs on the PACE program.[20]

Navy School House course costs were collected for Fiscal Year (FY) 1996.[21] These costs included the costs of A-school, C-school, bootcamp, and fleet training. For the analysis phase of the study, a single cohort was utilized (FY 1992 cohort) to construct and estimate the multivariable regression models.

2. Statistical Models

To analyze promotion outcomes, an ordered probit model was specified and estimated. A simple bivarate logit or probit model would have been inappropriate for this study because it would fail to account for the ordinal nature of the paygrade outcomes.[22] That is, in a given cohort individuals would advance to different grades at a given point in time.

The authors pointed out that motivation of VOLED participants may be different (higher) than that of non-participants, which would cause selection bias. This selection bias was controlled by isolating the promotion and retention effects directly attributable to VOLED by using

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[18] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:15, April 1998.

[19] Ibid., p. 16.

[20] Ibid.

[21] Ibid., p. 17.

[22] Ibid., p. 53.

the Heckman two-step process.[23] This involves estimating two equations, one to predict VOLED participation and one to predict retention (or promotion) outcomes. To analyze retention and promotion, a binomial probit model was used.

3. Findings

The findings from the promotion model indicated that the effect of VOLED is positive; 31 percent of Sailors with no college education who participated in the VOLED program achieved the rank of E5 within five years or less.[24] If 15 college credits were obtained through VOLED then the chances of achieving E5 in five years or less rose from 31 percent to 43 percent, a gain of 12 points. If 30 credits were obtained, the probability of promotion increased to 51 percent; at 45 college credits the percentage increased to 58 percent; and, finally, at 60 college credits obtained through VOLED, the percentage of those achieving E5 in 5 years or less increased to 66 percent.

These results are displayed in Figure 1 and in the regression results presented in Table 1 and Table 2. Table 1 shows the probability of participating in the VOLED program. These regression results were used as a correction factor for selection bias when estimating the effects of VOLED on retention and promotion. Table 2 analyzes the determinants of the probability of achieving the rank of E5

[23] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:23-24; 54, April 1998.

[24] Ibid., p. 27.

in five years or less. The marginal effects reflect percentage point change in the promotion probability from a one unit change in the desired variable.

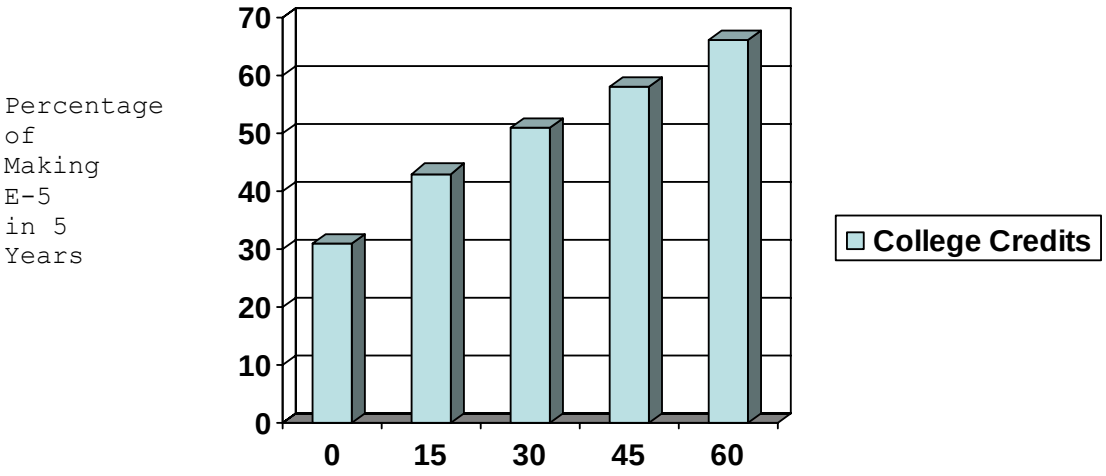

Figure 1. Effect of VOLED participation on promotion College credits accumulated through VOLED

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center for Naval Analyses, CRM 98-40, April 1998

Table 1. The probability of participating in the Voluntary Education Program probit estimates

Variable	Marginal effect (percentage points)[b]	t-ratio	Average
Orientation	12.31***	7.06	0.06
AFQT score	0.24***	8.83	59.70
Education at accession[c]			
No high school degree	-1.11	-0.15	0.01
Nontraditional high school	-0.21	-0.07	0.02
College experience	-12.83	-0.81	0.00
Individual and career			
Female	7.95***	5.95	0.15
African American	-0.29	-0.24	0.23
Hispanic	3.99***	2.85	0.11
Asian Pacific Islander	10.85***	5.21	0.05
Married	3.35*	1.69	0.05
Age (at accession)	-1.46***	-11.79	19.46
Demoted	-7.31***	-3.09	0.05
Sea duty (% of career)	-0.17***	-9.60	81.23
Rating group[d]			
Administration	9.16***	3.42	0.05
Aviation maintenance	-0.44	-0.19	0.09
Aviation operations	2.55	0.94	0.05
Aviation supply	12.86***	4.19	0.03
Construction battalion	0.07	0.02	0.03
Cryptology	4.64	1.59	0.03
Deck	5.14	1.35	0.02
General detail	-0.33	-0.17	0.28
Hull, mechanical, electrical	-3.42	-1.18	0.04
Medical	8.14***	3.48	0.09
Musician	-8.93	-0.67	0.00
Submarine	-4.09	-1.09	0.02
Supply	1.13	0.45	0.07
Surface operations	0.26	-0.11	0.08
Surface operations (combat systems)	3.36	1.32	0.06

a. Five-year survivors only. Dependent variable is participation in any of the elements of the Voluntary Education Program (college, academic skills, developmental, and vocational/technical). Average = 0.26. Standard deviation = 0.44. Number of observations = 8,113. Log likelihood function = -4,332. Chi-squared test (27) = 595. Regression confidence level = 99.99 percent.
b. Partial derivatives computed at the averages of the explanatory variables.
*** Statistically significant at 99-percent confidence level.
* Statistically significant at 90-percent confidence level.
c. Reference educational background group is high school graduates.
d. Rating group at 24 months of service or latest. Reference rating group is surface engineer.

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Table 2. The probability of reaching a determined paygrade: Ordered probit model corrected for sample selection

	Marginal effect (percentage points)[b]						
	E1	E2	E3	E4	E5	t-ratio[c]	Average
Voluntary Education Program							
College credits[d]	0.00	0.00	-0.07	-0.42	0.50	4.77***	2.24
Developmental (remedial) credits	0.00	0.00	0.00	-0.01	0.01	0.01	0.10
Academic skills participation	0.03	0.05	0.78	4.47	-5.33	-1.17	0.01
Vocational/technical coursework	-0.02	-0.03	-0.47	-2.70	3.22	1.37	0.01
Education at accession[e]							
No high school degree	-0.04	-0.07	-1.04	-6.01	7.17	0.75	0.00
Non-traditional high school	0.02	0.04	0.56	3.24	-3.86	-1.12	0.02
College experience	0.17	0.27	4.04	23.26	-27.74	-1.25	0.00
Vacancies: ratio of E5 billets and E4 inventory	-0.02	-0.04	-0.55	-3.15	3.76	3.03***	1.28
Individual and career							
Demoted	0.29	0.48	7.05	40.60	-48.43	-22.56***	0.05
Sea duty (% of career)	0.00	0.00	-0.04	-0.22	0.26	12.15***	56.23
AFQT score	0.00	-0.01	-0.09	-0.51	0.61	17.89***	59.70
Age (at E5 or latest)	-0.01	-0.01	-0.18	-1.06	1.27	5.85***	24.61
Female	0.02	0.04	0.58	3.32	-3.96	-2.34**	0.15
African American	0.05	0.09	1.31	7.52	-8.97	-6.64***	0.23
Hispanic	0.04	0.06	0.95	5.49	-6.55	-4.10***	0.11
Asian Pacific Islander	0.00	0.00	-0.05	-0.27	0.33	0.13	0.05
Married	-0.05	-0.07	-1.09	-6.28	7.49	3.34***	0.05
Accession program[f]							
School guarantee 4YO	0.04	0.07	1.07	6.14	-7.33	-2.35**	0.34
School guarantee 6YO	0.02	0.03	0.39	2.22	-2.65	-0.80	0.19
General detail	0.03	0.04	0.61	3.51	-4.18	-1.30	0.34
Other program	0.00	0.01	0.11	0.62	-0.75	-0.22	0.08
Rating group[g]							
Administration	-0.13	-0.21	-3.14	-18.07	21.55	6.79***	0.05
Aviation maintenance	0.03	0.05	0.75	4.32	-5.16	-1.88*	0.09
Aviation operations	-0.06	-0.10	-1.55	-8.93	10.65	3.35***	0.05
Aviation supply	-0.09	-0.14	-2.07	-11.95	14.25	3.95***	0.03
Construction battalion	-0.03	-0.05	-0.81	-4.64	5.54	1.31	0.03
Cryptology	-0.23	-0.38	-5.63	-32.40	38.64	10.35***	0.03

	Marginal effect (percentage points)[b]						
	E1	E2	E3	E4	E5	t-ratio[c]	Average
Deck	-0.06	-0.10	-1.43	-8.21	9.79	2.30**	0.02
General detail	0.10	0.17	2.49	14.35	-17.12	-6.26***	0.28
Hull, mechanical, electrical	-0.06	-0.10	-1.43	-8.22	9.80	3.22***	0.04
Medical	0.14	0.22	3.24	18.67	-22.27	-7.23***	0.09
Musician	0.13	0.20	3.00	17.28	-20.61	-0.82	0.00
Submarine	-0.06	-0.10	-1.41	-8.10	9.67	2.43**	0.02
Supply	0.00	0.01	0.11	0.63	-0.75	-0.26	0.07
Surface operations	-0.05	-0.07	-1.11	-6.38	7.61	2.79***	0.08
Surface operations (combat systems)	-0.16	-0.26	-3.77	-21.72	25.90	8.28***	0.06
Correction for sample selection	-0.03	-0.05	-0.69	3.98	4.75	5.40***	0.00

a. Five-year survivors only. Dependent variable is last paygrade observed. Number of observations = 8,113. Log likelihood function = -5,872. Chi-squared test (37) = 2,550. Regression confidence level = 99.99 percent.
b. Partial derivatives computed at the averages of the explanatory variables.
c. *** Statistically significant at 99-percent confidence level.
** Statistically significant at 95-percent confidence level.
* Statistically significant at 90-percent confidence level.
d. In a separate specification, we included the square value of the college credits but it was not statistically significant. Without correction for sample selection, the marginal effect of college credits on paygrade is -0.01, -0.01, -0.12, -0.69, and 0.82 percentage points for E1 through E5, respectively (statistically significant at the 99-percent confidence level). The marginal effect of the other variables are not much different from those presented in this table.
e. Reference educational background group is high school graduates.
f. Reference accession program is school guarantee 5YOs.
g. Rating group at 24 months of service or latest. Reference rating group is surface engineer.

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Based on the ordered probit model for promotion (Table 2), demotion was found to be inversely related to VOLED participation. For sailors who did not participate in the VOLED program, 14 percent were demoted. If VOLED participation was elected, then demotion fell to 7 percent for those who attended academic skills and 6 percent for those with college credit.[25] This result is displayed in Figure 2 and also in Table 2.

[25] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:31, April 1998.

The results for the analysis of retention also indicated that VOLED had a positive effect on sailor reenlistment. Sailors who never used the VOLED program reenlisted at a rate of 31 percent.[26] Those who had used the VOLED program and obtained 15 college credits had a 37 percent probability of reenlisting. Much like the promotion scale, as the number of college credits increased so did the percentage of sailors who reenlisted or extended. The top of the scale was 60 college credits accumulated through the VOLED program, which corresponded to a reenlistment rate of 55 percent.[27] The regression estimates for the factors that determine the probability of participating in the VOLED program are displayed in Table 3. The regression estimates of the retention model are displayed in Table 4.

[26] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:32, April 1998.

[27] Ibid., p. 33.

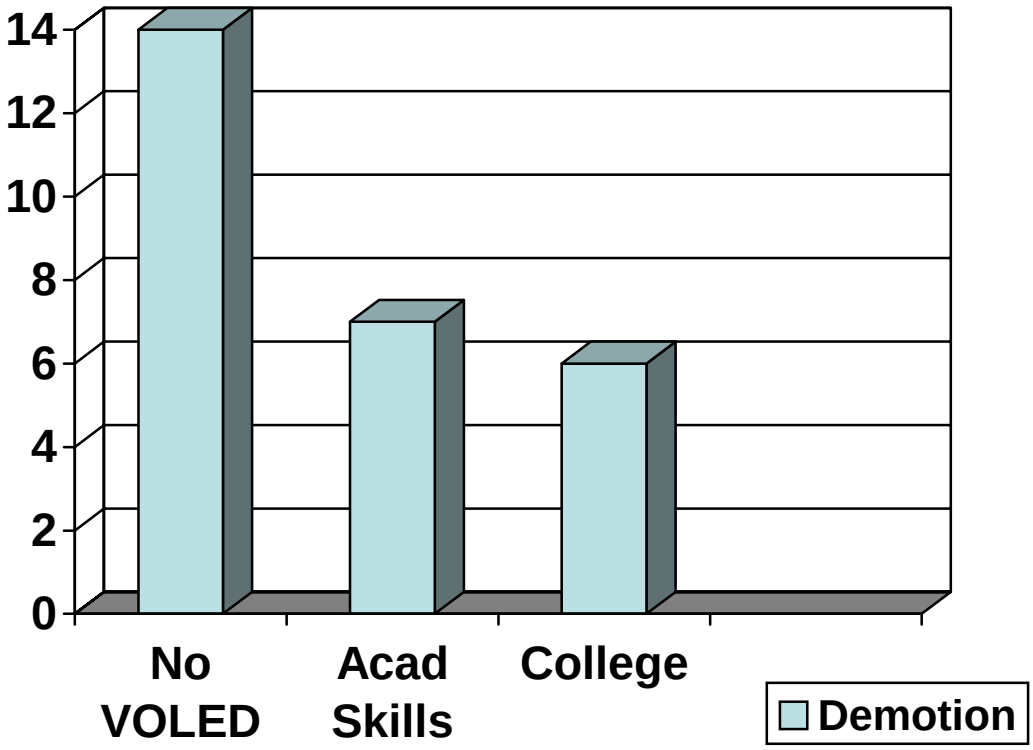

Figure 2. Participation in VOLED and Demotion

Source: Federico E. Garcia et al, Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Table 3. The probability of participating in the Voluntary Educational program: probit estimates.

Variable	Marginal effect (percentage points)[b]	t-ratio	Average
Orientation	12.94***	9.69	0.02
AFQT score	0.13***	9.77	55.64
Education at accession[c]			
No high school degree	-7.50*	-1.74	0.01
Nontraditional high school	-2.05	-1.45	0.03
College experience	-6.22	-0.60	0.01
Individual and career			
Female	6.00***	10.73	0.18
African American	-0.39	-0.66	0.18
Hispanic	3.31***	5.12	0.11
Asian Pacific Islander	8.40***	7.18	0.03
Married	-0.65	-1.48	0.34
Age (at accession)	-2.21***	-50.52	19.53
Demoted	-7.11***	-9.75	0.13
Sea duty (% of career)	-0.01	-0.24	47.43

Rating group[d]			
Administration	22.43***	7.00	0.01
Surface engineer	8.42***	7.49	0.06
Aviation maintenance	13.64***	13.95	0.07
Aviation operations	16.59***	21.26	0.11
Aviation supply	15.98***	17.44	0.08
Construction battalion	21.90***	20.69	0.04
Cryptology	23.18***	26.49	0.06
Deck	16.93***	13.64	0.03
Hull, mechanical, electrical	15.21***	16.67	0.08
Medical	23.07***	28.79	0.08
Musician	25.69***	22.42	0.03
Submarine	17.49***	13.07	0.02
Supply	15.51***	14.35	0.04
Surface operations	12.87***	6.52	0.01
Surface operations (combat systems)	25.86***	4.08	0.01

a. Four-year obligors only. Dependent variable is participation in any of the elements of the Voluntary Education Program (college, academic skills, developmental, and vocational/technical). Average = 0.15. Standard deviation = 0.36. Number of observations = 24,756. Log likelihood function = -9,329. Chi-squared test (27) = 2,313. Regression confidence level = 99.99 percent.
b. Partial derivatives computed at the averages of the explanatory variables.
*** Statistically significant at 99-percent confidence level.
* Statistically significant at 90-percent confidence level.
c. Reference educational background group is high school graduates.
d. Rating group at 24 months of service or latest. Reference rating group is general detail.

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

The results from Table 3 were used to estimate a correction factor for selection bias in the decision to participate in VOLED. Table 4 displays the probability of reenlisting using the sample selection correction factor (The Inverse Mills Ratio) from the Heckman two step

estimates.[28] The Heckman estimator controls for the probability that participants in the VOLED program are self-selected based on, for example, motivation or ability.

Table 4. The probability of reenlisting: Probit estimates for sample selection

Variable	Marginal effect (percentage points)[b]	t-ratio	Average
Voluntary Education Program			
College credits	0.43***	3.26	1.23
College credits squared	-0.01***	-2.49	24.32
Academic skills participation	35.17***	2.54	0.01
Developmental (remedial) credits	2.25**	2.14	0.06
Developmental credits squared	-0.31*	-1.74	0.27
Vocational/technical coursework	2.34	0.56	0.01
Associate degree (60 or more college credits)	11.00	0.13	0.01
Education at accession[c]			
No high school degree	-1.24	-0.26	0.01
Nontraditional high school	4.30***	2.45	0.03
College experience	4.50	0.47	0.01
Selective reenlistment bonus (SRB)			
Multiple	3.03***	5.65	0.37
Qualified	-0.74	-0.71	0.23
Paygrade (at decision point)			
E1-E2	-31.03***	-26.58	0.32
E3	-12.37***	-16.32	0.23
E5	17.04***	14.00	0.05
Scheduled to advance to next paygrade	14.19***	15.35	0.16
Sea duty (% of career)	0.54	0.73	0.55
Next tour ashore	7.76***	11.68	0.46
AFQT score	0.04***	2.31	55.64
Age (at decision)	3.65***	30.01	19.53
Female	6.35***	7.89	0.18
African American	14.48***	19.36	0.18
Hispanic	6.39***	7.80	0.11
Asian Pacific Islander	11.65***	7.61	0.03
Single parent	-2.12*	-1.75	0.05
Number of dependents	3.40***	8.04	0.27
Military spouse	3.19***	3.05	0.06
Unemployment rate[d]	-19.37***	-44.29	5.89

[28] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:61, April 1998.

Variable	Marginal effect (percentage points)[b]	t-ratio	Average
Rating group[e]			
Administration	46.52***	9.50	0.01
Surface engineer	14.86***	10.74	0.06
Aviation maintenance	10.74***	7.86	0.07
Aviation operations	21.74***	18.60	0.11
Aviation supply	17.83***	14.17	0.08
Construction battalion	23.90***	16.10	0.04
Cryptology	22.53***	17.14	0.06
Deck	15.15***	9.35	0.03
General detail	22.47***	18.28	0.08
Hull, mechanical, electrical	35.55***	27.97	0.08
Medical	27.21***	15.12	0.03
Musician	17.85***	9.97	0.02
Submarine	16.37***	10.32	0.04
Supply	23.00***	9.74	0.01
Surface operations	40.79***	4.70	0.01
Surface operations (combat systems)			
Correction for sample selection	-2.19***	-3.87	0.00

a. Includes 4-year obligors only. Dependent variable is reenlistment or extension observed. Number of observations = 8,113. Log likelihood function = -5,872. Chi-squared test (37) = 2,550. Regression confidence level = 99.99 percent.

b. Partial derivatives computed at the averages of the explanatory variables.
*** Statistically significant at 99-percent confidence level.
** Statistically significant at 95-percent confidence level.
* Statistically significant at 90-percent confidence level.

c. Reference educational background group is high school graduates.

d. The overall unemployment rate was 6.5 percent in FY92 and declined steadily to 4.2 percent in FY97. The race-specific unemployment rates experienced a similar declining trend. The negative effect of the unemployment rate on reenlistment reflects that a large proportion of the FY92 cohort's attrition occurred in the relatively high unemployment period of FY92 and FY93.

e. Rating group at 24 months of service or latest. Reference rating group is general detail.

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

As Table 4 shows, most variables are positive and statistically significant at the 99 percent confidence level. In other words, the VOLED program enhances retention almost across the board. Had there not been a VOLED program in place retention levels would have been lower.

CNA also conducted a cost-benefit analysis of the VOLED program to determine whether the program was cost effective. The replacement costs of a sailor were calculated by estimating an average cost of training invested in the sailor by the end of their first enlistment. The breakout for the costs were: Recruiting: $5,163; Bootcamp: $6,668; A-school/apprenticeship training: $6,902; C-school: $4,251; Team training: $426; and Fleet training: $890. The total was calculated to be $24,301 (FY 1998 average from frist term sailors)[29]. If a sailor reenlisted and used less than $24,301 of VOLED funds, then the VOLED program is said to be cost effective.

Figure 3 below discusses the cost effectiveness of the program per course completion. The authors estimated that course completion was under $500 for all courses. From Figure 3 Instructor PACE was the cheapest and Technology PACE was the most expensive program. Considering other programs funded by the Navy, Figure 3 shows that VOLED is truly low cost. All dollar amounts are expressed in 1998 dollars.[30]

[29] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:23, April 1998.

[30] Ibid., pp. 33-35.

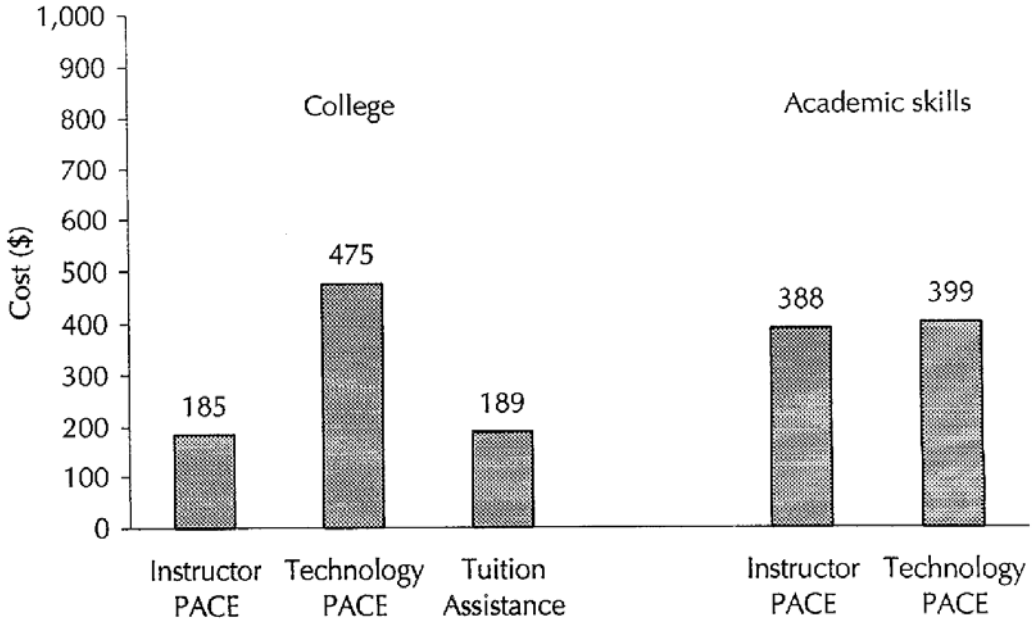

Figure 3. Cost per course completion

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Figure 4 displays the costs of increasing college enrollments by 1,000 (on the left hand panel). Based on their findings, the authors report that in each case the benefits (on the right hand panel) exceed the cost of the program. For Instructor PACE and TA, the Navy's benefit ratio is calculated to be 2:1. For Technology PACE the benefit cost ratio is 1:1. The benefits stem from the reduction in requirements for training new recruits because of increased retention. All dollar amounts are in 1998 dollars.[31]

[31] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:35, April 1998.

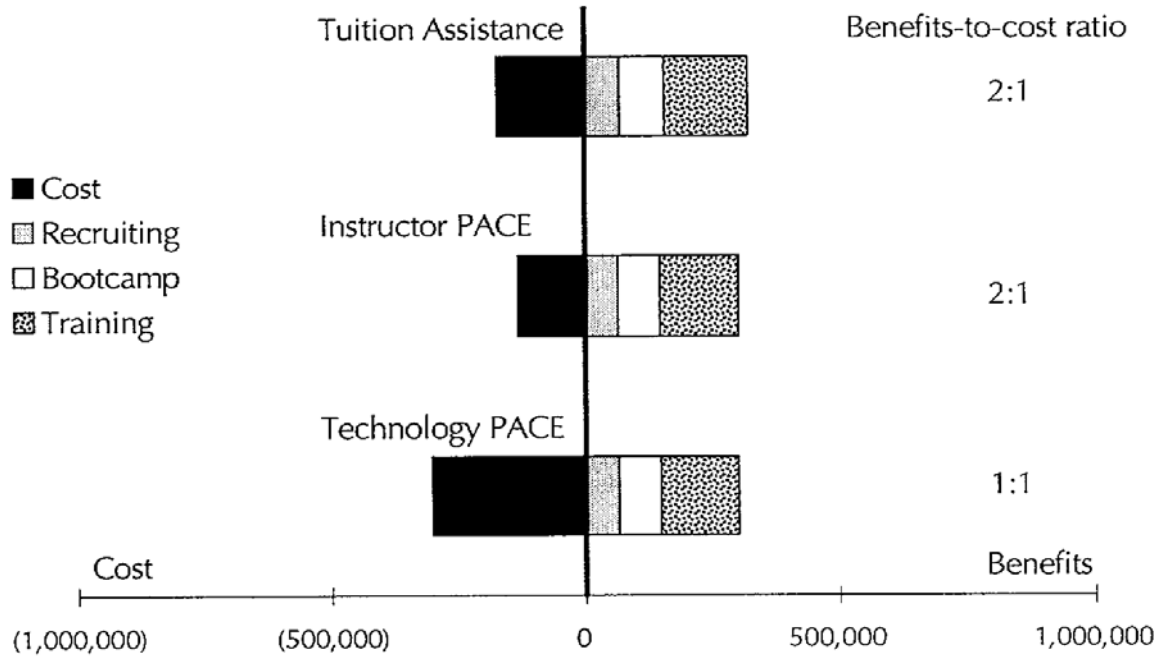

Figure 4. Benefits and Costs of increasing college enrollments by 1,000 (in FY 1998 dollars)

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Figure 5 displays the results of the cost effectiveness analysis for the academic skills portion of the VOLED program based on increasing enrollment by 1,000 courses. Figure 5 also demonstrates that remedial education is very cost effective for the Navy. When academic skills classes are taught through Instructor PACE the Navy receives $14 from improved retention rates for every $1 that is invested. When the academic skills classes are delivered through Technology PACE, a savings of $22 is realized for every $1 invested. Finally, if academic skills classes are delivered through the actual learning centers, the savings is reduced to $9 for every $1 invested. This program is more cost

effective than any other portion of VOLED. As with the other finding, all amounts are reported in 1998 dollars.[32]

Based on these graphs and observed the increase in retention associated with VOLED, the report concludes that the VOLED program is cost-effective across all components. This stems largely from the reductions in recruit training costs due to the improved retention of the existing force. Arguably, the program is only cost effective when a high percentage of sailors complete the courses that they sign up for. Figure 6 shows completion rate of college course by Navy VOLED users as compared to their civilian counterparts.

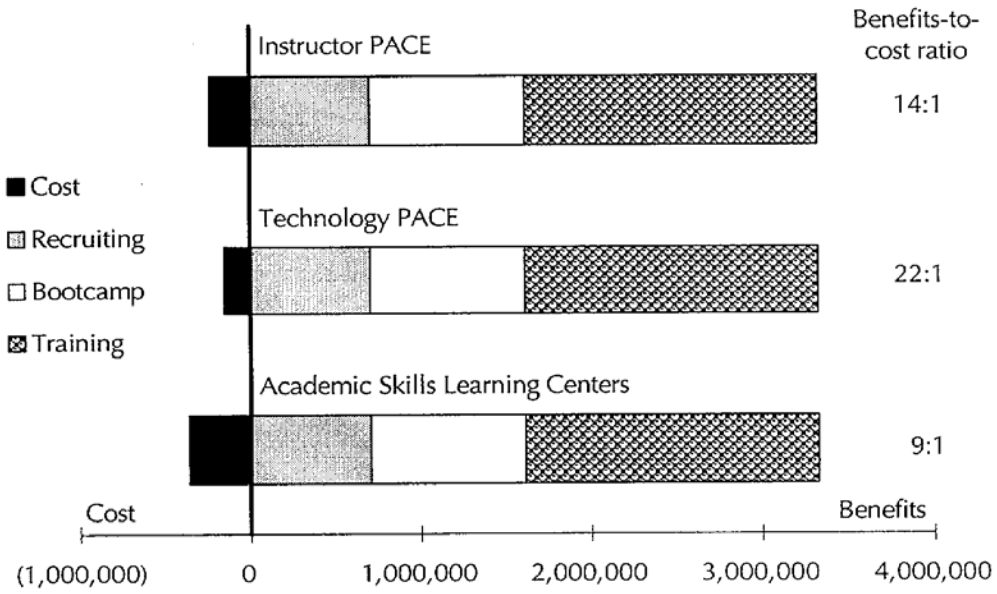

Figure 5. Benefits ad Cost of increasing academic skills enrollment by 1,000 (in FY 1998 dollars)

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

[32] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:36, April 1998.

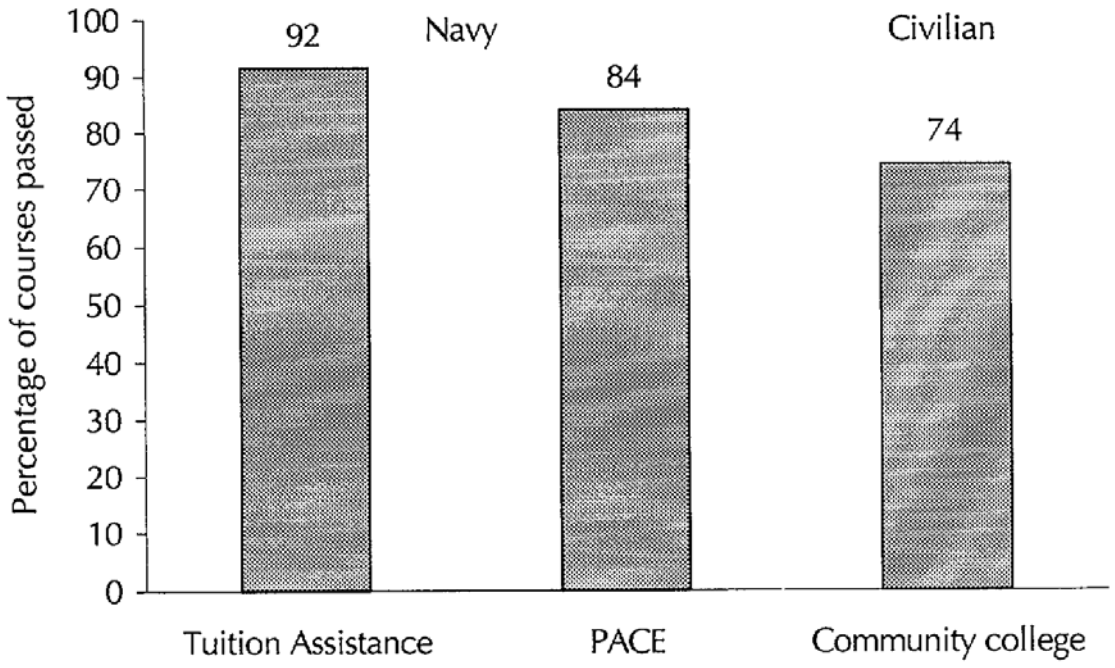

Figure 6. Comparison of Navy and civilian course completion rates

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

Given that the Navy sailors complete their course more often then their civilian counterparts, the authors conclude that the program is once again judged cost effective.

Additionally, the study provided data that seemed to support the fact that sailors who participated in the VOLED program often cross-rated to more technical rates and were more successful at these rates than sailors who did not participate in the program. Figure 7 shows that sailors who participated in the VOLED program cross-rated, or switched their rates, at a higher percentage than sailors who did not

participate.[33] Although not really emphasized in the study, women and minorities were more likely to use VOLED than their Caucasian male counterparts.[34]

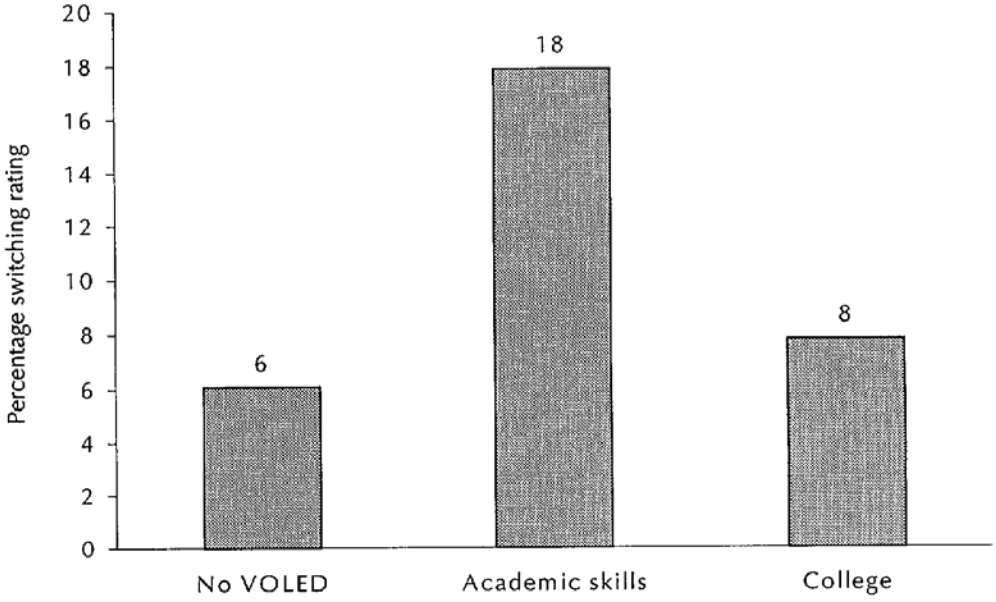

Figure 7. Participation in VOLED and cross-rating

Source: Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40, April 1998

4. Study Recommendations

Given these results, CNA recommended full support for the VOLED program, continuation of the establishment of the SMART transcript program, encouragement of a more supportive command climate toward VOLED and modification of the ASLC contract to promote greater participation.[35]

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[33] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:28-29, April 1998.

[34] Ibid.

[35] Ibid.

5. Flaws

Since its publication, a number of flaws in the study have been identified by later studies. The first flaw discussed by follow-on studies was that the models in the VOLED study were too simplistic. Using a more complex model with the additional variables of job satisfaction, satisfaction with the military way of life, and civilian employment prospects, the effect of VOLED on reenlistment rates, promotion, and cross-rating would be much smaller than estimated in the CNA study.

Another flaw discussed was the differences across sailors in the opportunity to use the VOLED program. It has been argued that the CNA study only measured the behavior of sailors who stayed to the end of their enlistment contracts and who had the opportunity to utilize this benefit. Sailors who attrited did not have the same opportunity to use the VOLED program. If the opportunity factor is controlled for, then the TA portion of the VOLED program could actually have a negative effect on reenlistment.

The opportunity factor is a valid argument because the CNA study sample focused on sailors who had an initial contract of four years of service. The sample compared sailors who reenlisted or extended for more than one year against all sailors who entered the Navy in the original cohort even if the sailors attrited service before their obligation was complete. Since the reenlisting sailors stayed longer, they had more opportunity to use the TA portion of the VOLED program. The sample should have been

restricted to only those sailors who stayed to the reenlistment decision point. In this way all sailors in the sample would have and equal opportunity to use VOLED.

It also can be pointed out that another problem with the study was that the study combined all the different components, (TA, PACE, SLC etc.), of the VOLED program together. This can skew the results because the educational goals of the separate components of VOLED are different, as are the goals of the sailors attending them. This would affect the outcome of the students' participation in the program and could also affect the outcomes.

B. EMPLOYER FINANCED GENERAL TRAINING

Prevailing labor economic theory states that employers are reluctant to fund employee general training for fear of generating a higher turnover and losing the cost of the training even though workers' productivity could be increased through the training and firms would be better off.[36] Researchers have argued both sides, and in 2002 the article "Does Employer Financed General Training Pay? Evidence from the US Navy," appeared in the Economics of Education Review. The article tackled the issue of protecting employer investments with regard to supplying additional worker training. This article was written using the U. S. Navy as the employer. The authors were Federico Garcia, Jeremy Arkes, and Robert Trost. Federico Garcia was also an author on the CNA VOLED study and the same data that

[36] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:19, October 11, 2000.

was used for the CNA study also was used in the analysis in this article. In essence, the article represented an improved version of the CNA study.

On average, most Navy enlistments expire in four years. If a sailor reenlisted or extended to the six year point, then it can be assumed that the Navy would recoup the cost of additional training.

The Navy provides additional training and education through the VOLED program. Although the Navy is not a for-profit organization, it is subject to reducing costs and eliminating programs that are not efficient. So the question posed in this article, "Does VOLED increase the probability that service of members will achieve the six year decision point?"[37]

1. Data

The data sample included recruits who entered in FY 1992 with no prior military experience and with contracts up to four years. Total sample size for this research was 44,441 observations. This is essentially the same data set as used in the CNA study.[38]

2. Statistical Model

The model chosen for this article was a bivariate probit model. This two step-recursive model shown below was chosen to model the effect of VOLED participation on retention;

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[37] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:20, October 11, 2000.

[38] Ibid., pp. 22-23.

$$V^* = Z(\alpha) + n$$

$$C^* = XB + \delta(V + u)$$

where V* is an unobservable propensity to participate in VOLED, Z is a vector of characteristics associated with participation, C* is an unobservable index denoting propensity to continue in the Navy for six years and X includes demographic and career variables associated with continuation of Naval Service.[39]

3. Findings

In determining what predicts participation in VOLED, the bivariate probit model showed that a high AFQT score, being female, being younger, being a minority, or being single are all associated with a higher likelihood of participating in the VOLED program. The dependant variable for the regression was participation in any componet of the VOLED program, the sample size was 44,441 and the base case for educational background was a high school graduate.[40] These results for predicting participation are shown in Table 5.

[39] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:23-24, October 11, 2000.

[40] Ibid., p. 24.

Table 5. The determinants of participation in the VOLED program

Variable	Estimate (standard error)
Constant	-1.769*** (0.078)
Attended academic orientation session	0.845*** (0.053)
AFQT score/100	1.071*** (0.049)
Female	0.358*** (0.020)
Age when entering the Navy	-0.007** (0.003)
African-American	0.070*** (0.022)
Hispanic	0.183*** (0.024)
Asian/Pacific-Islander	0.397*** (0.043)
Married	-0.073* (0.038)
Single parent	-0.048 (0.074)
GED/No HS diploma	-0.233*** (0.049)
More than high school	-0.216*** (0.059)
General detail: two- and three-year contracts	0.113*** (0.028)
General detail: four-year Contracts	0.320*** (0.027)

*** Statistically significant at 1 percent level, ** Statistically significant at 5 percent level, * Statistically significant at 10 percent level.

Source: Economics of Education Review, 21 (2002) 19-27

The effect of VOLED participation on continuation in the Navy for six years was explained via two versions of the continuation equation.[41] The first set of estimates was taken from a standard probit model, and the second set of estimates were taken from a bivariate probit model.[42] This was done because the first estimation assumed the VOLED participation decision point was independent of retention. The second estimation correlated the unexplained propensity

[41] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:25, October 11, 2000.

[42] Ibid., p. 25.

to continue to the six-year decision point (the error term in the retention model) with the unexplained propensity to participate in VOLED (the error term in the participating equation). The results in Table 6 are from a standard probit model (columns 1 and 2) and a bivariate probit model (columns 3 and 4). For the standard probit model, VOLED participation decision was independent of the six-year continuation decision. The Bivariate probit model correlated the propensity to participate in VOLED with the propensity to continue to the six-year decision point.[43] The results reveal that sailors that participate in the VOLED program are more likely to continue Naval service for six years than those who did not participate. Table 6 shows that the coefficient of the VOLED participation variable is positive for both sets of regressions.[44]

The results did answer the original question of "Does VOLED increase the probability that service of members will achieve the six year decision point?"[45] The result show that in most instances it does. That result is expected though, because the data set is the same as in the original CNA study. If that is the case, then the argument that continuing to fund general training will benefit the Navy is also supported. According to the results above, it can be calculated that the Navy saved approximately $53 million annually (1998 dollars) via the reduction of turnover. In 1998 the VOLED program cost the Navy $57.8 Million dollars.

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[43] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:25, October 11, 2000.

[44] Ibid.

[45] Ibid.

The program almost paid for itself.[46] Finally, other noted attributes of the VOLED program is the recruiting benefits obtained by marketing this program to potential recruits, which was not covered in this article.

Table 6. Effect of VOLED participation on continuation in the Navy for six years

Variable	Estimate (standard error)	
	Standard probit	Bivariate probit
Constant	-1.148*** (0.069)	-1.146*** (0.070)
Participated in VOLED	0.413*** (0.019)	0.576*** (0.111)
AFQT score/100	-0.080* (0.045)	-0.119** (0.052)
Female	-0.064*** (0.020)	-0.078*** (0.022)
Age when entering the Navy	0.016*** (0.003)	0.016*** (0.003)
African-American	0.453*** (0.018)	0.450*** (0.019)
Hispanic	0.196*** (0.023)	0.189*** (0.023)
Asian/Pacific-Islander	0.571*** (0.039)	0.554*** (0.041)
Married	0.155*** (0.033)	0.158*** (0.033)
Single parent	0.076 (0.065)	0.078 (0.064)
GED/ No HS degree	0.104** (0.042)	-0.096** (0.043)
More than high school	-0.016 (0.055)	-0.007 (0.055)
General detail: two- and three-year contracts	-0.079*** (0.023)	-0.083*** (0.023)
General detail: four-year contracts	0.223*** (0.022)	0.212*** (0.024)
Unemployment rate	0.004*** (0.001)	0.004*** (0.001)
Correlation between the error terms		-0.091 (0.061)

*** Statistically significant at 1 percent level, ** Statistically significant at 5 percent level, * Statistically significant at 10 percent level.

Source: Economics of Education Review, 21 (2002) 19-27

4. Flaws

There were flaws pointed out throughout the article by the authors. In their opinion, the equation and methods were not without weaknesses, but their methods and approaches were justified so the results are reliable nonetheless. However, VOLED is a continuing education

[46] Federico Garcia et al., "Does Employer-Financed general training pay? Evidence from the US Navy," Economics of Education Review, 21:25, October 11, 2000.

program, not a training program. The Navy views training differently than education, as does most academic institutions. Private businesses, might view the two as the same. If the point was to address training concerns, not continuing education concerns, then perhaps this article would be more relevant to the Navy.

Additionally, this study suffers from the same flaw as the CNA study. All the VOLED programs were combined together, when each program with the VOLED system should have been analyzed independently.

Nonetheless, this research and their conclusions are useful. As pointed out by the authors, the decision to stay or leave the Navy (or a business) at the six year point is a much more complex decision than whether or not continuing education is funded by the employer.

C. RAND STUDY

The Rand Corporation published a study that analyzed the TA program by itself for the Navy and Marine Corps entitled Tuition Assistance Usage and First Term Military Retention by Richard Buddin and Kanika Kapur. This study also tried to replicate the CNA study and the Economics of Education Review study as well as eliminate some of the perceived flaws as already noted. Both studies shared the same goal but approached the analysis differently. If the researchers could demonstrate how TA affected retention in their sample, then they could use their models and analyze the data set from the CNA study to test the robustness of the impact of TA on retention.

1. Data

The data for the study was based on the first term retention decisions of enlisted service members from the Navy and Marine Corps during FY 1997 and half of FY 1998.[47] The records acquired displayed service members' TA usage 24 months prior to the reenlistment decision.[48] The research was further restricted by only including in the sample service members who successfully completed their first contract. This restriction was necessary to correct the flaw in the earlier CNA and the Economics of Education Review study. Additionally, data on demographics, pay grade, pay components and deployment was obtained from the Defense Manpower Data Center (DMDC). For the second part of this study, the authors used data for the FY 1992 cohort in order to replicate the CNA study.[49]

2. Statistical Model

A bivariate probit (two-equation) model was specified to analyze TA usage and the effects of TA on retention. The goal of the first equation was to isolate the direct effect of various factors on TA usage. The second probit equation, was estimated to compare the reenlistment rates of sailors who utilized the TA Program against those who did not.[50] The authors also estimated retention based on a propensity score matching technique in order to test the robustness of their bivariate probit results.

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[47] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, p. 22.

[48] Ibid.

[49] Ibid., p. 22.

[50] Ibid., p. 15.

3. Findings

Table 7 displays the bivariate probit results. Determinants of TA usage are displayed in columns 1 and 2 while retention results are displayed in columns 3 and 4.

Buddin and Kapur discovered that women are more likely to use TA than men, and that age and sailor aptitude did not make a difference in TA usage. Family responsibilities, (married, single parents), of a service member showed a slight negative effect on TA usage. Shore- based personnel are more likely to use TA than ship-based personnel. Of greater importance, the final result showed that sailors who utilized TA were less likely to retain than those who did not use it, a result that contradicts the findings in the earlier study.[51] The regression models for Table 7 for the Navy, use data from cohort FY 1997 and half of cohort FY 1998. The column labeled df/dx shows the partial effect of the estimated probit coefficients. The partial effects for TA usage shows that TA users were nearly nine percent less likely to reenlist. This result contradicted the positive retention finding in the CNA and the Economics of Education Review studies.

[51] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, p. 49.

Table 7. Bivariate probit model results for TA usage and first term retention in the Navy

Characteristic	TA Usage dF/Dx	Standard error	First Term Retention dF/dX	Standard error	Mean
TA usage in the					
Past 2 yrs			-0.0892*	0.0393	0.0804
Age	0.0009	.0006	0.0092*	0.0012	23.8702
Female	0.0607*	0.0077	0.0239	0.0142	0.1433
Black	-0.042	0.0031	0.1967*	0.0092	0.1860
Hispanic	0.0228*	0.0045	0.0651*	0.0103	0.1044
Asian/PI	0.0211*	0.0079	0.1925*	0.0153	0.0380
Cat I AFQT	0.0473*	0.0087	0.0534*	0.0155	0.0253
Cat II AFQT	0.0238	0.0038	0.0063	0.0057	0.3294
Cat III AFQT	0.0097*	0.0030	0.0018	0.0053	0.2537
NHS Grad	-0.0208*	0.0081	0.0522*	0.0238	0.0122
Alternative Ed	-0.0105	0.0068	0.0244	0.0225	0.0252
Some College	-0.0093	0.0067	-0.0519*	0.0195	0.0176
Single Parent	-0.0300*	0.0031	0.0973*	0.0161	0.0599
Married Parent	-0.0339*	0.0028	0.1372*	0.0196	0.1186
Married Nonparent	-0.0184*	0.0030	0.0917*	0.0149	0.2673
Joint Mil. Mar.	-0.0049	0.0055	0.0490*	0.0172	0.0279
Skilled Tech.	0.0272*	0.0043	0.1797	0.0115	0.2469
Support&Admin	0.0463*	0.0048	0.1866*	0.0102	0.1244
Electrical/Mech	-0.0073*	0.0030	0.0706*	0.0128	0.3169
Craftsman, Supply	-0.0060	0.0056	0.1003*	0.0122	0.0981
NR of Deployments In the last 2 yrs	-0.0148*	0.0031	0.0194*	0.0065	1.4431
Months Deployed in Past 2 yrs	0.0000	0.0006	-0.0036	0.0021	5.5604
Lives in Off Base Housing	0.0215*	0.0043	0.0039	0.0103	0.3390
Retention Decision FY 1997	-0.0039	0.0027	-0.0004	0.0060	0.7585
Stationed Overseas	0.0377*	0.0114	0.1020*	0.0320	0.0273
Assigned to a Ship	-0.0471*	0.0113	-0.0431*	0.0199	0.7223
Size of Base	-0.0062	0.0020	-0.0111*	0.0041	0.2141
Distance to 4 yr College	-0.0002*	0.0001			21.2623
NR of schools On base	-0.0047	0.0025			3.259
Proportion Staying at end of First term			0.1215	0.0802	
Sample Size					32712

Source: Tuition Assistance Usage and First-Term Military Retention, RAND Corporation, Richard Buddin, Kanika Kupur, 2002

The propensity score matching technique was then applied to estimate the key parameters to determine their robustness. Propensity score match, as defined by Shenyang Guo, Richard Barth, and Clarie Gibbons, employs a predicted probability of group membership (in this case TA users and non-TA users) based on observed predictors, usually obtained from logistic regression to create a counterfactual group.[52]

Additionally, Propensity scores may be used for matching or as covariates (alone or with other matching variables or covariates). There is a limitation to Propensity Score Matching that needs to be addressed. If the groups being matched do not overlap, then errors may be introduced into the results. For this study, TA users and non-users were matched based on similar characteristics. This matching was needed in order to eliminate the differences in means of the covariates between the groups. The goal of this technique is to eliminate selection bias in who chooses to participate in the TA program.

The results from the matching process show that a sailor who utilizes TA has a 10.8 percentage lower probability of reenlisting at the end of their first term than a sailor who is a non-user of TA. This estimated effect was similar in magnitude and significance to the authors' results from the bivarate probit model.[53]

Table 8 shows the before and after matching numbers. After the matching process, the numbers for the variables

[52] The University of North Carolina at Chapel Hill, School of Social Work, Jordan Institute for Families, Virtual Resource Community, www.ssw.unc.edu/vrc/lectures/psm sswr 2004.ppt (last accessed March 2007).

[53] Ibid., p. 46.

changed significantly resulting in many variables becoming negative or close to zero. After the matching process is completed it can be determined that TA users do not retain as well as non TA users.[54] This clearly can be seen by the Retention variable which continues to show a negative effect.

Since the results of the TA analysis in the Rand study differed from the CNA study, the methodology was applied to the same data used in the CNA study in an effort to replicate the CNA study. For the reexamination of the TA portion of the CNA study, length of service was held constant at four years, and the FY 1992 cohort data were used. Rand obtained the results in Table 9. Upon examination of Table 9, it is clear that TA users have a continuation rate five percentage points lower than those of non-users and the reenlistment rate for users of TA is six percentage points lower than non-users of TA.[55]

[54] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, pp. 39-48.

[55] Ibid., p. 60.

Table 8. Two Tailed T-Test of Covariate Means (TA Users Minus Nonusers) before and After Matching for the Navy

Characteristic	Before Matching	After Matching
Age	3.73*	−1.35
Female	39.97*	0.03
Black	−2.91*	−0.44
Hispanic	3.99*	−0.57
Asian/Pacific Islander	2.97*	0.52
Category 1 (AFQT 93–99 Percentile)	5.99*	−0.60
Category 2 (AFQT 65–92 Percentile)	11.21*	0.95
Category 3a (AFQT 50–64 Percentile)	−0.70*	0.58
Non–High School Graduate	−2.80*	−0.65
GED	−3.23*	0.65
Alternative Education Credential	−2.90*	0.67
Some College	5.07*	0.24
Single Parent	−1.54	−1.47
Married Parent	−8.16*	−0.80
Married Nonparent	5.00*	0.33
Joint Military Couple	10.55*	−0.74
Skilled Technical	18.93*	−0.79
Support and Administrative	17.27*	0.92
Electrical/Mechanical	−17.81*	0.87
Craftsmen, Service, and Supply Handlers	−8.87*	−0.63
Number of Deployments in Past Two Years	−37.22*	0.74
Months Deployed in Past Two Years	−35.09*	1.32
Lives in Off-Base Housing	15.76*	−1.27
Retention Decision in FY 1997	−2.16*	−0.51
Stationed Overseas	30.38*	1.35
Assigned to a Ship	−48.98*	0.50
Size of Base (in Logarithms)	−30.10*	1.44
Distance to Four-Year College	−4.58*	−0.40
Number of Schools at Base	18.38*	0.13

NOTE: Entries with asterisks are associated with differences in means that are
significant at the < = 0.05 confidence level.

Source: Tuition Assistance Usage and First-Term Military Retention, RAND Corporation, Richard Buddin, Kanika Kupur, 2002

Table 9. Replication Analysis Probit Regression Results for Effect of TA Usage on Continuation and Reenlistment Rates of Four-Year Sailors in the FY 1992 Cohort

Variable	Continuation Rate Coefficient	Continuation Rate Standard Error	Reenlistment Rate Coefficient	Reenlistment Rate Standard Error
TA User	0.0502*	0.0209	-0.0590*	0.0276
Female	0.0374*	0.0182	0.0403	0.0266
Age at Entry	0.0056*	0.0026	0.0126*	0.0036
Black	0.1295*	0.0170	0.01751*	0.0239
Hispanic	0.0517*	0.0198	0.0840*	0.0276
Asian/PI	0.1318*	0.0340	0.1559*	0.0461
AFQT Score	0.0134	0.0075	0.0089	0.0103
GED or No degree	0.0846	0.0700	0.2097	0.1092
Some College	0.0376	0.0505	-0.0396	0.0675
Single Parent	0.0504	0.0259	0.0397	0.0363
Married	0.1786*	0.0129	0.1629*	0.0177
Percentage of Time at sea	-0.2916*	0.0711	-0.4306*	0.0995
Percentage of Time at sea squared	0.5885*	0.0727	0.5705*	0.0990
Electronic Equipment repair	0.0299	0.0271	0.0433	0.0366
Comm/Intell	0.0751*	0.0287	0.0492	0.0377
Health Care	0.2304*	0.0290	0.1992*	0.0392
Other Technical	0.2455*	0.0668	0.2652*	0.0914
Func. Support and Admin	0.1061*	0.0285	0.1573*	0.0391
Elec/Mech Repair	0.0078	0.0236	-0.0113	0.0314
Craftsman	-0.1767*	0.0404	-0.2113*	0.0533
Service/Supply Handler	-0.0249	0.0306	0.0197	0.0421
Undesignated	-0.0613*	0.0228	0.0098	0.0316
Constant	-0.6291*	0.0734	-0.5715*	0.1031
Proportion staying	0.2809	0.4214		
Sample Size	5383		3588	

Source: Tuition Assistance Usage and First-Term Military Retention, RAND Corporation, Richard Buddin, Kanika Kupur, 2002

Rand further stipulated that the stayer/leaver problem in the CNA study had to be addressed. The CNA study did not account for those service members who dropped out of the 1992 cohort before completing six years. Typically, sailors who attrited before the six year point did so with only 2.3

years service. These leavers did not have the full opportunity to utilize the TA program. This could bias the final results in favor of the TA program. Thus Rand deleted attriters from the sample and reestimated the model using the FY 1992 cohort data set.[56] As Table 10 shows, Rand was able to replicate the Economics of Education Review result but demonstrated that TA users are less likely to remain in the Navy when attriters are appropriately omitted from the sample.

[56] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, pp. 63-64.

Table 10. Probit Regression Results for Effects of TA Usage on Navy Retention

Dependent Variable	Equal Time Eligible for TA Stay Sixth Year	Stay fifth Year	Stay fourth Year	Stay Third Year
Years Eligible For TA Var	Years Variable	5	4	3	2
Characteristic					
TA User	0.1355*	−0.0936*	−0.0628*	−0.0512*	−0.0637*
Female	−0.0407*	−0.0361	−0.0094	−0.0134	−0.0113
Age at Entry	0.0066*	−0.0001	0.0152*	0.0018	0.0057*
Black	0.1153*	0.0649*	0.1561*	0.0450*	0.0687*
Hispanic	0.0437*	0.0079	0.0749*	−0.0007	0.0293
Asian/Pacific Islander	0.1306*	0.0505	0.1820*	0.0656	0.1237*
AFQT Score	−0.0043	−0.0106	0.0033	0.0078	0.0044
GED or No Degree	0.0421	0.1595	0.0685	−0.0196	0.0563
Some College	−0.0108	0.0642	−0.0563	0.0379	-0.0533
Single Parent	0.0407	−0.0007	0.0887	−0.0012	0.0423
Married	0.0452*	0.0058	0.0807*	0.0197	0.0303
Electronic Equip Repair	−0.0102	0.0125	0.0099	−0.0460	−0.0166
Communications/ Intell	0.0334	0.0193	0.0087	−0.0254	0.0975*
Health Care	0.0725*	0.0069	0.1122*	0.0611*	0.0678*
Other Technical and Allied	0.1241*	0.0451	0.1836	0.0099	0.2624
Functional Support & Admin	0.0401	0.0138	0.1231*	0.0050	0.0009
Electrical/Mech Equipment Repair	−0.0188	−0.0246	−0.0659*	−0.0117	0.0200
Craftsman	−0.1086*	−0.0807	−0.1882*	−0.0678*	−0.0016
Service & Supply Handler	−0.0330	−0.0389	−0.0381	0.0093	−0.0424
Not Occupationally Qualified	−0.0857*	0.0004	−0.0134	0.0137	−0.0750*
Two- or Three-Year Term	−0.1078*	0.0135	0.4116*	0.1298*	−0.5014*
Constant	−0.3271*	0.2994*	−0.3642*	0.1358	0.1961*
Proportion Staying	0.2115	0.8714	0.4537	0.7975	0.7336
Sample Size	7,819	1,898	3,491	4,377	5,942

NOTE: The estimated effects (dF/dX) correspond to changes in the probability relative to the excluded reference category for discrete variables and the derivative of the probability for continuous variables. Entries with asterisks are associated with coefficients significant at the $\alpha = 0.05$ confidence level.
The reference categories for demographic variables in the model are male, white non-Hispanic, high school diploma graduate, and single with no children. The reference groups for military characteristics are infantry, gun crews, and seamanship specialists and four-year enlistment term.
Source: Tuition Assistance Usage and First-Term Military Retention, RAND Corporation, Richard Buddin, Kanika Kupur, 2002

4. Recommendations

The study did not present recommendations, only conclusions/findings. The highlighted findings are:

1. TA usage was higher for women and minorities than for other members.
2. TA Usage varies with rating/occupation code.
3. Members who are assigned to overseas billets are more likely to use TA. Deployments decrease TA use.
4. TA may have important recruiting benefits that help recoup the cost of the program. Most new recruits are interested in using TA at the start of their enlistment.
5. Congress and DOD have a long standing commitment to enhance the education of the military members.
6. TA Usage is associated with lower, not higher, retention.[57]

5. Flaws

The occupational ratings were grouped together, which could have skewed the results for these ratings. For example, the Administrative/Support variable is not described at all. It is not known exactly what ratings were lumped into this variable. The same is true for the other grouped rating variables. The broad spectrum of actual Navy ratings may not be detailed enough to accurately obtain the effect of the individual ratings. This is important because a possible explanation is that sailors in various ratings may not use TA because that component of VOLED which is available to them is impractical. If that is the case, a possible solution may be that more funding should be

[57] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, pp. 49-51.

allocated to the Technology PACE instead of TA, to have VOLED more practical to sailors, as an example. If access to the education is made easier for the end user, retention rates may increase. If access is made difficult for the end user, that user will abandon the current institution in search of a new one.

D. THE ARMY ACES STUDY

In 2003 the United States Army Research Institute for the Behavioral and Social Sciences conducted an analysis of the Army's VOLED program entitled, Impact of the Army Continuing Education System (ACES) on Solider Retention and Performance, authored by Sticha et al. The Research Institute attempted to estimate the effects of the ACES program on first term retention.

1. Data

The data used in the retention analysis was based on records of all soldiers who entered the Army from FY 1996 to FY 1998, and who served at duty stations that maintained automated records of the soldiers' participation in the ACES program. 203,630 service members were identified as being in the master cohort from FY 1996 to FY 1998. From that sample 51,764 were stationed in locations where the automated education records were accurately maintained. The

final sample contained 43,831 records. These records were combined with data records from DMDC to obtain the demographics data on the same soldiers.[58]

To control for the opportunity to use TA, there was an indicator included in the bivariate probit model to distinguish whether the service member had a three- or four-year contract. Only soldiers who were eligible to reenlist were included in the data set.[59]

For promotion, the study considered the effects of four programs within the ACES system. Those programs are TA, NCO Leader Skill Enhancement Courses, MOS Improvement Training (MOSIT), and the opportunities to take the Armed Forces Classification Test (AFCT).[60]

2. Statistical Model

The model used in this study was a bivariate probit model of promotion and retention.[61] This model was chosen because it can predict two outcomes, and accounts for the correlation in the error terms of these two equations, TA participation and reenlistment. The model was constructed for an unweighted sample set displayed in Table

[58] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, pp. 28-29.

[59] Ibid., p. 31.

[60] Ibid., p. 47.

[61] Ibid., p. 31.

11.[62] Using the information from Table 11, the model was estimated and produced the results displayed in Table 12.

3. Findings

Table 11 shows unweighted sample statistics for soldiers in the reenlistment analysis. For this reenlistment measure only soldiers who were defined as eligible for reenlistment were considered.[63] An eligible solider was one who had completed 2.5 years of service and who had a three year obligation or completed 3.5 years of service and who had a four year enlistment.[64] It should be noted that this analysis was restricted to a sample of soldiers who were stationed at locations with the electronic educational accounting system. After imposing these criteria on the data, the resulting sample used in the retention model regression was not random. Since the sample is not representative of the entire first term enlisted population of the Army, the results in Table 12 cannot be used to make generalizations about the entire Army.

Table 11 indicates that within the overall sample the reenlistment rate was 35 percent and TA participants reenlisted at a rate of 28 percent. Soldiers who participated in Functional Academic Skills Training (FAST) reenlisted at a rate of 21 percent. Table 11 shows that Soldiers with longer contracts used TA more than those with shorter contracts (an expected result because of greater

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[62] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 34.

[63] Ibid., p. 31.

[64] Ibid.

opportunity to participate in TA. Similarly, higher paygrade service members used TA more than juniors, and females participated in the program more than their male counterparts. Soldiers with higher AFQT scores used TA more, while those with lower AFQT scores were more likely to use FAST.[65]

Table 11. Unweighted Sample Statistics for Soldiers in the Reenlistment Analysis of ACES Program

Soldier Characteristic	Sample Size	Rate of Participation During First Enlistment		Reenlistment Rate
		TA	FAST	
Overall				
All	10,597	28%	21%	35%
Initial Contract Length				
3 Years	7,762	24%	22%	34%
4 Years	2,835	39%	18%	37%
Grade at ETS				
E1	130	20%	17%	13%
E2	551	18%	15%	23%
		TA	FAST	
E3	4,141	23%	21%	36%
E4	5,642	32%	21%	36%
E5	133	54%	20%	47%
Sex				
Male	9,254	26%	20%	35%
Female	1,343	44%	26%	38%
Marital Status at ETS				
Single	9,170	28%	21%	33%
Married	1,427	30%	22%	46%
Race				
Black	2,874	29%	28%	42%
White	6,494	26%	16%	32%
Other	1,229	33%	28%	36%

[65] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003,p. 32.

Soldier Characteristic	Sample Size	Rate of Participation During First Enlistment		Reenlistment Rate
		Hispanic Ethnicity		
Hispanic	1,234	33%	29%	36%
Non-Hispanic	9,363	27%	20%	35%
		AFQT Category at Accession		
I	251	36%	8%	23%
II	2,794	33%	11%	30%
IIIA	2,609	32%	17%	37%
IIIB	4,591	23%	29%	37%
IV	352	19%	31%	44%
		Highest Education at Accession		
GED	1,350	24%	14%	42%
HS Graduate	8,663	28%	20%	34%
HS+	584	29%	22%	35%
		Accession Calendar Year		
1995	804	28%	27%	29%
1996	4,072	32%	19%	34%
1997	3,675	28%	21%	34%
1998	2,046	20%	15%	41%

Source: Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003

Table 12. Bivariate Probit Results

Variable	Marginal Effect	Reenlistment Equation Coefficient	TA Equation Coefficient	Mean Value
TA participation	.076**	.964**		.279
FAST participation	.014**	.210**		.209
SRB	.006**	.093**		.613
Initial contract is 4 years (reference category is 3 years)	.022**	.149**	.159**	.268
Age at ETS	.0005	.125*	-.004	22.5
female	.013	-.163**	.347**	.127
Married	.020**	.246**	.028	.135
Black	.023**	.197**	.123**	.271
Other Race	.011**	-.010	.160**	.116
Hispanic	.010	-.042	.180**	.116
AFQT category I (reference category is IV)	-.010	-.494**	.336**	.024
AFQT category II	.000	-.300**	.291**	.264
AFQT category IIIA	.007	-.150**	.242**	.246
AFQT category unknown	.006	.165*	-.062	.033

Variable	Marginal Effect	Reenlistment Equation Coefficient	TA Equation Coefficient	Mean Value
GED/Equiv. Exam	.014**	.323**	-.099*	.127
Post-high school education	-.014**	.005	-.251**	.055
Grade at ETS is E1 (reference category is E4V)	-.028**	-.613**	-.231	.012
Grade at ETS is E2	-.025**	-.285**	-.299**	.052
Grade at ETS is E3	-.008*	.036	-.160**	.391
Grade at ETS is E5	.054**	.044	.519**	.126
Field Artillery (CMF 13)	.003	-.119**	.160**	.223
Air Defense Artillery (CMF 14)	-.176**	-.115	-.229**	.068
Armor (CMF 19)	-.015**	-.012	-.260**	.057
Signal Operators (CMF 31)	-.002	-.099	.063	.084
Mechanical Maintenance (CMF 63)	-.008	-.121*	-.011	.084
Administration (CMF 71)	.040**	-.211	.690**	.016
Petro and Water (CMF 77)	-.008	-.201**	.058	.053
Transportation (CMF 88)	.020**	.452**	-.138	.040
Supply and Services (CMF 92)	.010	-.049	.187**	.165
Accession year is 1995 (reference category is 1996)	-.017**	-.111*	-.219**	.076
Accession year is 1997	-.001	-.035	.017	.345
Accession year is 1998	.006	.137**	-.037	.193
Intercept		-.975**	-1.039**	
State per capita expenditures for higher education	.00004	.0006**		452

* p < .05; ** p < .01

Source: Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003

The results from Table 12 indicate that there is a 7.6 percentage point difference in the reenlistment rate of TA users, as compare to non-users, while FAST participants had a difference of 1.4 points. Other significant predictors of reenlistment factors in the model were SRB level, having a four year contract, age, black, male married and lower AFQT category.[66]

[66] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, pp. 37-38.

An analysis was conducted on first and second year attrition rates to try to discover if the ACES program had any effect on attrition. The sample set for this analysis included soldiers who had completed the first six months of their enlistment. This led to a sample size of 28,516. Of those, only 1 percent participated in TA and 1 percent had participated in the FAST program during their first six months of enlistment. For second year attrition criteria, completion of the first enlistment year was used.[67] Only soldiers with three or four year contracts were used in the sample because it was determined that soldiers who had a two year contract could not be easily identified from those who separated early. This led to a sample size of 24,662, of which 7.5 percent had participated in the TA program in their first year of enlistment and 4.5 percent had participated in FAST. These sample statistics are not a reflection on the Army as a whole because "the soldiers in the sample systematically differ from soldiers in the Army as a whole."[68] The unweighted sample statistics are shown in Table 13.

[67] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 42.

[68] Ibid., pp. 42-43.

Table 13. Unweighted Sample Statistics for Soldiers in the Attrition Analysis

Contract Year	Sample Size	Rate of Program Participation Through Beginning of Year		Attrition Rate
		TA	FAST	
Year 1 Attrition Analysis (analysis includes soldiers who reach 6 months of service)				
2-year contract	1,677	2%	1%	6%
3-year contract	13,987	1%	1%	11%
4-year contract	12,852	1%	1%	12%
Year 2 Attrition Analysis (analysis includes soldiers who reach 12 months of service)				
3-year contract	12,944	7%	5%	18%
4-year contract	11,678	8%	4%	19%

Source: Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003

From the sample statistics a bivariate probit model was used to estimate results.[69] These results are provided in Table 14 (First Year Completion) and Table 15 (Second Year Completion).

[69] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 41.

Table 14. Estimated Marginal Effects of TA and FAST on First Year Completion Probability (Conditional on Completing First Six Months of Enlistment)

Variable	Marginal Effect	Probit Coefficient	Mean Value
TA participation	0.060	0.436	0.012
FAST participation	0.061	0.442	0.009
Initial contract is 2 years (reference category is 3 year contract)	0.035	0.216	0.059
Initial contract is 4 years	-0.006	-0.032	0.451
Age	-0.002	-0.010	21.596
Female	-0.066	-0.316	0.147
Married	0.004	0.021	0.124
Black	0.008	0.043	0.252
Other Race	0.026	0.154	0.103
Hispanic	0.025	0.150	0.101
AFQT category I (reference category is IIIB)	0.035	0.219	0.030
AFQT category II	0.021	0.118	0.314
AFQT category IIIA	0.008	0.044	0.304
AFQT category IVA	-0.033	-.163	0.019
AFQT category Missing	0.009	0.054	0.002
GED/Equivalency Exam (reference category is HS grad)	-0.078	-0.360	0.106
Post-high school education	-0.018	-.094	0.054
Diver (CMF 00)	-0.521	-1.575	0.000
Band (CMF 97)	0.070	0.558	0.001
Field Artillery (CMF 13)	0.022	0.129	0.172
Air Defense Artillery (CMF 14)	-0.052	-0.248	0.047
Air Defense Artillery Crewmember (CMF 16)	0.013	0.077	0.003
Armor (CMF 19)	-0.008	-0.043	0.066
Air Defense System Maintenance (CMF 23)	-0.042	-0.204	0.002
Paralegal (CMF 27)	-0.084	-0.373	0.005
Signal Operator (CMF 31)	-0.027	-0.137	0.103
Electronic Maintenance and Calibration (CMF 35)	-0.020	-0.105	0.009
Psychological Operations (CMF 37)	0.009	0.049	0.001
Parachute Rigger (CMF 43)	0.065	0.495	0.001
Financial Management (CMF 44)	-0.019	-0.097	0.000
Artillery Maintenance (CMF 45)	0.023	0.137	0.008
Public Affairs (CMF 46)	-0.081	-0.362	0.000
General Engineering (CMF 51)	0.025	0.152	0.002
General Engineering-Other (CMF 52)	0.029	0.178	0.002
Ammunition (CMF 55)	0.023	0.134	0.013
Supply and Services (CMF 57)	-0.006	-0.035	0.006
General Engineering Equipment (CMF 62)	0.043	0.287	0.001
Mechanical Maintenance (CMF 63)	0.038	0.237	0.069
Aircraft Maintenance (CMF 67)	0.017	0.098	0.001
Administration (CMF 71)	-0.007	-0.039	0.028
Administration-Accounting (CMF 73)	0.008	0.044	0.005
Chemical (CMF 74)	-0.139	-0.560	0.003
Administration-Other (CMF 75)	0.045	0.297	0.028
Medical Supply (CMF 76)	0.024	0.142	0.000
Petroleum and Water (CMF 77)	0.036	0.229	0.041
Topographic Engineering (CMF 81)	-0.016	-0.085	0.000
Topographic Surveyor (CMF 82)	0.003	0.014	0.007
Transportation (CMF 88)	0.053	0.364	0.032
Medical (CMF 91)	-0.012	-0.063	0.003

Variable	Marginal Effect	Probit Coefficient	Mean Value
Supply and Services (CMF 92)	0.027	0.156	0.148
Aviation Operations (CMF 93)	-0.020	-0.103	0.006
Military Intelligence (CMF 96)	0.027	0.162	0.001
Signals Intelligence (CMF 98)	-0.316	-1.054	0.000
Missing CMF	-0.479	-1.466	0.001
Accession Year is 1995	-0.049	-0.236	0.043
Accession Year is 1996	-0.028	-0.145	0.237
Accession Year is 1997	-0.030	-0.157	0.292

* p < .05; ** p < .01

Source: Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003

From Table 14 it can be seen that participation in TA and FAST within the first six months of enlistment increased the completion rate for the first year by 6 and 6.1 percent, respectively. The results in Table 15 show that second year completion rates are higher by 4.7 percent for TA users and 5.7 percent for the FAST program.

Table 15. Estimated Marginal Effect of TA and FAST on Second Year Completion Probability (Conditional on Completing First Year)

Variable	Marginal Effect	Probit Coefficient	Mean Value
TA participation	0.047	0.194	0.076
FAST participation	0.057	0.242	0.046
Initial contract is 4 years (reference category is 3 year contract)	-0.010	-0.040	0.474
Age	-0.001	-0.002	22.618
Female	-0.099	-0.341	0.142
Married	-0.022	-0.081	0.129
Black	-0.010	-0.039	0.257
Other Race	0.040	0.163	0.106
Hispanic	0.034	0.135	0.103
AFQT category I (reference category is IIIB)	0.051	0.217	0.028
AFQT category II	0.031	0.119	0.301
AFQT category IIIA	0.002	0.009	0.292
AFQT category IVA	-0.037	-0.133	0.020
AFQT category Missing	0.005	0.020	0.002
GED/Equivalency Exam (reference category is HS grad)	-0.125	-0.417	0.107
Post-high school education	-0.049	-0.174	0.054
Diver (CMF 00)	-0.240	-0.714	0.000
Combat Engineering (CMF 12)	0.145	0.909	0.001
Field Artillery (CMF 13)	0.020	0.080	0.171

Variable	Marginal Effect	Probit Coefficient	Mean Value
Air Defense Artillery (CMF 14)	0.040	0.162	0.046
Air Defense Artillery Crewmember (CMF 16)	0.019	0.077	0.001
Armor (CMF 19)	0.002	0.009	0.061
Air Defense System Maintenance (CMF 23)	-0.029	-0.107	0.001
Paralegal (CMF 27)	0.041	0.170	0.004
Signal Operator (CMF 31)	0.014	0.056	0.100
Electronic Maintenance and Calibration (CMF 35)	0.057	0.247	0.009
Parachute Rigger (CMF 43)	0.135	0.789	0.001
Financial Management (CMF 44)	0.061	0.267	0.000
Artillery Maintenance (CMF 45)	0.043	0.180	0.009
Public Affairs (CMF 46)	0.116	0.608	0.000
General Engineering (CMF 51)	0.094	0.453	0.002
General Engineering-Other (CMF 52)	0.094	0.455	0.002
Chemical (CMF 54)	0.076	0.348	0.000
Ammunition (CMF 55)	-0.027	-0.100	0.010
Supply and Services (CMF 57)	-0.001	-0.002	0.006
General Engineering Equipment (CMF 62)	-0.099	-0.329	0.001
Mechanical Maintenance (CMF 63)	0.036	0.147	0.068
Aircraft Maintenance (CMF 67)	0.077	0.352	0.001
Aircraft Maintenance-Other (CMF 68)	0.034	0.137	0.000
Administration (CMF 71)	-0.022	-0.080	0.030
Administration-Accounting (CMF 73)	-0.007	-0.025	0.005
Chemical (CMF 74)	0.008	0.033	0.003
Administration-Other (CMF 75)	0.045	0.188	0.031
Medical Supply (CMF 76)	0.105	0.530	0.000
Petroleum and Water (CMF 77)	0.025	0.101	0.041
Topographic Engineering (CMF 81)	0.046	0.192	0.000
Topographic Surveyor (CMF 82)	0.017	0.067	0.007
Transportation (CMF 88)	0.065	0.285	0.031
Medical (CMF 91)	0.001	0.005	0.004
Supply and Services (CMF 92)	0.021	0.084	0.152
Aviation Operations (CMF 93)	0.001	0.005	0.006
Military Police (CMF 95)	-0.018	-0.066	0.000
Military Intelligence (CMF 96)	-0.008	-0.032	0.001
Signals Intelligence (CMF 98)	0.072	0.324	0.000
Missing CMF	-0.456	-1.265	0.000
Accession Year is 1995	-0.001	-0.005	0.042
Accession Year is 1996	-0.029	-0.107	0.229
Accession Year is 1997	-0.030	-0.112	0.286

* p < .05; ** p < .01

Source: Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003

Also discussed in the ACES study was that TA participation had a positive and statistically significant effect on the probability of retention. This estimate was similar to the findings of Garcia et al. (2002), "Does Employer-financed General Training Pay? Evidence from the

U. S. Navy," but is at odds with the Buddin and Kapur study. The ACES study attempted to control for opportunity to participate in the TA program and soldier attributes as did the Buddin and Kapur study.[70]

4. Recommendations

The study recommends that the Army expand the automated education record collection efforts to allow further study for the ACES program. A cost benefit analysis was deemed impossible, but since there was a clear benefit in terms of retention, completion of first and second year, they recommended that the Army should continue to encourage self development programs like ACES in order to continue to transform the Army into a fighting force for this century and beyond.[71]

5. Flaws

This study did not conduct a cost-benefit analysis of the ACES Program or any component of it; Sticha et al. only reported that the program had positive effects on Army retention. Since no cost effectiveness was completed, it is unknown if the increased retention justifies the cost of the entire program.

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[70] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 43.

[71] Ibid., pp. 71-76.

E. OCCUPATIONAL TRENDS IN THE CIVILIAN AND NAVY LABOR MARKETS

In December 1991, LT Mike Haumer completed a Master's Thesis entitled Occupation trends in the civilian and Navy Labor Market. Here, LT Haumer explored the relationship between the civilian and Navy labor markets and attempted to show whether or not each one was trending toward or away from highly technical skills. The understanding of this relationship would allow decision makers to be aware of consequences when budget cuts were allowed for sailors and equipment.

1. Data

The sample used to evaluate the civilian community was developed from the Current Population Survey (CPS). The CPS interviews 57,000 households monthly and these interviews provide such demographic data as age, race, sex, marital status as well as employment status, occupation, and industry. The population studies used in the Thesis were from March of 1980, 1985 and 1990.[72]

The Navy samples were obtained from DMDC in Monterey, CA. The data files contained the enlisted records from the Navy and Marine Corps from 1980 and 1990. The data included demographic data, age, race, sex and occupational specialty codes.[73]

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[72] LT Mike Haumer, Occupational Trends in Civilian and Navy Labor Markets, Naval Postgraduate School, Monterey CA, December 1991, p. 11.

[73] Ibid., p. 12.

2. Statistical Model

An occupational "crosswalk" matched civilian occupations to Navy ratings. This process was developed by CNA for the DOD. The first step in the process was to link the civilian occupations and the military ratings. CNA researchers matched the military job code to the civilian Dictionary of Occupation Titles (DOT). These DOT codes were linked to the Standard Occupational Classification (SOC) codes and census codes used in a separate crosswalk. During this process, certain occupations were excluded from the overall sample due to incompatibility of terms of the different classification systems. The final result was a matching of 41 percent of the Navy's enlisted personnel and 30percent of the civilian work force.[74]

3. Findings

LT Haumer reported that from 1980 to 1990 there was a 5.6 percent change (showing an increase from 23.4 percent to 24.7 percent) in highly technical ratings and a 3.8 percent change (showing an increase from 47.2 percent to 49.0 percent). The civilian results displayed a 120 percent change (and increase from 3.0 percent to 6.6 percent) for highly technical occupations and for technical occupations there was a -4 percent change (from 84.2 percent to 80.9 percent).[75] The findings support that the military and the

[74] LT Mike Haumer, Occupational Trends in Civilian and Navy Labor Markets, Naval Postgraduate School, Monterey CA, December 1991, pp. 15-18.

[75] Ibid., pp. 22, 24.

civilian labor markets are trending toward a highly technical occupation system, although not at the same rate of movement.

4. Recommendations

The main recommendation from this study was the Navy should continue to emphasize a highly technical and skilled occupational force. Other recommendations discuss the Selective Reenlistment Bonuses (SRBs), to retain sailors in highly technical ratings, and specific measures to analyze occupation specific earnings and employment trends in the civilian labor market.[76]

5. Issues

The author did not mention, or recommend, how these individuals should receive training for this, or who should fund it. In order to have a high- or semi-technical workforce, the education and training measures have to be in place with the organization and the resources allocated for that program has to be examined. Although it may not be viewed as a flaw, the failure to mention the education and training was an oversight worth mentioning.

[76] LT Mike Haumer, Occupational Trends in Civilian and Navy Labor Markets, Naval Postgraduate School, Monterey, CA, December 1991, pp. 37-41.

III. COMPARISON OF STUDY DESIGN

A. INTRODUCTION

The studies discussed in the previous chapter attempted to determine how advanced education and retention are related. Each study approached the question differently, each trying to improve upon the last. This chapter will compare the research design of each study and attempt to determine if there is a significant difference in the design of each and if that difference could explain the reason for different outcomes.

B. EFFECTIVENESS OF THE VOLUNTARY EDUCATION PROGRAM (CNA 1998)

1. Data Samples and Sample Restrictions

In the CNA study Effectiveness of the Voluntary Education Program, the FY 1992 cohort was used for the analysis sample. The sample used to analyze promotion outcomes consisted of all enlisted active duty sailors who accessed in the last two quarters of FY 1992. The last two quarters were selected in order to track the promotion performance of sailors who joined six months apart. The analysis of the demotion sample consisted of the FY 1992 cohort of active duty sailors enlisted sailors (the four year obligors), which was tracked to the end of their first obligation. This sample was used to compare the demotion rates of participants and non-participants. For the analysis of cross-rating, undesignated apprenticeships (GENDETS) were omitted from the analysis sample. Only

sailors who were rated were included in the sample. For the analysis of retention, the FY 1992 cohort was used (four year obligors only). The measure of retention included reenlistments and extensions of more than a year.[77]

2. Methods to Deal with Selection Bias

The method that was used to correct for selection bias was the Heckman Two Step process and the Inverse Mills Ratio. Because sailors who pursue advanced education may not be representative of the population of enlisted personnel, the effect of VOLED on promotion may be overstated. The main question is to what extent sailors who participated in VOLED would have been promoted faster even if they had not participated in VOLED. The authors used the equation;

$$Z_i^* = Y' w_i + u_i$$

Here Z_i^* denotes participation in VOLED program, and w_i is a vector of measurable factors that explain the choice to participate and u_i is a random error term. The vector w_i includes an instrument (variable) that is expected to affect participation in VOLED but not to affect the promotion or retention outcomes.[78]

The equation for the Heckman two-step procedure for sample selection model is:

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[77] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40:19-21, 60, April 1998.

[78] Ibid., pp 54-55.

$$\lambda_i = \frac{\phi(\hat{Y}w_i)}{\Phi(\hat{Y}w_i)}$$

The procedure fits probit model for the selection variable Z_i, where $\phi(\hat{Y}w_i)$ is the normal probability density function and $\Phi(\hat{Y}w_i)$ is the normal cumulative density function. The ratio λ_i is also known as the Inverse Mills Ratio. Next, the procedure estimates the selection corrected estimates of β by regressing Y on X and λ. The marginal effect of college credits, which is a component of the term X gives the promotion effect that is directly attributable to VOLED. The marginal effect of the Inverse Mills Ratio gives the promotion effect that is attributable to the high motivation of VOLED participants.[79]

C. RAND STUDY

1. Sample and Sample Restrictions

In the Rand study Tuition Assistance Usage and First-Term military Retention, the focus was on the TA portion of the VOLED program only and the data used were collected from enlisted master files from FY 1997 and the first half of FY 1998. These files, obtained from DMDC, were combined with TA usage for the same timeframe. This sample was restricted to TA only and the other components of the VOLED program were not analyzed. Additionally, this study also used the

[79] Federico E. Garcia et al., Effectiveness of the Voluntary Education Program, Center of Naval Analyses, CRM 98-40: 54-55, 60, April 1998.

FY 1992 data set that was previously used in the VOLED study conducted by CNA in 1998 to see if the results could be replicated.[80]

2. Methods to Deal with Selection Bias

To deal with selection bias, the propensity score model and a bivariate probit model were used. The bivariate probit model is estimated in two steps. The first step estimates the probability of TA usage as a function of demographic characteristics, military environment, proximity to a four year college at accession, and the number of colleges offering courses at the member's base. From there, a prediction of TA usage is made based on each individual's X and Z variables for the bivariate probit model (where X is is a vector of observed variables and Z measures the sailors taste for college classes and TA opportunities available at there base).[81] The entire bivariate probit model for estimating TA usage is shown below:

$$TA_i* = \beta_2 x_i + \delta Z_i + \varepsilon_{2i}$$

The prediction of a TA user from the model, or the propensity score, is then matched with a non-user of TA. Then, using the matched sample, a probability of retention is then estimated using the model:

[80] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, pp. 3-4.

[81] Ibid., pp. 15-16.

$$R_i^* = \beta_1 x_i + \gamma TA_i + \varepsilon_{1i}$$

Here R_i^* is the continuous measure of the tendency to reenlist.[82]

D. IMPACT OF THE ARMY CONTINUING EDUCATION SYSTEM (ACES) ON SOLDIER RETENTION AND PERFORMANCE: DATA ANALYSES

In the study Impact of the Army Continuing Education System (ACES) on Solider Retention and Performance the Army's ACES program was analyzed. The analysis focused on retention and promotion outcomes.

1. Sample and Sample Restrictions

For the analysis of retention, the sample was restricted to first term enlistments from FY 1996 through FY 1998. Further, the data was also restricted to soldiers who were stationed at locations where automatic records of education participation were maintained. Demographic data was obtained from DMDC and merged with enlisted education data.[83]

The promotion selection for the Army is quite different from the Navy. The Army operates selection boards for paygrade E-4 through E-9, whereas the Navy only holds selection boards for paygrades E-7 through E-9. This fact has to pointed out because the Navy's promotion system uses rating exams for grades E-4 through E-6, (an exam is held

[82] Richard Buddin and Kanika Kapur, Tuition Assistance Usage and First Term Military Retention, RAND Corporation, 2002, pp. 18-19.

[83] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, pp. 28-29.

for E-7 in order to be board-eligible for selection to E-7). This is significant because less credence could be given to the ACES program on promotion as compared to the Navy. An example could be a direct effect of VOLED/TA for the Navy would be a sailor who learns study skills and could apply those skills directly to advancement, (by studying harder for the rating exam). In the Army, that study skill will not directly correlate because the Army holds a selection board for promotion. That stated, the Army did explore the promotion outcome in their study.

For the promotion model, data was collected from NCO21 Validation Project and from the Army Enlisted Master file (EMF). The NCO21 project contained the Promotion Point Worksheet (PPW) which included information on awards, medals, military and civilian education. Also included were direct supervisors' assessments of each soldiers progress. The sample for promotion included paygrades E-4, E-5, and E-6. Only soldiers who were eligible to reenlist were considered for inclusion in the data set. Blacks and women were underrepresented in the sample at 27 percent and 13 percent contrasted with the Army population of 30 percent and 15 percent, respectively. Males and Caucasians were overrepresented at 47 percent and 32 percent compared to the Army population of 86 percent and 57 percent, respectively. Also noted was a 10 year age difference between soldiers in

paygrades E-4 and E-6. There was also a difference in years of service: E-4's had a median service length of three years while E-6's had a median of 13 years.[84]

2. Methods to Deal with Selection Bias

A quasi-experimental design is used because it controls for factors that affect both assignment to a test group and the outcomes that a researcher desires to be analyzed. Additionally, numerous control variables were included in the multivariate regression to help minimize the potential problem of omitted variable bias. Further, the study utilized a bivariate probit model for the regressions.[85]

3. Summary

Of all three studies, the Army ACES study appeared to be the most robust. The Army study attempted to account for all the flaws that had been identified in the previous studies. Although the retention effect is not as large in the Army ACES study as in the CNA study, the results indicate a positive effect of VOLED on retention and promotion. The retention results contradict the results of the RAND study.

There are some concrete reasons why the studies reach different conclusions. First, service fit comes into

[84] Paul J. Sticha et al., Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses, United States Army Research Institute for the Behavioral and Social Sciences, June 2003, p. 47

[85] Ibid., pp. 20, 36.

question. Did the CNA study show the true retention effects of TA usage, or did they simply prove that those who attrited did not use TA?

Second, the Army markets its education benefits to incoming recruits more heavily than the Navy. Thus, those who value education will be attracted to the service that is perceived to offer the best educational opportunities. The Army has consistently marketed itself as being an excellent way to increase college courses, thus attracting people who value education. These people may not have been able to complete their educational goals in their first enlistment and need to reenlist to complete their education program.

Third, the studies used different model specifications and different approaches to control for the opportunity to use TA. These different approaches have to be taken into account, as different model specification could yield different results. For example, an ordered probit and a binomial probit model were specified for the VOLED study conducted by CNA using the Heckmen two-step process. The RAND researchers utilized a bivariate probit model and a propensity score model. The ACES study also used a bivariate probit model.

To obtain a definitive answer on which study is more robust a study for the Navy would have to be commissioned that used the same approach as in the ACES study. This would test whether the Army results could generalize to the Navy. If consistent approaches are not used, different results will always be produced. Since the Army tried to correct for the flaws conducted in the previous studies,

their study should be used as a baseline. However, unless the service fit question can be answered, results from a given service may not be generalizeable to the others.

Ultimately, the results of the Army study and the RAND study may be due to the fact that one analyzed Army enlisteds whereas the other analyzed Navy enlisteds. The two service's programs are likely to differ in structure and execution. Moreover, as mentioned above, motivation of program users in the two services may differ. Finally, retention standards may differ across services.

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IV. CHARACTERISTICS OF A NEW GENERATION

A. INTRODUCTION

The statistical studies previously reviewed focused on the current generation by examining cohorts from the early and late 1990s. This section will concentrate on the future generation, (which is now emerging in the ranks of the military), how advanced education is valued, how access to that education being reduced, and finally, what the citizens of the next generation are going to do about it.

B. MILLENNIALS MERGING: LEADING A NEW GENERATION IN WAR

This article, authored by LTCOL Wayne A. Sinclair, tries to explain how the latest generation of junior Marines is different than the previous generations and how leaders from previous generations can adapt to the new generations' expectations. This article provides a basic understanding of the Millennials generation, and guidance for current military leadership who are having trouble connecting with them.

1. Millennials

A new generation is begun to enter the Armed Forces. Dubbed the "Millennials" these are the new Soldiers, Sailors, Marines, and Airmen entering in the new century. This generation differs significantly from their predecessors, and in order to understand how to transform the military, the new wave of recruits and young officers should be understood first.

The Millennials are the latest cohort to be born in America. Their birth years are from 1981 to 2002. Other common names from this cohort are The Net Generation, Generation Y, and Echo-Boomers. This latest generation is quite different from its predecessors Generation X (born between years 1961-1980 and the Baby Boomers (born between years 1943-1960).[86] To understand how they differ, the origin of the Millennials has to be examined and predictions made about how the generation will react to ongoing world events.

2. The World Around the Millennial Generation

The Millennial generation arrived into the world in 1981 when childbearing and family values became a national priority again. Divorce rates in America were declining throughout the primary birth years (1981-2002), the economy was on the rise, and the birth rate during this period doubled as compare to the Generation Xers period (about 76 million Millennials born).[87] With these new changes in society and the economy, parents and educators tried to remove all the risk from the Millennial childhood and make the world a safer place for this new generation.

Social institutions began to reform. By the mid-1990's most public school districts had adopted a policy of "accountability."[88] School systems were no longer funded blindly and parents began to get involved and ask the

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[86] LTCOL Wayne A. Sinclair, "Millennials Merging: Leading a New Generation in War," Marine Corps Gazette, 90:71, September 2006.

[87] Ibid., p. 72.

[88] Ibid.

question, "What is our ROI for our tax dollars?" As a consequence, higher academic standards were enforced and "zero tolerance" policies took center stage.[89]

The parent involvement for this new generation trended upward and soon parents became highly vested in their children. The parent or guardian really paid attention to outcomes and results of programs that affected their children. As a result, the children turned to their parents/guardian for advice, and often receiving coaching rather than counseling for dealing with life's problems.[90] This is a sharp contrast to Generation X who grew up in a world of rising divorce rates, single parent families, and duel working parents.

3. Generation X vs. Generation Millennial

Generation X became known as the "latch-key kid" generation.[91] Generation X also lived through turbulent times at home when divorce was at an all-time high. If the divorce did not enter the home, then both parents had to work, and the absence of parents continued. As a result, Generation X never fully embraced their parents as the Millennals do. Generation X became self reliant, pragmatic and most often adopted a "go for broke" attitude. Without a coach, Generation X wanted "just the facts" about any situation and then made a decision or a course of action. Since Generation X also had a childhood filled with uncertainty, this Generation embraced order and discipline

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[89] LTCOL Wayne A. Sinclair, "Millennials Merging: Leading a New Generation in War," Marine Corps Gazette, 90:72, September 2006.

[90] Ibid., p. 72.

[91] Ibid.

wherever it could be found. The Millennial Generation has always known order, so they tend not to seek order out. Chaos disturbs the Millennial Generation, but Generation X thrives on it.[92]

4. Millennial Values

Much attention has been paid to the Millennial generation. A highly noticed trait of this new generation is that they have had time to reverse some perceived negative attributes of their predecessor generations. The Millennials are more civic minded, they tend to shy away from negative youth trends such as drug use, criminal activity, and teen pregnancies.[93] The Millennials also thrive in the 21st century. Multitasking has become their way of life. Technology adoption is faster for them than most generations in the past. The author argues since the Millennial generation has never known a world without the cell phone, the internet, laptop computers, their conceptions of time, space, and communications are drastically different than any generation before.[94]

The Millennials are having a hard time adapting to military service. Although a large number of them are civic minded and very patriotic, day-to-day military life, and the current Global War On Terror (GWOT), which is a breeding ground for chaos, is inconsistent with their upbringing. Table 16 below details the Millennials positive and negative military traits:

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[92] LTCOL Wayne A. Sinclair, "Millennials Merging: Leading a New Generation in War," Marine Corps Gazette, 90:73, September 2006.

[93] Ibid., p. 72.

[94] Ibid., p. 74.

Table 16. Millennial Military Traits

Positive Military Traits	Negative Military Traits
Used to order and structure	Unsettled by chaos and friction
High self esteem	Can't connect with difficult people
Positive attitude	Have not experienced much loss
Technologically savvy	Lack creative thinking
Team collaboration	Trouble leading without consensus
Determined to matter	Easily dejected by adversity
Trusting of authority	Expect and need guidance
Safety a priority	Averse to risk taking
Thrive on multitasking	Prone to piecemeal efforts
Good followers	Poor self discipline

Source: "Millennials Merging: Leading a New Generation in War", Marine Corps Gazette, LTCOL Wayne A. Sinclair, 2006

If there is agreement about these traits, it should not be a surprise that the Millennials expect ready made solutions to problems. They prefer small units, oversight, structure, teamwork, methodology, and a cause greater than themselves. The Millennials are not impressed with position or title. They count on hands-on leaders who earn their respect by recognizing their potential and leaders who are willing to teach them and provide the tools necessary to succeed.[95]

The military should recognize these differences and adapt to them. Leaders need to understand that this generation led a sheltered existence compared to other generations, and the "sit and listen" technique of teaching/training may not work with this technology-driven generation.[96]

5. Solutions to the Generation Gap

LTCOL Sinclair suggests leaders apply their mentoring/coaching skills in the following ways: Explain why and how things must be done (at least until the new service member understands his/her role in the organization), Establish boundaries, Clarify their roles in any venture, Enforce accountability, Show how opportunism and risk taking can be balanced, Teach self-assessment techniques, Teach project and time management, Provide feedback often. The article also stresses that careful

[95] LTCOL Wayne A. Sinclair, "Millennials Merging: Leading a New Generation in War," Marine Corps Gazette, 90:74, September 2006.

[96] Ibid., p. 74.

investments in this generation's human capital is essential, because "human capital will continue to pay the highest dividends in war."[97]

C. APPLEBEE'S AMERICA: THE 9/11 GENERATION

Douglas Sosnik, Matthew J Dowd, and Ron Fournier published Applebee's America in 2006 to explain how the emerging generations view the world, and how that view has changed from the "Greatest Generation" and the "Baby Boomers." The focus of the book centered around Generation Xers and their particular positions on various issues and how political and social leaders could use the understanding of the positions to win elections, and change social issues. The last chapter in the book introduces the 9/11 Generation, (called Millennias in the last article). This introduction gives the reader a glimpse into the life of the follow-on generation, and how these 9/11ers differ from the Generation Xers.

1. Social Changes and Generation 9/11

The authors define Generation 9/11 as 18-to-24 year olds in 2005.[98] Through surveys and interviews, the core values of these individuals are revealed and as well as their personal traits. Their results are discussed below.

Generation 9/11 is the most ethnically diverse generation in U. S. History. The authors argue that the non-Caucasian population will increase, but that increase is

[97] LTCOL Wayne A. Sinclair, "Millennials Merging: Leading a New Generation in War," Marine Corps Gazette, 90:75, September 2006.

[98] Douglas B. Sosnik et al., Applebees's America (New York, 2006), p. 221.

not the main cause of change.[99] What will cause social change and drive the nation's priorities will be these minorities ascending to positions of influence and elite status. Young minorities are graduating from high school at higher rates than ever before.[100] Most of these high school graduates desire a college education, as seen by the average graduating class from Harvard University where the minority graduation rate is approximately 30 percent and continuing to rise.[101] Technology allows minorities to form their own online communities that bypass old cultural and class boundaries. This gives way for minorities to prosper without bias. The impact of this on the United States is clear. Population experts have stated that minorities will make up a majority of the United States population by 2050.[102] The Census Bureau reports Texas, California, New Mexico and Hawaii already have majority minority populations and Maryland, Mississippi, Georgia, New York, and Arizona have 40 percent minorities.[103] With these facts, it is easy to understand that diversity will have to be embraced in the future, and that intolerance will not be accepted.

2. Women

The second finding in the surveys was that young women outshine young men and that the women are changing the nation's gender dynamics. The authors contend that,

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[99] Douglas B. Sosnik et al., Applebees's America (New York, 2006), p. 223.

[100] Ibid., p. 223.

[101] Ibid.

[102] Ibid., p. 224.

[103] Ibid.

according to the National Center for Education Statistics, in 2005 universities were on track to give at least 200,000 more Bachelor's degrees to women than to men. Additionally, women also seek graduate degrees more often then men. Generation 9/11 women are starting families later and teenage pregnancy is down for this generation and abstinence has increased.[104]

How will these trends change society? The family dynamics will continue to shift. Women in this generation will have a harder time finding men with the same educational background as themselves. Women will become the best and brightest. The old "boys clubs" will run out of members, and women will take their place. Women can and will occupy more important political and business positions in the coming years.[105]

3. Opportunity Gap

Another finding of the survey and research indicates that the opportunity gap for citizens will widen. Members of Generation 9/11 with the right education will have boundless opportunities in the coming years.[106] With the country moving into knowledge-based jobs and a highly technological workplace, advanced education will become essential in the coming years. Those without the advanced education will not be able to climb the social ladder and their social mobility will be capped for another generation. Since college costs rising, not all high school students who

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[104] Douglas B. Sosnik et al., Applebees's America (New York, 2006), p. 223.

[105] Ibid., p. 224.

[106] Ibid.

want to enter college and qualify scholastically will be able to enter. These students are priced out of the market. The Center for Information and Research on Civic Learning and Engagement states that nearly half of current 18-to-24 year olds have no college experience even though education will become increasingly important in the future.[107] This Opportunities Gap will be an important issue for this generation. With traditional educational avenues unavailable for some citizens who desire higher education, these same citizens will seek alternative and non-traditional ways to obtain that advanced education so they can participate in the world around them.

Technology is embraced by this generation more than any other. This generation uses it to make their life easier, to connect to more people and to enjoy their life to the fullest.[108] This quick adoption of technology is critical because if traditional institutions are not compatible with the 9/11 generation, then they will change them with technology or abandon them. Cell phones are preferred over traditional phone lines, and this generation utilizes the internet for all their daily uses Brand loyalty could decrease because switching costs are perceived as low.

Final results reveal that the next generation will seek work-life balance and that money will not buy status for them.[109] This generation was overscheduled from an early age, so in their prime years they will tend to slow down. Also, money is a tool that can provide items for them, and

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[107] Douglas B. Sosnik et al., Applebees's America (New York, 2006), p. 225.

[108] Ibid., p. 221.

[109] Ibid., p. 227.

not define them.[110] This generation wants safety, quality education, and quality entertainment.[111] They are willing to pay for it, but if the access is not there, then they could create alternate institutions to provide these items.

D. GENERATION DEBT

Anaya Kamenetz is the author of Generation Debt. This book describes the life issues surrounding the Millennia generation, which she describes as Generation Debt. The subjects included in the book are college education, low wage jobs, jobs without benefits, declining federal programs, and current family troubles. Her book was based on thousands of interviews, emails, and phone calls from people living in New York New Orleans, San Francisco and Washington D.C. All interviews were conducted in late 2004 and early 2005.

1. College and Money

According to Kamenetz, almost two thirds of all students currently enrolled in college are financing their education with debt.[112] This is a drastic change from years past. "In 1981 45 percent of all federal undergraduate student aid dollars came in loans, 52 percent in grants. By the end of the 1990s the proportion was reversed; loans make up 58 percent and federal funds made up 41 percent."[113]

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[110] Douglas B. Sosnik et al., Applebees's America (New York, 2006), p. 227.

[111] Ibid., p. 227.

[112] Anya Kamenetz, Generation Debt: Why Now Is A Terrible Time To Be Young (New York 2006), p. 18.

[113] Ibid., p. 17.

This statement displays a shift from government responsibility to provide access to higher education for citizens to the people themselves. She continues to write, "Although the government doesn't issue an official figure, studies in 2004 and 2005 put the average student loan debt for graduates of four year colleges between $17,600 and $23,485."[114] Most college students also utilize credit cards to fund their education when the education loans and the government resources are depleted.

Rising tuition costs combined with fewer federal funds available to the population give rise to increasing debt of the next generation. Colleges are raising their costs due to technology upgrades, marketing costs, and the simple fact that the market will bear these prices.[115] The Can-do attitude of the Gen-Xers parents to the new generation finds ways to get their children through college, no matter the financial cost of that education to the student. The consequence of this action can be severe and affect the future livelihood for the college student.

When graduation arrives, the students' debt repayment begins. It becomes their responsibility to pay off the debt, and that responsibility generally damages the ability of starting a family or buying a house because the graduate simply can't afford a lifestyle and the college debt on a low wage job. The term "low wage job" applies to the recent college graduate because with a lack of work experience, starting wages will tend to be lower. The superior earning

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[114] Anya Kamenetz, Generation Debt: Why Now Is A Terrible Time To Be Young (New York 2006), p. 18.

[115] Ibid., p. 22.

years will materialize, but not until after a sizeable amount of practical experience is gained and the workforce rewards that experience in conjunction with the education. Consequently, "Generation Debt" starts out behind pervious generations financially, and finds it exceptionally hard to maintain a lifestyle equal to their parents.[116]

2. The Definition of Low Income Changes

Traditional wisdom states that low income families are not affected by the increased debt a student is now carrying because most the federal funds go to them since they are truly needy. This is not the case though. Since tuition rates have increased, more students, even the middle class ones whose parents could afford to pay for their college, fit the new definition of low income and can compete for the federal funds that were not an option for them before. Since the federal funds have not increased even though the population competing for these funds has increased, the truly low income students receive even less federal aid.[117]

3. Jobs without Benefits

Along with higher education costs, higher loan debt and lower wage starting jobs there are additional costs of life that previous generations did not have to deal with. Most jobs have lowered "fringe benefits" such as medical coverage, or worse there are no fringe benefits at all and the employee must fund 100 percent of their medical insurance. In previous generations, medical, dental and

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[116] Anya Kamenetz, Generation Debt: Why Now Is A Terrible Time To Be Young (New York 2006), pp. 55-90.

[117] Ibid., p. 40.

other coverage's were part of a job, or at least the company paid the lion's share of the coverage. This often is not the case today. With costly legacy costs, most companies are reducing both retirement benefits and medical benefits, just when medical costs are soaring and citizens in the workforce are saving less and less for retirement. According to the author the combination of rising tuition costs, low paying jobs without benefits, and higher debt accumulation the society is setting up the next generation for failure.[118] As this country moves into a "Knowledge Economy" from a "Manufacturing Economy" advanced education will be a must, but if changes aren't made, generation Millennia will be worse off then Generation X, a Generation whose standard of living has decreased as compared to the Baby Boom generation.[119]

The members of the newest generation will aspire to join the knowledge workforce rather than the manufacturing workforce because more opportunities will exist within the knowledge workforce. In general, children want to be better off than their parents. Traditional college may not be a feasible for a large portion of the generation. In that instance, a substitute will be sought out and the military VOLED program offers such a substitute.

4. A Possible Solution: A Case Study

In her book, Kamenetz cites a young woman named Latoya who lived in South Philadelphia, PA. She was working at a fast food restaurant for $6.25/hr and had attended a local

[118] Anya Kamenetz, Generation Debt: Why Now Is A Terrible Time To Be Young (New York 2006), pp. 125-150.

[119] Ibid., pp. 59-62, 94.

community college. She cites that she joined the Air Force in search of a "better life." She was an intelligent 17-year-old (in 2004) who graduated at the top of her class in high school, but could not maintain her life by going to work in the civilian labor force and attending community college. So for her, the military, which offered her a job, training and education became a viable option. It was all three attributes that convinced her that military service was right for her. She valued a decent paying secure job with benefits and educational opportunities. The author further cites that with the current GWOT and counter-recruitment movements in large cities, the military has missed its recruiting goals (except for the Air Force).[120]

5. Education and the Next Generation

Kamenetz cites that the American Economic Association states that a bachelor degree holder is able to earn approximately 45 percent more money on average than high school graduates, as of 2005.[121] It can be demonstrated that the Generation Debt/Generation Millennia believes this because college enrollments are increasing not decreasing. Although critics may argue that students are enrolling based on other non-monetary values, the author argues that the "monetary" factor cannot be ruled out. The educational system is in need of change or another generation will suffer needlessly.

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[120] Anya Kamenetz, Generation Debt: Why Now Is A Terrible Time To Be Young (New York 2006), pp. 61-64.

[121] Ibid., p. 74.

E. THE CNO AND DIVERSITY

On February 5, 2007 the CNO released his guidance to the Navy for calendar year 2007. From his guidance, the CNO states "I consider diversity a strategic imperative for our Navy and vital to our ability to accomplish the mission." At the heart of the Develop 21st century leaders concept is diversity. The CNO further states, "We will drive to execution of the diversity conops in 2007 and will refocus our energies on recruiting, developing, educating, and retaining leaders from and for all parts of our Navy and nation."[122]

Admiral Masso released guidance that expanded upon the CNO's Guidance with regard to the diversity issue. ADM Masso writes

> Diversity is a strategic imperative for the United States Navy. We defend the greatest nation in the world. It is a nation that welcomes, indeed encourages, the active participation of every citizen regardless of race, gender, creed or color – A democracy founded on the promise of opportunity for all. It is also a nation whose demographic makeup continually changes reflecting the influx of new immigrants and the growth of minority populations. The Navy must change with it. To the degree we truly represent our democracy, we are a stronger, more relevant armed force. Diversity is a leadership issue, and everyone is a leader. We will Promote and engender a culture that embraces our diversity. Through our communications, education, policies, programs and conduct, each of us will actively foster work environments where people are valued, respected and provided the opportunity to reach their full

[122] Navy Personnel Command, Bureau of Naval Personnel, Reference Library, Messages, NAVADMIN 028/07 DTG 052330Z FEB 07.

> personal and professional potential. We will recruit, develop, educate and retain leaders from and for all parts of our navy and nation.[123]

F. THE FEDERAL RESERVE CHAIRMAN AND EDUCATION

The current Federal Reserve Chairman, Ben Bernanke delivered a speech to the Omaha Chamber of Commerce on February 6, 2007. His speech focused on the economic changes of the world and the United States position in the sea of change. Part of his speech focused on the education of Americans. Specifically he said the disparity in education and training is "likely the single greatest source of the long term increase in inequality. Polices that boost our national investment in education and training can help reduce inequality while expanding economic opportunity."[124] This statement does not directly impact the Navy. He also notes that there are disparities in the educational system and that they should be addressed. The Navy has already answered this call by providing a VOLED program to the sailors who desire it. With this disparity problem making front page headlines the Navy can answer with the VOLED program and offer new recruits an option to gain an advanced education. Whether a person spends four or 30 years in Naval service, that person will return to society and have to participate in the changing global economy that the Federal Reserve chairman is speaking off. VOLED can offer that ability to participate in that global economy whenever the sailor desires to leave active duty.

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[123] Navy Personnel Command, Bureau of Naval Personnel, Reference Library, Messages,NAVADMIN 025/07 DTG 021339Z FEB 07.

[124] Jennine Aversa, "Bernanke: Education Narrows Income Gap," Washington Post, February 6, 2007.

Each article in this chapter refers to ethnic diversity, the willingness to participate in obtaining advanced education and the lack of access for many individuals. When generational information for the Millennials are examined with the statistical analysis, which show that minorities and women are using VOLED and TA more often than their white male counterparts, a whole new realm of possibilities opens up for recruiting, retention and education.

V. ANALYSIS OF LITERATURE

A. SUMMARY

The information presented in this thesis can enable the Navy to achieve higher recruiting goals and understand why the analysis of retention and VOLED is difficult. This chapter will discuss the results reached in the previous literature and derive implications for Navy policy.

Three primary studies were reviewed to discover if continuing education improved retention, or if funding advanced education enabled service members to exit their service at a faster rate. The studies reached three different conclusions.

The VOLED study conducted by CNA discovered that retention was higher for those who used the Navy's VOLED system, and the researchers also listed other important benefits attributed to the program. The RAND Corporation study found the opposite result, that funding advanced education leads to decreased retention. The Army study found that when soldiers used their advanced education programs, retention was higher, but only slightly.

All three studies used different research design and methods, which in part explains the different results concerning the effect of VOLED on retention. One item was clear throughout all the studies, though. Women and minorities consistently used the advanced education programs at higher rates. That fact is not really interesting by

itself, but when the current population demographic shifts that are occurring within the United States are considered, this fact becomes more relevant.

The generation information provided in Chapter IV combined with the results obtained from the statistical studies provides a target market for the military. The Millennial generation values education (especially women and minorities), but their access to that education is reduced because of increased tuition costs. Currently, these young people are funding their education with huge college loans, causing them future debt problems. The demographic groups in the U. S. that are seeking advanced education are shifting toward women and minorities. As these groups achieve higher status within society old social norms will change paving the way for individuals with higher education and higher skills to be successful in society.

The country is moving toward a highly technical workforce, both in the civilian and military sectors. In order to participate, higher education will be required. If that higher education is not obtained, the opportunity gap within society widens, and the potential for increased poverty for the country grows.

Recently, Flag officers have called for increased diversity throughout the Navy. Senior leaders are aware of the demographic shifts within the population and desire the Navy to lead the way in having their service mirror society. Yet, they did not offer a detailed plan on achieving this goal. The VOLED program could be the detail that is needed to bring the Flag Officer’s vision into reality.

The Federal Reserve Chairman has challenged politicians to increase the educational opportunities for younger Americans entering college. The Navy has already answered that call, by providing a VOLED program that does not require the student to be burdened with heavy debt. This is in contrast to the civilian answer, which is to lower interest rates on student loans and make it easier for more people to borrow. By borrowing though, the borrower may be put at future financial risk.

When all the information of the literature is examined closely, the reader realizes that the Navy is poised to capture and retain more sailors from the demographics which are growing the most rapidly.

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VI. CONCLUSIONS

A. CONCLUSIONS

The research questions that were posed in this thesis were: What is the economic return on the Navy's Voluntary Education Program (especially TA)? What is the impact of Tuition Assistance on a sailor's career? and What does a review of the literature indicate about the effects of the Voluntary Education program?

Economic return for the Navy involves several components. The literature suggests that sailors use VOLED in order to cross-rate, retain, and advance within their current rating. The literature was not conclusive on whether VOLED increase retention. Higher retention translates into lower replacement costs for the Navy. Additionally, the recruiting costs for new recruits could be lowered if the potential recruit seeks out the service instead of the service seeking out the potential recruit. If those who value education view the Navy as providing the best educational opportunities, then potential recruits will pursue the Navy without extra effort by the recruiters.

Under the economic return heading, worker productivity for those already serving the in the Navy maybe an important aspect of the program. If the daily output of a sailor increases from additional education, that is also a gain for the Navy. The sailor who participates in VOLED could potentially work harder because their quality of life is increased by participating in VOLED, which increases personal satisfaction for the member. This increase in

personal satisfaction could lead to higher worker performance, which in turn, leads to higher readiness throughout the fleet.

The impact of VOLED on a sailor's career covers a wide spectrum. Sailors who are engaged in productive activities such as VOLED potentially will not attend Captain's Mast at the same rate as sailors who are not involved in outside activities. The reduction in refenals to Captain's Mast lowers the potential for demotion rates. Further, education that the sailors receive improves their study skills, allowing them to perform better on Rating exams, thereby increasing promotion rates. Also, critical thinking skills are introduced to sailors who had never been exposed to them. This could help junior sailors to make better leadership decisions during command operations.

A review of the literature about the effects of the VOLED program indicates that while there is a debate about its effects on retention, (due to a difference in study methodologies), the VOLED program is a fringe benefit that is sought after by sailors. There is no apparent decline in the desire to obtain additional education, and the program provides opportunities to sailors that they would otherwise not have.

1. The Retention Issue

In order to determine if an effect of VOLED does increase retention, a new study should be commissioned using the Army ACES study methodology as a baseline. The methodology for analyzing the VOLED program must remain consistent. While there may be criticism regarding the

simplicity of models used in regression analysis, the ACES study argues that their choice of method corrects for anticipated biases, which is the goal of any study.

2. Manpower Possibilities

The Navy benefits in numerous ways from service members utilizing VOLED and TA. The studies profiled in this thesis do show members advancing in their given rates, or cross-rating to undermanned ratings. This leads to reduced costs for recruiting in areas with enlisted manning shortfalls. Fewer demotions benefit the Navy by commanders or commanding officers not wasting their time dealing with discipline problem onboard their commands. This waste of time is extended to the Chief's mess and the Junior Officer's wardroom. All that time saved adds up to real productivity benefits.

3. The Overlooked Results

Women and minorities utilize the VOLED and TA programs more than their white male counterparts in the Navy. The most drastic change in society is that the women and minorities will be the power base in the next generation. These groups will always be searching for ways to fund their education as the price of education rises and excludes them from participating in the civilian sector.

4. Cost Effective

Currently the VOLED program may not pay for itself as shown by the previous studies analyzed. If VOLED is marketed inexpensively to the target market of women and minorities who desire higher education, and they enlist in

the Navy, then savings to the recruitment process may begin to appear. Another way to have the program pay for itself is by increasing retention. But to use VOLED as a retention tool, the program would have to change slightly.

5. Solutions

In order to stimulate change in the current polices, an alternative must be presented and discussed. This solution should be debated vigorously so that VOLED and TA can reach the maximum number of sailors.

Demographics in the U. S. are changing rapidly. Many citizens are priced out of the educational market, yet they persist in obtaining advanced education at great cost to their personal financial well being. If the VOLED program is emphasized to target recruiting markets (minorities and women) and the benefits to the individual, reduced cost of college for example, are stressed, then these target groups may enlist in higher numbers. If this educational message could be distributed at a low cost, using the internet for example, and more people enlist because of it, cost savings begin to be realized. These particular target markets are expanding so the chances of recruiting this group are also expanding. The VOLED program could be marketed as a principle reason for enlisting, not just an added benefit.

If more women and minorities enlist as a result of the low cost education campaign, then the accessions numbers increase, translating into recruiting goals being met. As a direct result of increased numbers of women and minorities in the Navy, the VOLED, to include TA usage, will increase because these groups value education.

The second part of the solution is to change the VOLED program slightly. If the Navy increases the budget for the VOLED program the retention goal could be met. If users are utilizing the resources as in years past, within the increased VOLED budget, more sailors will be apt to pursue their educational goals. Given the optempo of the Global War on Terror, it will take longer for these users to obtain their educational goal and these users will remain in service because they value advanced education. If a sailor realizes it may take six years to complete their education goals, reenlistment rates may increase.

There is no guarantee how long the member will retain, but given that enlistment contracts are three or more years in length (or an option to extend for 24 months), it can be assumed that the sailor will stay to at least year six. After year six, the decision to stay or leave the Navy will not focus on education but on other quality of life factors, such as order selection, family decisions and deployment rotations.

This above scenario follows the Flag Officers guidance for 2007, and satisfies the policy changes called for by the Federal Reserve Chairman of having better access to higher education. The benefits of this program will exceed the cost over time because the emerging recruiting pool values education and is currently seeking ways to fulfill their educational needs. This will solve the final problem of ensuring that the VOLED program is cost effective.

Opponents to this idea will cite that the Montgomery G.I. Bill encourages sailors to exit the service in order to complete their degree. One VOLED program, in contrast,

encourages sailors to stay in the Navy to complete a degree. The other benefits, such as medical benefits and exchange/commissary privileges, will retain the sailor, as will as an opportunity to execute permanent change of station (PCS) orders to shore duty.

A second solution can also be presented. As technology decreases the cost of different methods to deliver education the cost of the education also drops. The newest generation adapts to technology faster and prefers technological solutions. A change could be made to the VOLED funding where funding for teacher/student TA could be reduced by having the newest recruits participate more in the technology education program.

6. Move Ahead Not Backward

Today's Navy is concerned about being cost efficient and cost effective. Waste in the Navy needs to be eliminated and what resources the Navy is allocated should be spent wisely and in accordance with the vision of today's leaders.

Clearly, the Navy Flag community supports diversity in the Navy and is committed to educating that diverse force. This is the forward vision, and the orders are clear. Diversity and education of the force will be in the forefront of the leadership's responsibility.

To fund studies that continually examine the Navy's ROI on the VOLED program is still a necessity, but the scope should be changed to reflect the changing demographics and the changing times.

7. Future Studies

The next phase of research should conduct a retention study modeled after the ACES study. This approach will ensure that the VOLED program components are analyzed separately to ensure that each part of the program works for the sailors of the current force. If the program components are old and antiquated, then the programs will be abandoned by the sailors. If the VOLED program can change to meet the current needs of service members, then benefits will be realized. Finally, a cost benefit analysis for each component must be reviewed separately. An in-depth cost analysis will help decision makers allocate funds to VOLED programs where the money can yield the highest returns.

The speech given by Mr. Bernanke clearly supports the argument that lack of education increases inequality among Americans. His comments to amend policies that will boost educational opportunities to close economic gaps are in line with what others have noticed with the next generation. His call for education is clear; however, few governmental agencies are heeding the call for change.

With the Navy's leadership embracing diversity and education, and in light of the Federal Reserve Chairman's comments about increasing educational opportunities, the Navy's responsibility with respect to education should be clear: Recruit the demographics of the U. S. population and educate them so youth can benefit from closing the inequality gap.

In conclusion, society is changing and the Navy is in a position to benefit from the changes without expending more resources. The recommendations above are meant to spark

discussions of how to adapt to the changing demographics of society, to improve recruiting efforts, to reduce replacement costs for personnel, to close the opportunity gap for the next generation and to ensure that the younger generation does not bear the burden of heavy debt because of education. The Navy should be a leader in this endeavor: Full Speed Ahead.

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