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Determining Correlation Between Mathematics Proficiency and U.S. Navy System Administrator Training Success

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Determining Correlation Between Mathematics Proficiency and U.S. Navy System Administrator Training Success

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By
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APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Qualified state-of-the-art computer system administrator and LAN management professionals are in exceptionally high demand throughout the United States. Maintaining training program currency in this highly technological field requires constant curriculum redevelopment and instructor qualification upgrade. The Information Technology University (ITU) training program is the United States Navy's attempt to make their system administrator and LAN management training more effective and efficient by outsourcing via a partnership with Tidewater Community College (TCC) (As suggested Golfin et al, 1998). TCC agreed to provide the curriculum and instructional staff; the Navy is providing classroom space, a fully configured training laboratory, books, and essential consumable materials.

Before ITU, the Navy's only basic system administrator and LAN management training program attempted to train Navy system administrators in only eight (8) weeks. While this curriculum was highly organized and comprehensive, the student's most frequent complaints were that there was too much information, too quickly presented. This resulted in long-term knowledge and skill retention difficulties, often requiring their receiving command to provide additional job skills reinforcement training.

Market forces drive community college system administrator and LAN

management curriculum currency. By partnering with the local community college and using their staff and curricula, the Navy minimizes their curriculum development requirements. Additionally, spreading the curriculum delivery over a full year affords the student with additional skills practice and more in-depth practical reinforcement resulting in higher long-term retention of material. The students benefit from this arrangement by earning an Associate in Applied Science (AAS) degree, a universally recognized accreditation. The Navy benefits by minimizing its curriculum development costs and getting better trained, more motivated sailors after graduation. TCC expands its enrollment and realizes financial benefits from Navy participation. Overall, this appears to be a win-win situation. While not confirmed as such, the drawbacks may be the high initial cost outlay and innumerable retention, re-enlistment, and other educational program cost benefit savings that will be very difficult, if not impossible, to determine and factor in.

In developing this training partnership, the college's training track requirements and pre-requisites were discussed. The specific pre-requisites addressed in this research document are those that require the students to complete college mathematics before getting into the technology courses related to system administration or LAN management. This researcher feels that the pre-requisite is a holdover from the days when computer system administration required the individual to understand and read the computer code and then program the computer systems he/she was administering. Such is not the case

anymore.

The results of this study will enable the researcher to evaluate the correlation between a U. S. Navy student's proficiency in mathematics and their successful completion of the Computer System Administrator training in the Information Technology University program.

Statement Of The Problem

The problem of this study was to determine if there is a correlation between a U.S. Navy Information Systems Technology student's mathematics proficiency and college level computer System Administrator and LAN Management training course successes.

Research Goals

To effectively determine if there is a relationship between mathematics skills and computer system administration and LAN management training success, the following hypotheses will be tested:

$H1_0$ - For each of the 20 junior IT University sailors/students, there is no relationship between the results of the mathematics portion of the ASVAB and the student's performance in the IT University computer related technical courses.

$H2_0$ - For each of the 20 junior IT University sailors/students, there is no relationship between TCC's Math 121 (College Algebra) course results and the student's performance in the IT University computer related

technical courses.

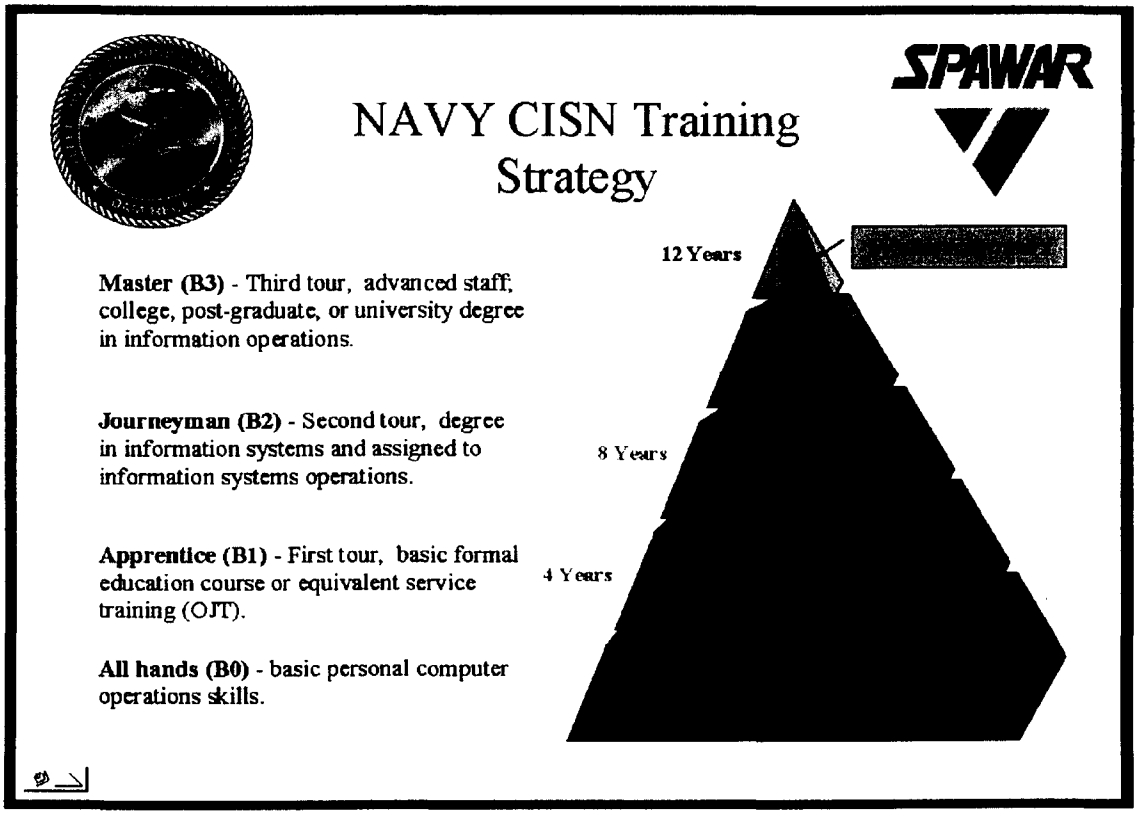
Background And Significance

For the last 10-15 years, the Navy has been rebuilding and upgrading its electronic and computer systems to try and maintain state-of-the-art technology. Unfortunately, technology was, and still is, advancing faster than the Navy could keep up with it and the Department of Defense (DOD) test, evaluation, and procurement system was so antiquated that by the time the Navy incorporated a specific aspect of that computer technology, it had become obsolete. In the past few years, the Navy decided that it would be more efficient and cost effective to buy commercial-off-the-shelf (COTS) technology thus eliminating the need to fund the expensive test, evaluation, and development process required for Navy specific systems.

As noted previously, the Navy's basic computer education and system administrator training was being taught in only eight weeks via Navy designed, developed and formatted curriculum. Navy recruits were thrust into the Navy's system administration courses, designed to develop Entry/Apprentice level System Administrators (see Figure 1 showing CISN Strategy), and then expected to perform at the Journeyman level with minimal additional training time to become qualified. The Information Technology University (ITU) program is the Navy's first attempt to partner with a local community college to provide more in-depth system administrator training and, consequently, create a more

qualified computer system administrator. Students who successfully complete this program will earn an AAS degree in Information Systems Technology from TCC. Through this partnership, the training program development costs were shifted to TCC and because their continued existence depends on meeting the needs of the general public, their courseware is continually updated and kept technologically current. This saves the Navy thousands of dollars in curriculum developmental costs, provides for more highly trained personnel with current qualifications, while supporting, through tuition payments, the local community college.

Figure 1
Communications Information Systems and Networks (CISN)
Training Strategy



The first participants in this program are a group of twenty Information Technology "A" (IT-A) School graduates who have been in the service for less than 6 months. Additionally, five senior sailors were handpicked, from a list of volunteers, to enroll in the program as students and act as mentors to the twenty junior sailors. These five mentors are Navy experienced, fully qualified system administrators, who, for a variety of reasons, have not had the opportunity to attend formal classes and receive college credits. The mentor's extraordinary competency as systems administrators, lack of mathematics background, and their difficulty with the mathematics portion of the college placement exams led this researcher to question whether mathematics proficiency is still a valid pre-requisite and indicator of computer system administrator training success.

The required skills to perform as a system administrator or LAN manager have radically shifted away from any requirement to be fluent in mathematics. Operating System (OS) software used to require the System Administrator (SA) to understand, operate, and program in, at least, three different mathematical bases (binary, decimal, and hexadecimal); not so anymore. Now, from the apprentice through the journeyman knowledge and skill levels, the SA needs to know how to navigate through a software menu system. When dealing with LAN technology and software, there are some Boolean Algebra related concepts that need to be understood, but even those are more related to the field of Logic than Mathematics.

The researcher intends to show that mathematics is not a valid indicator of computer system administrator and LAN management training success. If true, it would open the vocation to students who may initially lack the mathematics background. It would also allow TCC and the Navy to open their computer system administrator and LAN management course enrollment to include students who have the desire and aptitude to successfully complete the training, but may not have previously acquired the mathematics credentials.

Additionally, the information, data, results, and conclusions garnered through this research study will be incorporated into a larger, U.S. Navy-wide Information Systems Technician program analysis that is being initiated through the Chief of Naval Operations (CNO) and Commander In Chief, U.S. Atlantic Fleet (CINCLANTFLT). The Center for Naval Analysis (CNA), Alexandria, VA, is the agency conducting the analysis.

Limitations

The researcher recognizes the following research and program limitations as they relate to this study:

1. 20-25 students is not a large sample.
2. The mentor's influence on the student's computer class test scores can not be measured directly. This can only be inferred based upon the frequency and duration of their contact with the students.

3. Because this is a pilot program, there may be influences that may not have been anticipated.
4. The researcher had no control over the student's prior computer knowledge and experience.
5. Generalized comparisons of results to related computer fields might be limited.

Assumptions

The researcher recognizes the following research and program assumptions as they relate to this study:

1. Mathematics ability is assumed to be one of Tidewater Community College's primary qualifiers for computer aptitude.
2. Information Technology "A" School provided basic computer familiarization.
3. The mentors will have some effect on student's performance.
4. The student's mathematics ASVAB scores are assumed to reflect their mathematics proficiency.
5. The students will complete Math 121 prior to enrolling in the advanced computer technology courses; this may have some effect on the computer course grades.

Procedures

The researcher will arrange for individual student consent to acquire their

ASVAB mathematics, TCC Math 121 and computer course test results. This data will be collated, tracked, and documented by charting the information. Documentation will include mentor assistance provided, so as to show mentor influence that may have mitigated the accuracy of the student's mathematics or computer course scores. The researcher will then compare

(1) ASVAB mathematics test results to each of the student's individual computer course formative test scores, and

(2) Math 121 GPA to each of the student's individual computer course formative test scores.

The student's final computer course GPAs will be compared, both individually and combined, to their mathematics and ASVAB test scores using Pearson's r analysis techniques.

Definition Of Terms

The following terms and acronyms are defined to assist the reader in understanding this research study.

1. "A" School: The basic professional training given to sailors who are on a specific professional training track.
2. AAS: Associate in Applied Science Degree.
3. ASVAB: Armed Services Vocational Aptitude Battery. A Department of Defense battery of comprehensive standardized tests that provide indications

of an individual's professional aptitude.

4. C^4ISR: Command, Control, Communication and Computer Information Systems Resource and usually refers to newly developed computer systems that are not Department of Defense specific and in keeping with the Navy's Information for the 21st Century (IT-21) publications.
5. CISN: Communications Information Systems and Networks. A Navy training strategy modeled on civilian, skilled based, professional development requirements.
6. DOD: Department of Defense.
7. Information Technology University: A Navy/TCC partnership and training program that provides sailors with and Associate degree in Computer System Administration and LAN Management.
8. IT-21: Information for the 21st Century technology.
9. IT-A: Information Technology "A" School.
10. ITU: Information Technology University.
11. LAN: Local Area Network.
12. Mentors: An experienced professional, in the same professional field as the trainees, who assists and guides the student toward success.
13. Network: Two or more computer systems physically (via cable) and digitally connected to enable sharing of data.

successes in the ITU program's computer technology related courses.

Chapter II will provide an overview of the existing research that has been completed in computer technology college course pre-requisites, as well as Navy ASVAB test creation and placement successes. Chapter III will detail the researcher's procedures used to collect data and create a basis for evaluating the pre-requisite requirement. Chapter IV will include new information discovered through the research and the final chapter, Chapter V, will summarize research results, enabling the researcher to draw conclusions and provide recommendations for changing or retaining the computer course pre-requisites.

CHAPTER II

REVIEW OF LITERATURE

This chapter is intended to research and identify the literature regarding characteristics of computer system administrators and LAN managers (hereafter referred to as system administrators) that the Navy uses to determine an individual's aptitude toward the system administration field and Tidewater Community College uses to set their prerequisite requirements for system administrator training. While there is a significant amount of literature dealing with occupational aptitudes and requirements for training success, none had the specificity needed to narrow this study to system administrators in particular. This is not an unforeseen revelation, as this field is relatively new (less than 15 years old) and the exceptionally quick advances in computer technology have redefined the job requirements for most of the labor force ("The changing nature of work: Implications for occupational analysis," 1999). An aspect of occupational analysis and aptitude determination that the researcher had not expected was that of its exceptionally general nature. Rather than pointing an individual at a vocation, the existing occupational aptitude inventories assisted the individual by directing them toward very general fields of study. Since the fundamental document to all occupational analysis begins with the Armed Services Vocational Aptitude Battery (ASVAB), this is where this review begins.

The Armed Services Vocational Battery (ASVAB)

Until recently, the military, educational system, and civilian corporation's

primary occupational aptitude measurement instrument has been based on the ASVAB. A descendent of Shartle's *Occupational Information* (1948) and the *Dictionary of Occupational Titles*, which was originally developed in 1958 (Scoville, J. G. (1972)), the ASVAB was developed out of the Army's need to identify job specific training requirements. To adequately address these requirements, they needed a complete job listing. To determine aptitude for each one of those jobs, the specific responsibilities associated with each profession was identified and an inventory was created that measured the respondent's desires, background knowledge and aptitude for that specific vocation.

The ASVAB' s first generation of tests, forms 1 through 4, measured nine aspects of an individual's aptitude. Based upon a combination of scores in the various general areas, the Army determined the specific job opportunities that were offered to the individual. Since the ASVAB occupational aptitude development effort was by far the most comprehensive and the reliability and validity studies had no parallel in the civilian community (the sample size for analysis consisted of all military members), it was adopted as the De Facto standard across the marketplace. As marketplace requirements changed ("The changing nature of work: Implications for occupational analysis," 1999), the ASVAB evolved. The last update to the ASVAB was published in 1990 and consisted of 22 different subtests (Curran, L. T., Palmer, P.. Haywood, C. S., 1990). This version incorporated numerous computer related job task skills, however the basis for occupational analysis still rested with the Dictionary of

Occupational Titles (DOT), the last update of which was 1992.

Further investigations into job descriptions contained in the DOT revealed that the system administrator job was still not a valid entry (see Figures 2, 3 and 4). At best, the system administrator job was integrated into the same occupational category as computer programmers or systems analysts. In those categories, mathematics knowledge, proficiency and reasoning abilities were still absolutely essential.

Figure 2.
Excerpt from DOT, in vicinity computer related job titles

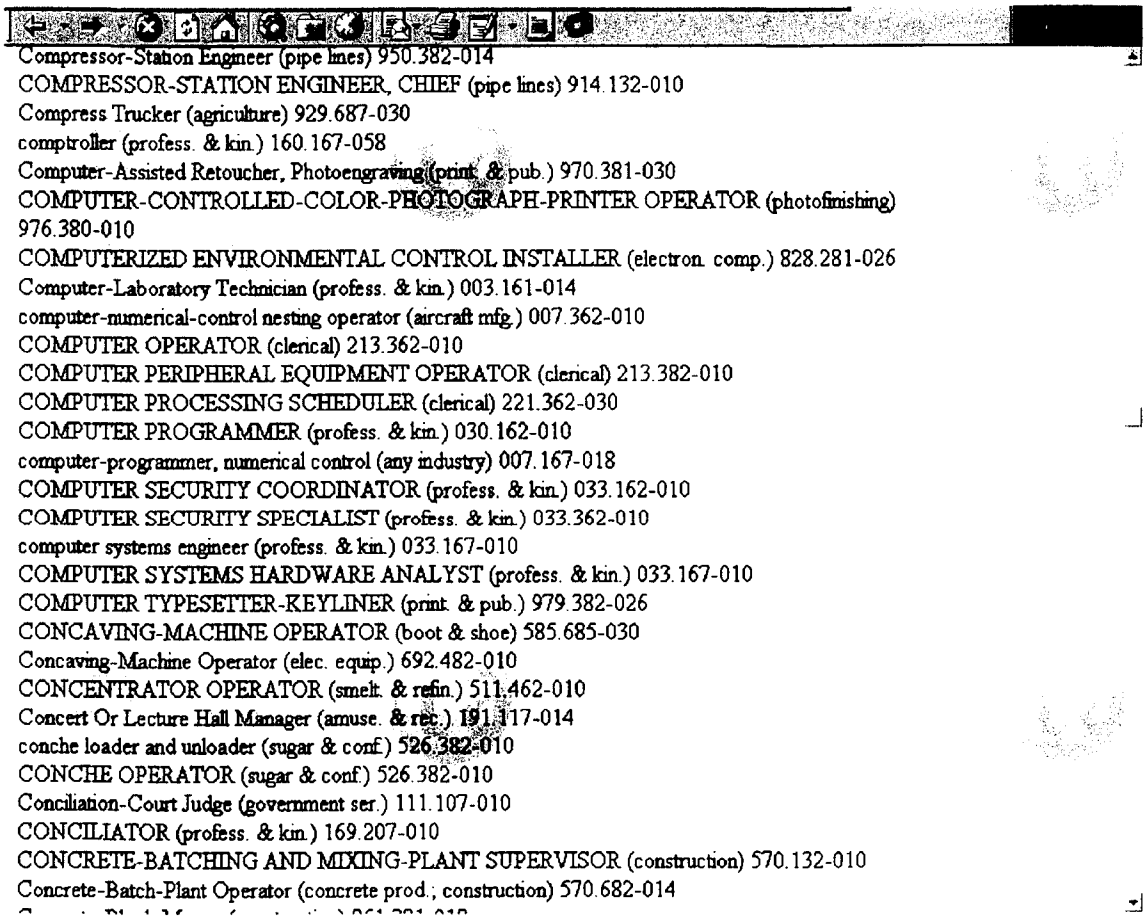
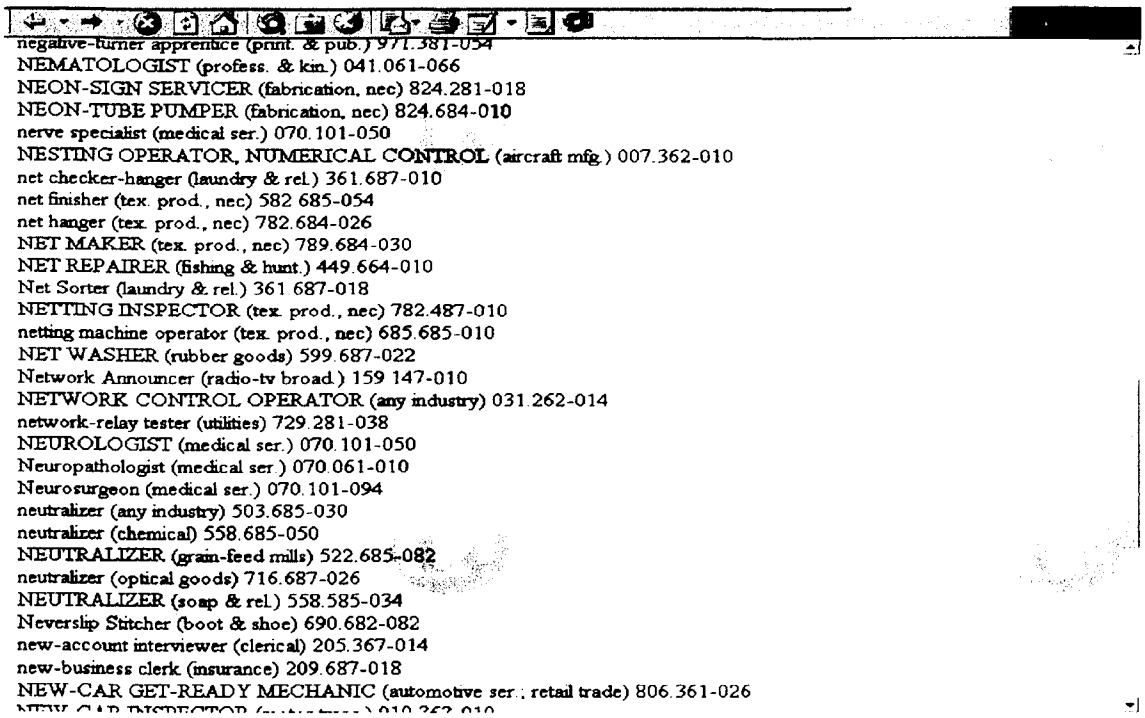

Compressor-Station Engineer (pipe lines) 950.382-014
COMPRESSOR-STATION ENGINEER, CHIEF (pipe lines) 914.132-010
Compress Trucker (agriculture) 929.687-030
comptroller (profess. & kin.) 160.167-058
Computer-Assisted Retoucher, Photoengraving (print. & pub.) 970.381-030
COMPUTER-CONTROLLED-COLOR-PHOTOGRAPH-PRINTER OPERATOR (photofinishing) 976.380-010
COMPUTERIZED ENVIRONMENTAL CONTROL INSTALLER (electron. comp.) 828.281-026
Computer-Laboratory Technician (profess. & kin.) 003.161-014
computer-numerical-control nesting operator (aircraft mfg.) 007.362-010
COMPUTER OPERATOR (clerical) 213.362-010
COMPUTER PERIPHERAL EQUIPMENT OPERATOR (clerical) 213.382-010
COMPUTER PROCESSING SCHEDULER (clerical) 221.362-030
COMPUTER PROGRAMMER (profess. & kin.) 030.162-010
computer-programmer, numerical control (any industry) 007.167-018
COMPUTER SECURITY COORDINATOR (profess. & kin.) 033.162-010
COMPUTER SECURITY SPECIALIST (profess. & kin.) 033.362-010
computer systems engineer (profess. & kin.) 033.167-010
COMPUTER SYSTEMS HARDWARE ANALYST (profess. & kin.) 033.167-010
COMPUTER TYPESETTER-KEYLINER (print. & pub.) 979.382-026
CONCAVING-MACHINE OPERATOR (boot & shoe) 585.685-030
Concaving-Machine Operator (elec. equip.) 692.482-010
CONCENTRATOR OPERATOR (smelt. & refin.) 511.462-010
Concert Or Lecture Hall Manager (amuse. & rec.) 191.117-014
conche loader and unloader (sugar & conf.) 526.382-010
CONCHE OPERATOR (sugar & conf.) 526.382-010
Conciliation-Court Judge (government ser.) 111.107-010
CONCILIATOR (profess. & kin.) 169.207-010
CONCRETE-BATCHING AND MIXING-PLANT SUPERVISOR (construction) 570.132-010
Concrete-Batch-Plant Operator (concrete prod.; construction) 570.682-014

Figure 3.
Excerpt from DOT, in vicinity network related job titles



negative-turner apprentice (print. & pub.) 971.381-054
NEMATOLOGIST (profess. & kin.) 041.061-066
NEON-SIGN SERVICER (fabrication, nec) 824.281-018
NEON-TUBE PUMPER (fabrication, nec) 824.684-010
nerve specialist (medical ser.) 070.101-050
NESTING OPERATOR, NUMERICAL CONTROL (aircraft mfg.) 007.362-010
net checker-hanger (laundry & rel.) 361.687-010
net finisher (tex. prod., nec) 582.685-054
net hanger (tex. prod., nec) 782.684-026
NET MAKER (tex. prod., nec) 789.684-030
NET REPAIRER (fishing & hunt.) 449.664-010
Net Sorter (laundry & rel.) 361.687-018
NETTING INSPECTOR (tex. prod., nec) 782.487-010
netting machine operator (tex. prod., nec) 685.685-010
NET WASHER (rubber goods) 599.687-022
Network Announcer (radio-tv broad.) 159.147-010
NETWORK CONTROL OPERATOR (any industry) 031.262-014
network-relay tester (utilities) 729.281-038
NEUROLOGIST (medical ser.) 070.101-050
Neuropathologist (medical ser.) 070.061-010
Neurosurgeon (medical ser.) 070.101-094
neutralizer (any industry) 503.685-030
neutralizer (chemical) 558.685-050
NEUTRALIZER (grain-feed mills) 522.685-082
neutralizer (optical goods) 716.687-026
NEUTRALIZER (soap & rel.) 558.585-034
Neverslip Stitcher (boot & shoe) 690.682-082
new-account interviewer (clerical) 205.367-014
new-business clerk (insurance) 209.687-018
NEW-CAR GET-READY MECHANIC (automotive ser.; retail trade) 806.361-026

Figure 4.
Excerpt from DOT, in vicinity computer related titles

synthetic department supervisor (pharmaceut.) 559.130-010
SYNTHETIC-FILAMENT EXTRUDER (plastic-synth.) 557.565-014
SYNTHETIC-GEM-PRESS OPERATOR (jewelry-silver.) 575.685-078
synthetic-resin operator (plastic-synth.) 558.382-050
SYNTHETIC-STAPLE EXTRUDER (plastic-synth.) 557.665-010
Syrup Blender (beverage) 520.485-026
Syrup Crystallizer (sugar & conf.) 529.686-034
syruper (can. & preserv.) 529.685-190
Syruper, Machine (can. & preserv.) 529.685-190
Syrup Filterer (beverage) 520.485-026
syrup-kettle operator (plastic-synth.) 558.382-050
SYRUP MAKER (beverage) 520.485-026
SYRUP MAKER (sugar & conf.) 529.482-022
SYRUP MIXER (grain-feed mills) 529.462-010
SYRUP-MIXER ASSISTANT (grain-feed mills) 520.687-058
system dispatcher (utilities) 952.167-014
system operator (print. & pub.) 979.282-010
system operator (utilities) 952.167-014
system operator, chief (utilities) 952.137-010
system-planning engineer (utilities) 003.167-026
SYSTEMS ANALYST (profess. & kin.) 030.167-014
systems analyst (profess. & kin.) 161.167-010
systems checkout mechanic (aircraft mfg.) 806.261-050
systems inspector (comm. equip.; electron. comp.; inst. & app.) 726.381-010
Systems Manager (print. & pub.) 972.137-010
SYSTEMS PROGRAMMER (profess. & kin.) 030.162-022
Systems-Testing-Laboratory Technician (profess. & kin.) 003.161-014

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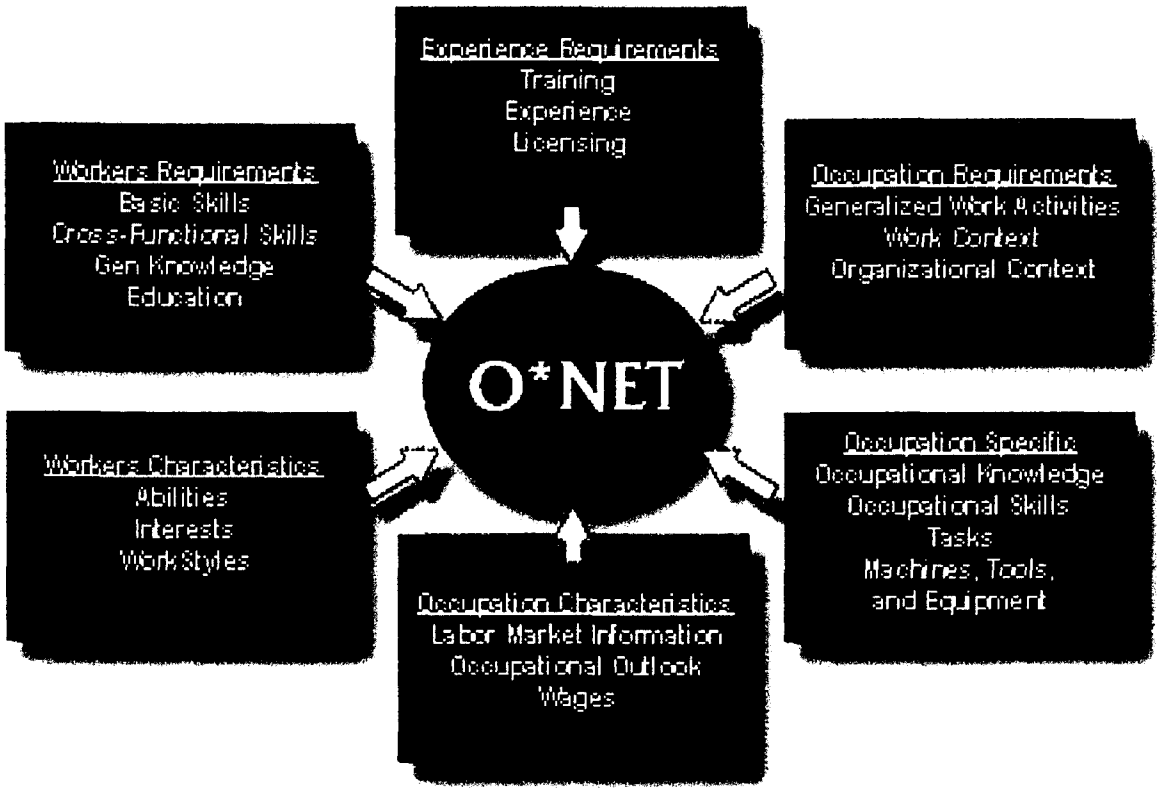
The Occupational Information Network (O*NET)

In 1994, the U. S Department of Labor realized that a more flexible alternative to the DOT was essential in maintaining occupational classification and job task currency in today's fast paced environment. The advent of very fast computer systems with extremely large storage capabilities and sophisticated computer programs was the ideal situation to review the paradigm. The Occupational Information Network (O*NET, 1998) was commissioned as DOT and ASVAB's (Rounds, J., Smith, T., Hubert, L., Lewis, P., and Rivkin, D., 1999) successor. While the traditional method of identifying the job and then developing a job task analysis to fit the profile is still being used within this system, O*NET has the additional flexibility to create a job description by inputting the occupational requirements and having the program define the vocation. For a college or career bound high school student, this significantly adds to the job description database and provides significantly more detailed and specific guidance for the individual's career path. Additionally, this could assist the military, as well as civilian corporations, in pointing the individual toward a specific occupation in which he/she has an aptitude and interest. This also identifies specific training requirements and provides the company/military with some confidence in successful completion of vocational training.

O*NET appears to be on the cutting edge. Their occupational interest and aptitude profiling promises to minimize the gap between the creation of a new job and the training prerequisites and requirements. Within the database is a newly created entry for Computer System Analyst and System Administrator.

The tasks associated with this occupation have not completely divorced mathematics from the job's description, however the emphasis is more on analytic abilities and concepts (parallel to the Mathematics Reasoning form within the ASVAB) than numbers and numerical concepts (See Figure 5).

Figure 5.
O*NET Program Model



O*NET's influence on training requirements is already being felt. Application for entry to Berkley University's Analysis and Design of Information Systems training program calls for evaluating "aptitude for processing abstract rules", but eliminates any requirement for mathematics; their web site (www.ce.columbia.cta.analysis_scene.html) specifically state "Mathematics is neither tested nor required." In their new course catalog, Tidewater Community

College has minimized their requirement for mathematics as a prerequisite. Mathematics is included as a requirement to fulfill their general education requirement for an Associates in Applied Science degree and suggests, but does not mandate, that mathematics remain as a prerequisite for the more advanced technical computer courses.

In summary, organizations that rely on computing resources to carry out their mission have always depended on systems administrators and the dramatic increase in the number and size of distributed networks of workstations in recent years has created a tremendous demand for more, and better trained, systems administrators. Unfortunately, the understanding of the profession and requirements to qualify systems administration has not kept pace with the growth in the number of systems administrators nor with the growth in complexity of system administration tasks. In this researchers opinion, that technological complexity is what has overcome the requirements for system administrators to be fluent in mathematics. As an oversimplified example, the computer now handles the mundane tasks of programming new users; the system administrator merely needs to scroll to a menu item and fill in the dialog box blanks opened by the operating system. While slowly changing, most system administrator education and training institutions are still using mathematics as an aptitude indicator and pre-requisite, believing that the programmer job classification, whose primary responsibility is to produce computer code and where math is an integral part of programming languages, still applies. As obviously recognized at Berkley University, for system administrators, this is not necessarily true.

CHAPTER III

METHODS AND PROCEDURES

As an experimental research study, this chapter describes the population, research variables, classroom procedures, methods of data collection and the statistical analysis mechanism used to evaluate the data. Each course's student GPA's will be obtained from tests given by the Tidewater Community College professors for Math 121 (Fundamentals of Mathematics) and each computer-related course. While it was not an integral factor in the analyses, a Background (Appendix B-1) and Computer Familiarity Self Assessment Survey (Appendices B-2 through B-5) was developed and used to collate and ascertain the student's background and computer knowledge and/or skills. The ASVAB purports to infer computer skill fluency from ancillary knowledge and skills (e.g., math, typing speed, semantic fluency), but it does not measure them directly. The results of this study will assist the Navy in identifying the **target population** of newly inducted sailors that demonstrate the aptitude and desire to become USN System Administrators.

Population

For this study, the **sample population** is a group of 20 newly inducted U.S. Navy sailors who are graduates of the Navy's Information System Technician "A" (IT-A) School. The researcher had no control over the ITU sample population's selection. This pilot program's student selection process was accomplished by offering this opportunity to IT-A School students whose

final GPA was near or at the top of their respective IT-A School classes. There was no additional screening processes.

The sample's background data was gathered via survey (Appendix B-1) and summarized in Table 1 (IT University Sample Population Make-up). While the sample population is not gender stratified as compared to the Navy's System Administrator population, which is a relatively even distribution, it is similar (90% male/10% female) to the civilian population's makeup in this field (80% male/20% female). This analysis focused on the individual that has had NO, or minimal, USN System Administrator experience, thus the noticeably limited age variation; 80% under 21 years old. One student was accepted into the program without a high school diploma or GED: He has since been given and passed the GED exam and awarded a GED.

Table 1
IT University Sample Population Make-up

		Number in Sample Population	Percentage
Ethnic Makeup	Caucasian	12	60%
	Black	4	20%
	Hispanic	2	10%
	Asian	0	0%
	Other	2	10%
Education	No HS/GED	1	5%
	GED	3	15%
	HS	12	60%
	Technical School	0	0%
	College Courses	4	20%
	AS+	0	0%
	BS+	0	0%
Gender	Male	18	90%
	Female	2	10%
Age	17-21 Years Old	16	80%
	22-27 Years Old	4	20%

Research Variables

The associated research variables used to conduct a Mathematics proficiency versus computer System Administrator course success correlation analyses are:

(1) The students' ASVAB Arithmatic Reasoning scores (AR)

(2) The students' Tidewater Community College Fundamentals of Mathematics (Math 121) final grade point average.

Note: Formative Math 121 test scores will be collected and, if significant variations are noted, compared to mentor assistance provided.

(3) The students' Tidewater Community College Fundamentals of Computer Information Systems (IST-114), Introduction to Microcomputer Software (IST-117), and Networking Essentials (IST-193) course's final grade point averages.

Note: Again, IST-114, IST-117 and IST-193 formative test scores will be collected and, if significant variations are noted, compared to mentor assistance provided.

Instrument Use

This research will use the results of data collected from already developed tests. The ASVAB has been validated and proven reliable over thousands of research cases (Welsh, J. R., 1990). Tidewater Community College is an accredited community college whose professors are of the highest

quality. Additionally, each professors was hand selected for this pilot program and has demonstrated their instructional abilities through numerous class convenings.

The Computer Background Self Assessment Survey (Appendices B-2 through B-5) was acquired via the WWW (Tamarkin, 1997) and modified by the researcher specifically for this program. U. S. Navy applications operator courses were referenced and used to modify the survey's Yes-No-Unsure response questions by comparing them to the courses' Learning Objectives and individual tasks. While it was considered, there was nothing built into the design to prevent a student from randomly selecting answers. Also, as the survey was developed and presented to the students as a **self-assessment,** some degree of inflation was expected.

Classroom Procedures

Classroom procedures consist of data collection only. The test development, validation, reliability and scoring was done by each of TCC's professors in accordance with their individual classroom and laboratory requirements. The researcher made no attempt to influence or modify the professor's academic requirements.

As each course is completed and final grades approved, the student's scores will be logged in both the professor's grade book and an Excel database. The U.S. Navy Information Technology University course supervisor will correlate each student's course GPA with a student number and provide the

data, using only the student number, to the researcher. The student number to student correlation will only be known by the course supervisor, thus maintaining each student's confidentiality for this research study. The study's analysis will use only the final GPA for each student and each course.

Methods of Data Collection

The students' background and computer familiarity data were collected using a self-assessment survey developed for this program by the researcher. The survey was presented by the ITU Course Supervisor to the students with instructions to complete the survey as accurately as possible, based upon pre-ITU knowledge. Some degree of competance and familiarity were expected, however since this aspect of the research project was primarily looking for trends, from which to baseline the students' background and provide a setting for the study, the results should provide that information.

Student ASVAB scores will be acquired directly from the student's training records. Only those test scores that relate to mathematics or computer aptitude will be used in the correlation, specifically the Arithmentic Reasoning scores.

The Math 121 and advanced computer technology courses will be graded by the professors teaching each subject. Math 121 test scores (formative and summative tests) will be acquired from each professor's grade book, as coordinated and authorized by Tidewater Community College for this project's research and analysis. Once authorized for release by the students, and once the students have completed the Math 121 course, those grades, both numeric

and alphabetic, will be recorded. The numeric final grade point average (GPA) grades will be used to conduct the correlative analysis.

The TCC curricula (Appendix C) delineates seven system administrator or computer related courses. All of the students' Tidewater Community College IST-114, IST-117, and IST-193 test scores will be acquired from the professor's grade book. Once authorized for release by the students and once the students have completed each advanced technical course, the numeric final grade point average (GPA) grades will be used to conduct the correlative analysis.

Statistical Analysis

To determine if there is a correlation between a U.S. Navy Information Systems Technology student's mathematics proficiency and college level computer System Administrator and LAN Management training course success, this research will conduct a Pearson's r product moment correlative analysis.

$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{\{[N\Sigma x^2-(\Sigma x)^2][N\Sigma y^2-(\Sigma y)^2]\}}}$$

All collected analysis data will use raw scores and interval data. Alphabetic or pass/fail grades on specific skills tests will be collected for possible future analysis, but not factored into this study. The reader is reminded that the analytical process implies NO causality, simply a positive or negative correlation to the hypotheses presented previously. With a degree of freedom (D_f) of eighteen (N-2), the study's level of statistical significance, as compared at

the .05 (.4438) and .01 (.5614) levels and based upon two-tailed tests, will be presented in the following chapter.

Because of the small sample size, the correlative analysis, reported herein, will be done in four parts, each independent of the others. Using this method, the researcher hopes to add a measure of reliability to the analysis.

1. ASVAB math scores as compared to the individual computer course final GPAs.
2. ASVAB math scores as compared to the averaged computer courses' final GPAs using all seven computer courses for each student.
3. Math 121 scores as compared to the individual computer course final GPAs.
4. Math 121 scores as compared to the averaged computer courses' final GPAs using all seven computer courses for each student.

Summary

The sample group, while small and not stratified, was randomly selected, identified, and all arrangements have been made for the data collection while considering each students' right to privacy. The students' pre-ITU computer familiarity was typical of 18-24 year old young men and women and should add validity and reliability. A Pearson's r statistical analysis using two unrelated test sources (ASVAB and Math 121) will, hopefully, provide results that support one another and dispute the validity of using mathematics proficiency and knowledge as a requirement to administer computer systems.

CHAPTER IV

FINDINGS

The problem of this study was to determine if there is a correlation between a U.S. Navy Information Systems Technology student's mathematics proficiency and college level computer System Administrator and LAN Management training course success. This chapter expands upon the Computer Familiarity Self-Assessment Survey results, provides the reader with findings and results of the statistical calculations, and calculates the research study's Pearson's r statistical analysis specifics. The following hypotheses were established by this researcher as a guide toward effecting resolution of the problem statement.

$H1_0$ - For each of the 20 junior IT University sailors/students, there is no correlation between the results of the mathematics portion of the ASVAB and the student's performance in the IT University computer related technical courses.

$H2_0$ - For each of the 20 junior IT University sailors/students, there is no relationship between TCC's Math 121 (College Algebra) course results and the student's performance in the IT University computer related technical courses.

The following paragraphs contain specific data collected, statistical computations, and findings for the product moment correlative analyses.

Background Survey Response Overview

The students' responses to the background survey (Appendix B-1) showed that one student was accepted into the program without a high school diploma or GED. One of the criteria specified in the initial IT University student screening processing was to hand select those students who excelled in IT "A" school. Considering that this is a college program which awards an AAS degree, the requirement to ensure that each selectee have a high school diploma (or equivalency) was assumed, but not voiced, to be one of the program's selection requirements. The aforementioned student has since been given and passed the GED exam and awarded a GED.

As aside note relating to student GED versus High School Diploma versus Dropout statistics, through liaison with the Center for Naval Analysis (Dr. Peggy Golfin), there was research and statistics to show Navy students who have acquired a GED were almost twice as likely to attrite from Navy "C" schools (advanced job training) as those who had actually graduated high school. In fact, the attrition rate for GED students was slightly higher than even those Navy "C" school students who dropped out of high school and did not seek an equivalency degree.

While not a stratified random sample, this group of students was a fair, although very small, representation of the computer System Administrator community. Outside of the purview of DOD organizations, the computer technology field is largely male dominated, as is this sample and most

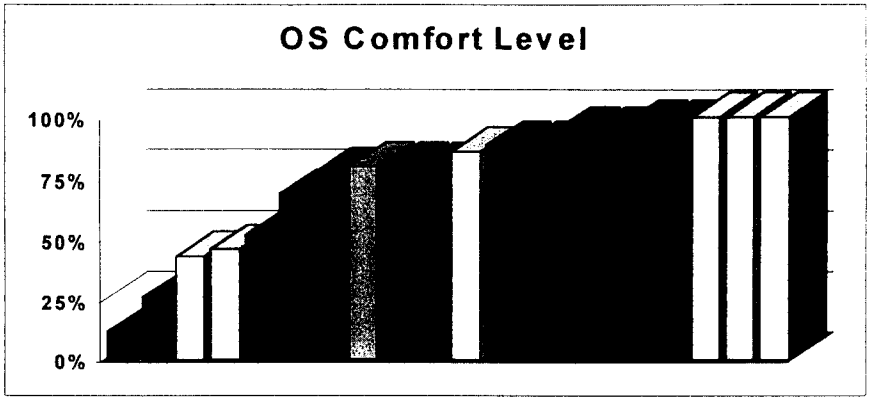
technology fields in general. DOD organizations, however, tend toward a more evenly distributed System Administrator base because this field was one that lacked any combat restrictions for women, resulting in a tendency to draw more women, thereby leveling the distribution. So, while this sample typified the **general populace's** stratification, with respect to the **Navy's** System Administrator population, it was more male oriented.

Self Assessment Survey Results

To provide the reader with a background of the student's computer operations familiarity, Figures 6 through 9 were graphs depicting the results of the Computer Familiarity Self Assessment survey, done in four specific functional areas: Operating System, Word Processing, Spreadsheet, and Database. The results were as expected – somewhere around a 75-25% split favoring user application familiarity, with some at zero and some at 100%, and a 25-75% split favoring the programming related applications. The average individual used a computer for word processing or web surfing and had some familiarity with the operating system to save and retrieve files. Most users did not have the need to design spreadsheets, develop forms, or create databases and queries.

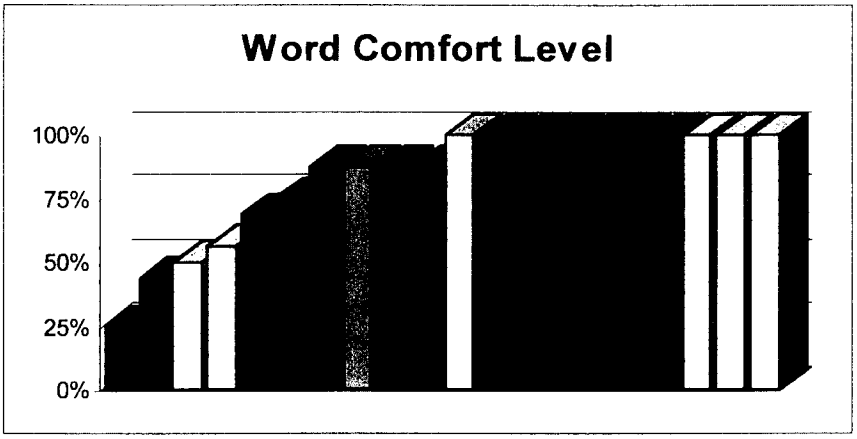
Most students indicated some computer familiarity in applications often associated with Computer Operators - Operating System (Figure 6) and Word Processing (Figure 7), although there were around 20% that felt that they were <u>not</u> comfortable in either environment, indicating novice computer users.

Figure 6
IT University Student Familiarity with a Computer Operating System



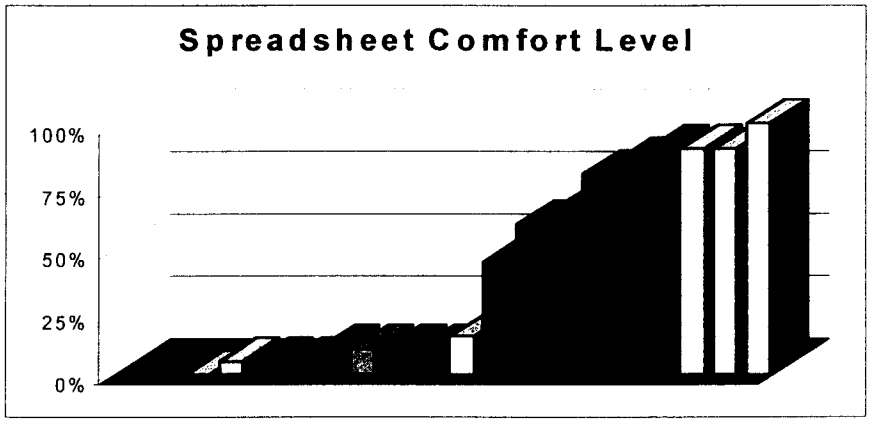
Each bar represents an individual student

Figure 7
IT University Student Familiarity with a Word Processing Application



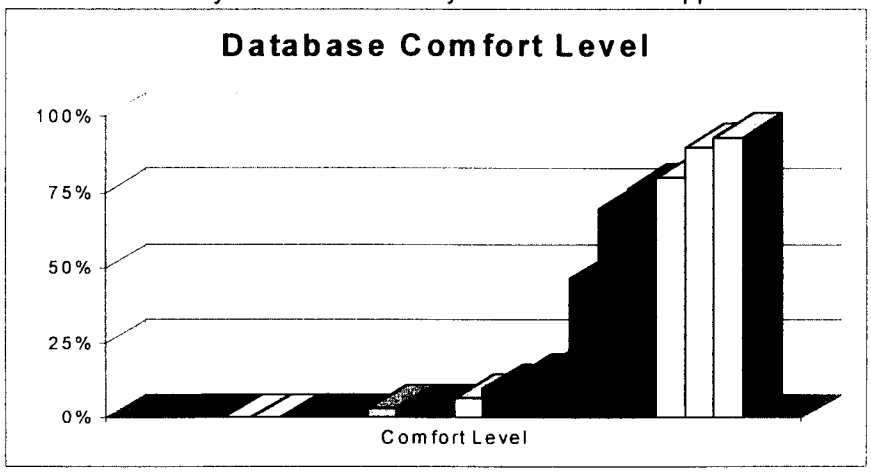
Each bar represents an individual student

Figure 8
IT University Student Familiarity with a Spreadsheet Application



Each bar represents an individual student

Figure 9
IT University Student Familiarity with a Database Application

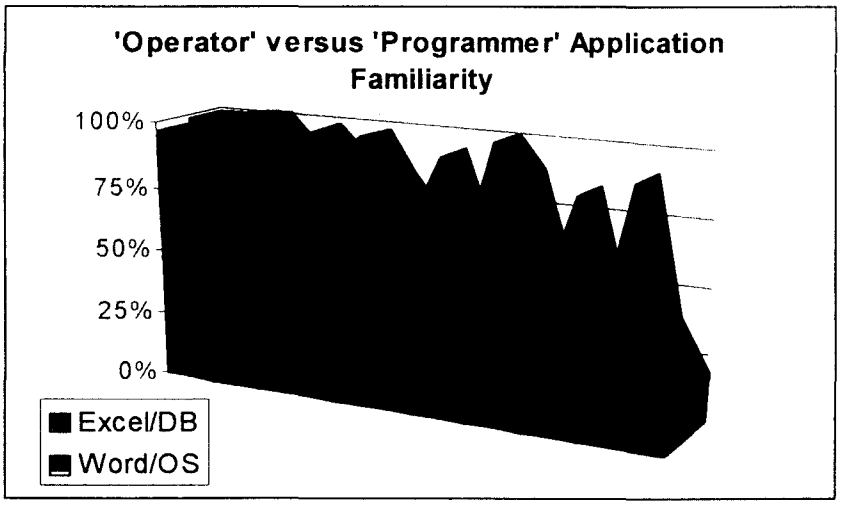


Each bar represents an individual student

As regarded Spreadsheet (Figure 8) and Database (Figure 9) familiarity, two types of applications that are associated more with programming than operator functionality, the majority (approximately 75%) felt comfortable in neither environment. There were some self-acclaimed experts in both, but this was expected as the field itself should attract those individuals with some computer aptitude and experience.

To ascertain if there was a relationship between operator and programmer associated applications, the following graphic (Figure 10) represented a comparison of the student's comfort levels when averaging the OS and Word Processing values versus the average of the Spreadsheet and Database comfort levels. As presented, there may be some gross trend correlation, which implied that the Computer Self Assessment Survey had some reliability, however a more extensive sample would be required to validate its reliability with certainty.

Figure 10
IT University Student Overall Computer Familiarity



ASVAB and TCC Course Test Data

Table 2 showed data collected and included the ASVAB Math scores and Tidewater Community College Math 121, computer course final GPA's, and averaged score of listed TCC computer course grades. A statistical representation of the data was presented in the following paragraph. One interesting annotation was that there were no failures in any TCC courses. Since the mentor's assistance in every course showed an even distribution throughout the sample, their influence can not be specifically assessed.

Table 2
Raw ITU Student ASVAB Math Scores,
Tidewater Community College Course Final GPA's, and
Overall Average of TCC Computer Course GPA's

Student Number	ASVAB AR	Math 121	IST 114	IST 117	IST 193	Overall IST Avg.
1	43	94	86.9	92.0	92.0	90.30
2	54	89	86.6	93.4	91.0	90.33
3	55	85	78.2	89.6	90.0	85.93

5	59	89.85	93.5	95.5	93.0	94.00
6	48	91	80.1	88.8	90.0	86.30
7	55	85	80.5	88.9	78.0	82.47
8	65	92	83.2	93.2	73.0	83.13
10	50	96	86.8	94.2	100.0	93.67
11	59	88.1	76.0	86.8	76.0	79.60
12	58	82	81.3	91.7	82.0	85.00
13	57	89.65	83.2	92.9	91.0	89.03
15	55	84	78.9	84.4	76.0	79.77
16	50	88	83.7	94.6	91.0	89.77
17	61	82	80.2	92.9	83.0	85.37
19	60	90	82.6	93.0	83.0	86.20
20	65	88.85	78.6	93.5	84.0	85.37
21	56	95	82.5	94.4	84.0	86.97
22	58	90	74.1	92.2	71.0	79.10
23	53	85	79.6	87.0	90.0	85.53
25	55	90	83.2	91.6	70.0	81.60
Σ	1116	1774.45	1639.7	1830.6	1688	1719.43

Since this class's induction to the Information Systems Technician (IT) rating, not only have the minimum entry requirements been revised and standards raised, the IT-A school now included basic computer familiarity courses that were not available to this class of students. Additionally, until O'Net comes fully online as the official DOD tool for determining job placement (rating assignment) and each individual's aptitude assessment, the U.S. Navy would still use ASVAB testing and has replaced Arithmetic Reasoning (AR) with Mathematics Knowledge (MK) as one of three factors for determining IT rating

aptitude. For this group of students, however, AR was one of two factors in their rating determination; Coding Speed (keyboard proficiency) being the second factor.

Statistical Data Analysis

To assist the reader in evaluating the collected information, a statistical analysis of the students' scores in the math section of the ASVAB test and the TCC computer course grades was done. The analysis data, rounded to the nearest tenth, provided the reader with Measures of Central Tendency (Mean, Median and Mode) and Measures of Variability (Range, Variance, and Standard Deviation). The results were presented in Table 3.

Table 3
Measures of Central Tendency and
Measures of Variance.

	ASVAB Math	Math 121	IST 114	IST 117	IST 193	Overall IST Avg.
Mean	55.8	88.72	82.0	91.5	84.4	85.97
Median	55.5	89.33	81.9	92.6	84.0	85.73
Mode	55.0	85.00	83.2	92.9	90/91	85.37
Range	22	14	22.1	11.1	30	14.9
Var (s^2)	29	15.7	18.7	8.9	68.9	18.63
Std Dev (s)	5.4	4.0	4.3	3	8.3	4.32

While there was no doubt as to the validity and reliability of the data as it relates to knowledge and skills transferred to the students, each course was

taught by different professors, using their individualized grading criteria. To compare the pure statistical results between courses, at this point with this small a sample, would have no real value in validity or reliability. To ensure statistical significance, a much greater sample size would be required.

As shown in Table 3, for TCC course GPA's within this sample, the mean varied from 82.0 to 91.5, with an average of 85.97. The median ranged from 81.9 to 92.6, with the average at 85.73. Overall, the standard deviation (SD) ranged from 3.0 to 8.3. The ASVAB, Math 121 and IST 114 GPA SD's were centered around 4.0 to 5.4, with IST 117 at 3.0 and TCC's more advanced computer course, IST 193, at the high end of 8.3.

ASVAB Math Scores Versus Technical Computer Course GPA's

This section, with the accompanying tables, dealt specifically with the correlative relationship between the ASVAB math scores and the student's performance in the Tidewater Community College computer technology courses. Using the calculations noted in Appendix D, a Pearson's r was calculated for the X_1 (ASVAB mathematics score) and Y_1 through Y_4 values (TCC numeric computer class GPA's) with results presented in Table 4.

Table 4
Pearson r results of
ASVAB versus TCC computer course GPA's

Course	r	Course	r
IST 114	-0.2438	IST 117	0.1605
IST 193	-0.5020	**IST Avg.**	-0.3664

Using a degree of freedom (df) of eighteen (N-2), this study's level of statistical significance was compared at the .05 (.4438) and .01 (.5614) levels for a two-tailed test. As presented above, the Pearson's r analysis results for TCC's two basic computer courses (IST 114 and IST 117) appeared to indicate no correlation (-0.2438 and 0.1605 respectively) and very low degree of relationship. On the other hand, the more advanced computer course, Networking Essentials, showed a moderate inverse correlation (-0.5020), which falls somewhere between the .05 and .01 levels of significance, thereby demonstrating a substantial inverse relationship. Performing a Pearson's r using the ASVAB grades and the averaged TCC computer course GPA's resulted in a correlation value of -0.3664, falling well below of the .05 level of significance.

TCC Math 121 Scores Versus Technical Computer Courses' GPA

This section, with the accompanying table, specifically addresses the correlative relationship between TCC's Fundamentals of Mathematics (Math 121) scores and the student's performance in the Tidewater Community College computer technology courses. A Pearson's r was calculated for the X_1 (Math 121 GPA) and Y_1 through Y_4 values (TCC numeric computer class GPA's), shown in the previous tables, and the results are presented in Table 5.

Table 5
Pearson r results of TCC Mathematics 121 GPA versus TCC computer course GPA's

Course	r	Course	r
IST 114	0.4080	IST 117	0.4736
IST 193	0.2474	**IST Avg.**	0.4044

Again, using a degree of freedom (df) of eighteen (N-2), this study used a level of statistical significance, for the correlative relationship between the Math 121 scores and the student's performance in the Tidewater Community College computer technology courses, at the .05 (.4438) and .01 (.5614) levels for a two-tailed test. As presented above, the Pearson's r analysis results for both of TCC's basic computer courses (IST 114 and IST 117) indicated a moderate correlation (0.4080 and 0.4736 respectively). IST 117 showed a significant relationship above the .05 level. The more advanced computer course, Networking Essentials, appeared to indicates a negligible correlation (0.2474) and very low degree of relationship. Performing a Pearson's r using the Math 121 grades and the averaged TCC computer course GPA's resulted in a correlation value of 0.4044, again, falling below the .05 level of significance.

Summary

To provide the reader with a background setting for the sample population, a Background and Computer Familiarity Self Assessment Survey was completed and the findings presented herein. This chapter also enumerated the IT University student test score data as collected from the ASVAB's Arithmetic Reasoning (AR) section and Tidewater Community College's Math 121 and computer class GPA's. To assist the reader in data evaluation, Measures of Central Tendency (Mean, Median and Mode) and Measures of Variability (Range, Variance, and Standard Deviation) were calculated and presented in

tabular format. A Pearson's r was then calculated for the student's TCC computer class GPA's versus, individually, the student's ASVAB AR scores and their TCC Math 121 GPA's and the results were presented.

CHAPTER V

This chapter summarizes the study and contains a brief and concise restatement of the background, problem, hypotheses, population, methods of data collection and analysis procedures. It also includes conclusions with regard to the hypotheses and recommendations regarding the problem statement and its significance to the U.S. Navy Information Technology University's (ITU) curriculum content and student selection criteria, as it pertains to Navy Computer System Administrator aptitude and training.

Summary

The Information Technology University (ITU) training program was the United States Navy's attempt to outsource their system administrator and LAN management training to Tidewater Community College (TCC), Virginia. In addressing program implementation, TCC's mathematics pre-requisite for advanced computer classes was discussed. This researcher felt that the mathematics pre-requisite was a holdover from the days when computer system administration required the individual to understand and read the computer code. The problem of this study was to determine if there remains any correlation between a U.S. Navy Information Systems Technology student's mathematics proficiency and college level computer System Administrator and LAN Management training course successes. Specific hypotheses that provided this researcher with a guide toward effecting resolution of this problem statement were:

$H1_0$ - For each of the 20 junior IT University sailors/students, there is no correlation between the results of the mathematics portion of the ASVAB and the student's performance in the IT University computer related technical courses.

$H2_0$ - For each of the 20 junior IT University sailors/students, there is no relationship between TCC's Math 121 (College Algebra) course results and the student's performance in the IT University computer related technical courses.

If the study results in no, or inverse, correlation, TCC and the Navy could open their computer system administrator and LAN management course enrollment to include students who have the desire and aptitude but may not have acquired the mathematics skills or credentials currently required. The information, data, results, and conclusions garnered through this research study could be incorporated into a larger, U.S. Navy-wide Information Systems Technician program analysis conducted by the Center for Naval Analysis (CNA). Some noted limitations included no control over student selection, small sample size, inferred mentor influence on the student's performance, and the typical unanticipated influences associated with a pilot program.

The data used in this study were collected from already developed and validated tests. A Background and Computer Familiarity Self Assessment Survey was developed and used to provide the study's setting and assist the reader in understanding the sample population's charactistics. The sample

group, while small and not stratified, was randomly selected, identified, and all arrangements had been made for the data collection from their service record while considering each students' right to privacy.

The data were collated and statistical Measures of Central Tendency and Measures of Variability were calculated and presented. A Pearson's r was then calculated for the student's TCC computer class GPA's versus, individually, the student's ASVAB AR scores and their TCC Math 121 GPA's.

Conclusions

The Pearson's r analysis results for ASVAB scores with respect to TCC's two basic computer courses (IST 114/117) indicated no correlation and very low degree of relationship, while the more advanced computer course, Networking Essentials, showed a moderate inverse correlation. In all instances, the analysis data supported the researcher's first hypothesis ($H1_0$) that there was **no correlation between the results of the mathematics portion of the ASVAB and the student's performance in the IT University computer related technical courses**.

The Pearson's r analysis results for Tidewater Community College's Fundamentals of Mathematics course (Math 121) scores with respect to TCC's two basic computer courses (IST 114 and IST 117) indicated a low to moderate correlation and a degree of relationship in the vicinity of the .05 level of significance. The more advanced computer course, Networking Essentials, however, indicates a negligible correlation and appreciably below the .05 level of

significance. Using the average of the computer course final GPA's, the Pearson's r fell well below the .05 level of significance. While one product moment correlation could be interpreted as significant, when viewed as a whole, the analysis data supported the researcher's second hypothesis ($H2_0$) that **there was no relationship between TCC's Math 121 (Fundamentals of Mathematics) course results and the student's performance in the IT University computer related technical courses.**

Recommendations

The observed data supported this researcher's opinion that mathematics should no longer be a factor in determining System Administrator aptitude or training requirements and may not be necessary to actually perform the job. However, because of this study's limitations, a larger sample size was needed to ensure statistical significance. The results of this study showed sufficient substantiation for continued research in the area.

Therefore, it was this researcher's recommendation that additional data collection and continued analytical research with regard to Computer System Administrator aptitude and job requirements was necessary. Alternatively, in the absence of additional data and based upon the data results in this study, it was recommended that future IT University curricula eliminate the mathematics pre-requisite for Computer System Administrator training.

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APPENDICES

Appendix A:

Student Release and Authorization to Review Service Records

Appendix B: Background and Computing Skills Self-Assessment Surveys

Appendix B-1 – Cover Sheet and Instructions

Appendix B-2- Netscape/Operating System Skills

Appendix B-3 – Word Processing Skills

Appendix B-4 – Excel/Spreadsheet Skills

Appendix B-5 – Database Skills

Appendix C: IT University Classes Schedule

Appendix D:

Formulaic Calculations of ASVAB Arithmetic Reasoning

and TCC Course GPA's

APPENDIX A

Student Release and Authorization to Review Service Records

APPENDIX A
Release and Authorization to Review Service Records

By my signature below, I hereby authorize Mr. Daniel Majkut to:

A. Review my service record to extract ASVAB mathematics test scores.
B. Review Tidewater Community College records to extract placement test mathematics scores.
C. Collect and collate my individual IT University computer class grades.

I understand that he is collecting this information for a school research project that will compare mathematics achievement to computer course success. The study's purpose is to determine if there is a correlation between student's mathematics scores and successful performance in System Administrator computer studies classes.

I understand that his final research paper will **NOT** use nor incorporate my name or any other written identification that could specifically identify me or my service record in any way. Additionally, any and all personally identifying material will be maintained in the strictest confidence.

	Printed Name	Signature	Date
1.	ABEL,KYLEEN N.	_____	_____
2.	CRAWFORD, KYLE A.	_____	_____
3.	DUNCAN, BRADFORD T.	_____	_____
4.	FANNING, FARON K.	_____	_____
5.	GARLAND, ANTHONY S.	_____	_____
6.	GARNETTE, STEPHEN E.	_____	_____
7.	HARVIN, TIMOTHY M.	_____	_____

8. ISENHOUR, STEVEN S. _____ _____

9. KUEHL, JACOB E. _____ _____

10. LASHLEY, MARK T. _____ _____

11. LUIKART, NATHAN T. _____ _____

12. MCCOY, CRAIG A. _____ _____

13. MESSER, TONY L. _____ _____

14. MOHR, BRANDON S. _____ _____

15. MURPHY, MICHAEL E. _____ _____

16. PARISH, JARED L. _____ _____

17. RINCON, JESUS (NMN) JR. _____ _____

18. SENDREY, SARAH M. _____ _____

19. SPEARS, PATRICK _____ _____

20. WHITFIELD, DEWAYNE L. _____ _____

21. COLLINS, JOSEPH L. _____ _____

22. ROEHRICH, WILLIAM L. _____ _____

23. WHITE, CRAIG A. _____ _____

24. RAYKOWSKI, JAMES C. _____ _____

25. MCCADDIN, PAMELA M. _____ _____

Note: To preserve the students' confidentiality, the line numbers in this appendix do **NOT** coincide with the student numbers as presented throughout the research document.

APPENDIX B

Background and Computing Skills Self-Assessment Surveys

Appendix B-1 – Cover Sheet and Instructions

Appendix B-2- Netscape/Operating System Skills

Appendix B-3 – Word Processing Skills

Appendix B-4 – Excel/Spreadsheet Skills

Appendix B-5 – Database Skills

APPENDIX B-1

Cover Sheet, Instructions, Personal and Background Information

Information Systems Computer Training

Computing Skills Self-Assessment Tool

Cover Sheet, Instructions, Personal and Background Information

As you are aware, everyone, from the CNO to the fleet, likes the idea and wants the IT University program to continue on indefinitely. Giving active duty sailors the opportunity to get their Associates Degree through full time college attendance seems to be a win-win situation.

The only way to ensure this program continues is to show the Navy leadership that ITU provides the Navy with benefits that outweigh its implementation costs. Those benefits can be expressed in increased recruitment or reenlistments, your fleet performance and contributions, course development cost savings, and a multitude of other less tangible considerations. This survey is intended to help determine the IT University program's effectiveness, as well as assist the Navy and the sailors that will follow you in subsequent ITU convenings.

In specific, to effectively evaluate the program's success, we need to have an accurate starting point. That is where the questions below and the attached survey sheets come in. Answering these questions accurately will give the Navy a performance baseline that can be used to judge program effectiveness.

Please try to answer all the survey questions. If you don't understand what the question is asking, check with ITCS Roby or one of the mentors.

THANK YOU FOR YOUR HELP

INSTRUCTIONS FOR PERSONAL DATA

PLEASE DO NOT PUT YOUR NAME ON THIS OR SUBSEQUENT SURVEY SHEETS.

If you have any concerns about answering any of the following questions, please discuss your concerns with ITCS Roby.

The questions on this sheet contain personal background information. This information will **NOT, in any way,** be attached to your name, social security number, or any other personally identifying data.

Please check or mark with an X in the appropriate block:

Gender:	☐ - Male
	☐ - Female
Age:	☐ - 17 to 21 years old
	☐ - 22 to 27 years old
	☐ - 28 to 150 years old
Ethnic:	☐ - Caucasian
	☐ - Black
	☐ - Hispanic
	☐ - Asian
	☐ - Other

Education completed prior to USN enlistment:

- ☐ - Do NOT have GED or graduate High School
- ☐ - GED or High School graduate
- ☐ - Technical School Graduate
- ☐ - Some College
- ☐ - Associates Degree
- ☐ - Bachelors Degree (or graduate level college)

APPENDIX B-2

Operating System/Netscape Basics Computing Skills Self-Assessment

IS Computer Training:
Computing Skills Self-Assessment Tool for Operating System/Netscape Basics

(Note: This is not an interactive form. Please print it and complete it with pen or pencil.)
For each item, answer **Yes** if you understand the concept or can perform the task with confidence. Answer **Unsure** if you are not sure of how well you know the concept or task, or don't understand the meaning of the statement. If at least one third of your answers are **No** or **Unsure**, you will probably benefit from taking the basics class. If you have any questions about this assessment tool, please contact Dan Majkut, (757) 492-7669.

Name_____ Date_____

Yes	Unsure	No	Operating System
			Turn on your computer
			Identify the make and model of your computer
			Identify the operating system and version number
			Determine the amount of memory (RAM) on your system
			Determine the size of your hard disk drive
			Get to the help system and search for a topic
			Shut down your computer correctly

Yes	Unsure	No	Graphical User Interface
			Explain the terms: icon, menu, window, click, select, drag, button
			Use the mouse to select and deselect an icon

			Use the mouse to select multiple icons
			Use the mouse to open an icon
			Use the mouse to move an icon
			Choose a command from a menu

Yes	Unsure	No	Windows
			Move, resize and close windows
			View the contents of a window using the scroll bars
			Switch among open windows
			Switch among open applications

Yes	Unsure	No	File Management
			Identify types of icons (file, folder, program)
			Copy or move a file or folder to another folder or floppy disk
			Create, rename, or duplicate a file or folder
			Find a file, a folder or another computer by its name and/or location
			Delete a file or folder
			Format or erase a floppy disk

Yes	Unsure	No	Common Conventions
			Pull-down menus
			Keyboard equivalents

			Dimmed menu item
			Dialogue box
			Thick border around a button

Yes	Unsure	No	World Wide Web via Netscape Navigator
			Explain the terms: browser, bookmark, link, search engine
			Open a URL when you know the location
			Move forward and back through pages
			Use a search engine
			Go to home page
			Create and organize bookmarks
			Search MIT web sites for help and information resources

APPENDIX B-3

Word 97/98: Basics Level 1 Computing Skills Self-Assessment

IS Computer Training:
Computing Skills Self-Assessment Tool for Word 97/98: Basics Level 1

(Note: This is not an interactive form. Please print it and complete it with pen or pencil.)
For each item, answer **Yes** if you understand the concept or can perform the task with confidence. Answer **Unsure** if you are not sure of how well you know the concept or task, or don't understand the meaning of the statement. If at least one third of your answers are **No** or **Unsure**, you will probably benefit from taking the basics class. If you have any questions about this assessment tool, please contact Dan Majkut (757) 492-7669.

Name_____ Date_____

Yes	Unsure	No	Concepts and Terms
			Know how and why to "select" text
			Understand the term "default" and the impact of changing defaults
			Understand the difference between the insertion point and the "I beam"
			Know how "AutoCorrect" and "AutoFormat as You Type" work

Yes	Unsure	No	Tasks
			Create and save a new document
			Open an existing document, change it, and save the changes
			Delete text
			Undo a previous change
			Change the font type and size

			Copy or move text from one place in a document to another
			Copy or move text from one document to another
			Switch between two open documents
			Preview a document to see how it will look when printed
			Check spelling in a document
			Three ways to move through a document
			Print a document

APPENDIX B-4

Excel Basics Computing Skills Self-Assessment

IS Computer Training:
Computing Skills Self-Assessment Tool for Excel: Basics

(Note: This is not an interactive form. Please print it and complete it with pen or pencil.)
For each item, answer **Yes** if you understand the concept or can perform the task with confidence. Answer **Unsure** if you are not sure of how well you know the concept or task, or don't understand the meaning of the statement. If at least one third of your answers are **No** or **Unsure**, you will probably benefit from taking the basics class. If you have any questions about this assessment tool, please contact Dan Majkut (757) 492-7669.

Name_____ Date_____

Yes	Unsure	No	Concepts and Terms
			Define the terms row, column, row heading, column heading
			Explain the terms cell, cell address, active cell
			Know the difference between the terms function and formula
			Understand the differences among the terms spreadsheet, worksheet, workbook

Yes	Unsure	No	Worksheet Tasks
			Create a new worksheet, enter and edit data, save the worksheet
			Select one or more cells; resize columns and rows
			Move around in a workbook
			Fill data series into cells

			Enter the same data on several worksheets
			Correct and remove data
			Delete, insert, or rename worksheets

Yes	Unsure	No	**Help and Assistance**
			Use on-line help
			Use Office Assistant

Yes	Unsure	No	**Writing Formulas**
			Build simple formulas (add, subtract, multiply, divide)
			Create formulas automatically
			Use shortcuts for writing formulas
			Use the Paste Function to create a formula

Yes	Unsure	No	**Printing Worksheets**
			Preview worksheets before printing
			Modify worksheet headers and footers, page orientation, and margins
			Print a worksheet

APPENDIX B-5

Database Basics, Level 1 & 2, Computing Skills Self-Assessment

IS Computer Training:
Computing Skills Self-Assessment Tool for Databases: Basics Level 1 & 2

(Note: This is not an interactive form. Please print it and complete it with pen or pencil.)
For each item, answer **Yes** if you understand the concept or can perform the task with confidence. Answer **Unsure** if you are not sure of how well you know the concept or task, or don't understand the meaning of the statement. If at least one third of your answers are **No** or **Unsure**, you will probably benefit from taking the basics class. If you have any questions about this assessment tool, please contact Dan Majkut, (757) 492-7669.

Name_____ Date_____

Yes	Unsure	No	Concepts and Terms
			Distinguish between characteristics of relational and flat file databases
			Define the terms field and record
			Distinguish between data and layouts

Yes	Unsure	No	Create a Database
			Create a new database
			Define database fields
			Distinguish between field types by their function
			Enter data
			Move among open files

			Move through fields and records

Yes	Unsure	No	Work with Field Definitions
			Change a field name, field type
			Add/delete fields
			Create a calculation field

Yes	Unsure	No	Work with Layout Objects
			Create and format a graphic object using the drawing tools
			Manipulate layout objects (select, move, resize, place, format, delete)
			Add text, fields and graphics to a layout
			Format text, fields and graphics in a layout
			Set formatting defaults

Yes	Unsure	No	Work with Layout Parts
			Define header, footer, and body for a layout
			Add/delete layout parts

Yes	Unsure	No	Work with Layouts
			Create a columnar layout
			Change to a different layout

			Create a mailing label layout
			Change a layout name
			Delete a layout

Yes	Unsure	No	Sort Records
			Sort records in alphabetic, number or date order
			Sort in descending order (from largest to smallest, Z to A)
			Sort using multiple fields (by department and name within department)

Yes	Unsure	No	Find Records
			Execute a simple Find request
			Use operators in a Find request (less/greater than, range, exact)
			Expand a Find request with AND, OR and OMIT

APPENDIX C

IT University Class Schedule – Special Program for Navy at Dam Neck
AAS - IST: Specialization - Windows NT
March 13, 2000 – March 2, 2001

Proposal Information for Dam Neck/TCC Training Partnership
AAS Degree in Information Systems Technology (65 Credits)
One-year Delivery with focus on Windows NT

Notes: STD 100 - Orientation to College will be waived. No credit will be granted, but the course will not be required thus reducing the total program to 65 credits (which is within the guidelines for an AAS degree). Some of the on-campus IST programs run 66-67 credits. Health electives will be met through ACE credits for experience in the military, thus reducing the program credits to be delivered by TCC faculty to 63.

Classroom space, lab space, hardware, and software to be provided by the Navy. Student textbooks and other student materials will be the responsibility of the Navy. Advanced students in the program will serve as lab assistants. Faculty instructional materials/ handouts will be the responsibility of TCC.

While the next page lists class times for each class, it may be necessary to change the meeting times to accommodate the availability of instructors and to allow for transportation time to and from campus for full-time faculty teaching in this program.

IST 114, IST 117, and MTH 121 provide content that is prerequisite to enrollment in advanced IST courses --- thus they must be offered during the first session. ENG 111 provides the student with composition skills needed throughout the entire program. Other general education offerings have been moved toward the end of the year program as requested by the Navy. The sequencing of the remaining IST classes is a combination of prerequisite requirements and instructor availability.

Monday, January 3, 2000

Class Schedule Proposal – Special Program for Navy at Dam Neck
AAS - IST: Specialization - Windows NT
March 13, 2000 – March 2, 2001

Session Number	Session Dates	Course Prefix/No.	Course Title	Number of Credits	Days Offered	Weekly Required Lecture – Lab Minutes for an 8-week offering	Suggested Class Meeting Times – Subject to Change*
1	3/13/00 – 5/5/00	ENG 111	English Composition	3	T	150 - 0 (16-week)	9:00 am – Noon
		IST 114	Fundamentals of CIS	4	MWF	300 – 200	8:45 am – Noon
		IST 117	Intro to Microcomputer Software	4	MWF	300 – 200	1:00 pm - 4:15 pm
		MTH 121	Fundamentals of Mathematics I	3	R	150 - 0 (16-week)	9:00 am – Noon
2	5/8/00 – 6/30/00	ENG 111	English Composition (continued)	~	T	150 – 0	9:00 am – Noon
		IST 106	Operating Systems	4	MWF	300 – 200	9:00 am – Noon
		IST 193	Networking Essentials	4	MWF	400 – 0	1:00 pm - 3:30 pm
		MTH 121	Fund. Of Math I (continued)	~	R	150 – 0	9:00 am – Noon
3	7/10/00 – 9/1/00	IST 133	Database: Oracle	4	MWF	300 – 200	8:45 am – Noon
		IST 193	Win NT: Workstation	4	MWF	300 – 200	1:00 pm - 4:15 pm
4	9/4/00 – 10/27/00	IST 108	Unix	4	MWF	300 – 200	9:00 am – Noon
		PLS 130	Basics of American Politics	3	TR	300 – 0	9:00 am – Noon
		IST 193	Win NT: Server	4	MWF	300 – 200	1:00 pm - 4:00 pm
5	10/30/00 – 12/15/00	IST 293	Win NT: Server in the Enterprise.	4	MWF	300 – 200	8:45 am – Noon
		IST 293	Win NT: Proxy/Server 2.0	4	MWF	300 – 200	1:00 pm - 4:15 pm
		SPD 100	Public Speaking	3	TR	300 – 0	9:00 am – 11:45 am
6	1/8/01 – 3/2/01	GEO 210	People & the Land: Intro to Cultural Geography	3	TR	300 – 0	9:00 a.m. – Noon
		IST 195	Intro – Cisco	4	MWF	300 – 200	8:45 am – Noon
		IST 295	Win NT: Exchange Server	4	MWF	300 – 200	1:00 pm - 4:15 pm

* Schedule includes minutes of instruction plus break.

Health Electives met through ACE credits for experience in the military: 2 credits
STD 100 waived.

Class scheduling contingent upon the availability of qualified instructors.

Monday, January 3, 2000

Proposed Class sessions: March 13, 2000 – March 2, 2001

Session #1 – Monday, March 13 thru Friday, May 5, 2000
Holidays: None

Session #2 – Monday, May 8 thru Friday, June 30, 2000
Holidays: May 29
Note: 7 Mondays

Break - Monday, July 3 thru Friday, July 7, 2000 (includes the July 4th TCC holiday)

Session #3 – Monday, July 10 thru Friday, September 1, 2000
Holidays: None

Session #4 – Monday, September 4 thru Friday, October 27, 2000
Holidays: September 4, October 9
Note: 6 Mondays

Session #5 – Monday, October 30 thru Friday, December 15, 2000
Holidays: November 23-24, 2000
Note: 7 Thursdays, 7 Fridays

Session #6 -- Monday, January 8 thru Friday, March 2, 2001
Holidays: January 15, 2001, February 19, 2001
Note: 6 Mondays

Monday, January 3, 2000

APPENDIX D

Formulaic Calculations Used As Input For Pearson's r Analysis

Formulaic Calculations Used As Input For

Pearson's r Analysis

Number Assigned	AR (X_1)	[AR] Squared	MTH-121(X_2)	[Math121] Squared
1	43.00	1,849.00	94.00	8,836.00
2	54.00	2,916.00	89.00	7,921.00
3	55.00	3,025.00	85.00	7,225.00
5	59.00	3,481.00	89.85	8,073.02
6	48.00	2,304.00	91.00	8,281.00
7	55.00	3,025.00	85.00	7,225.00
8	65.00	4,225.00	92.00	8,464.00
10	50.00	2,500.00	96.00	9,216.00
11	59.00	3,481.00	88.10	7,761.61
12	58.00	3,364.00	82.00	6,724.00
13	57.00	3,249.00	89.65	8,037.12
15	55.00	3,025.00	84.00	7,056.00
16	50.00	2,500.00	88.00	7,744.00
17	61.00	3,721.00	82.00	6,724.00
19	60.00	3,600.00	90.00	8,100.00
20	65.00	4,225.00	88.85	7,894.32
21	56.00	3,136.00	95.00	9,025.00
22	58.00	3,364.00	90.00	8,100.00
23	53.00	2,809.00	85.00	7,225.00
25	55.00	3,025.00	90.00	8,100.00
Σ	1,116.00	62,824.00	1,774.45	157,732.08

Student Number	IST-114 (Y_1)	[IST114] Squared	[(X_1) (Y_1)] ASVAB multiplied times IST114	[(X_2) (Y_1)] Mth121 multiplied times IST114
1	86.90	7,551.61	3,736.70	8,168.60
2	86.60	7,499.56	4,676.40	7,707.40
3	78.20	6,115.24	4,301.00	6,647.00
5	93.50	8,742.25	5,516.50	8,400.98
6	80.10	6,416.01	3,844.80	7,289.10
7	80.50	6,480.25	4,427.50	6,842.50
8	83.20	6,922.24	5,408.00	7,654.40
10	86.80	7,534.24	4,340.00	8,332.80
11	76.00	5,776.00	4,484.00	6,695.60
12	81.30	6,609.69	4,715.40	6,666.60
13	83.20	6,922.24	4,742.40	7,458.88
15	78.90	6,225.21	4,339.50	6,627.60
16	83.70	7,005.69	4,185.00	7,365.60
17	80.20	6,432.04	4,892.20	6,576.40
19	82.60	6,822.76	4,956.00	7,434.00
20	78.60	6,177.96	5,109.00	6,983.61
21	82.50	6,806.25	4,620.00	7,837.50
22	74.10	5,490.81	4,297.80	6,669.00
23	79.60	6,336.16	4,218.80	6,766.00
25	83.20	6,922.24	4,576.00	7,488.00
Σ	1,639.70	134,788.45	91,387.00	145,611.57

Number Assigned	IST-117 (Y_2)	[IST117] Squared	[(X_1) (Y_2)] ASVAB multiplied times IST117	[(X_2) (Y_2)] Mth121 multiplied times IST117
1	92.00	8,464.00	3,956.00	8,648.00
2	93.40	8,723.56	5,043.60	8,312.60
3	89.60	8,028.16	4,928.00	7,616.00
5	95.50	9,120.25	5,634.50	8,580.68
6	88.80	7,885.44	4,262.40	8,080.80
7	88.90	7,903.21	4,889.50	7,556.50
8	93.20	8,686.24	6,058.00	8,574.40
10	94.20	8,873.64	4,710.00	9,043.20
11	86.80	7,534.24	5,121.20	7,647.08
12	91.70	8,408.89	5,318.60	7,519.40
13	92.90	8,630.41	5,295.30	8,328.49
15	84.40	7,123.36	4,642.00	7,089.60
16	94.60	8,949.16	4,730.00	8,324.80
17	92.90	8,630.41	5,666.90	7,617.80
19	93.00	8,649.00	5,580.00	8,370.00
20	93.50	8,742.25	6,077.50	8,307.48
21	94.40	8,911.36	5,286.40	8,968.00
22	92.20	8,500.84	5,347.60	8,298.00
23	87.00	7,569.00	4,611.00	7,395.00
25	91.60	8,390.56	5,038.00	8,244.00
Σ	1,830.60	167,723.98	102,196.50	162,521.82

Number Assigned	IST-193(Y_3)	[IST193] Squared	[(X_1) (Y_3)] ASVAB multiplied times IST193	[(X_2) (Y_3)] Mth121 multiplied times IST193
1	92.00	8,464.00	3,956.00	8,648.00
2	91.00	8,281.00	4,914.00	8,099.00
3	90.00	8,100.00	4,950.00	7,650.00
5	93.00	8,649.00	5,487.00	8,356.05
6	90.00	8,100.00	4,320.00	8,190.00
7	78.00	6,084.00	4,290.00	6,630.00
8	73.00	5,329.00	4,745.00	6,716.00
10	100.00	10,000.00	5,000.00	9,600.00
11	76.00	5,776.00	4,484.00	6,695.60
12	82.00	6,724.00	4,756.00	6,724.00
13	91.00	8,281.00	5,187.00	8,158.15
15	76.00	5,776.00	4,180.00	6,384.00
16	91.00	8,281.00	4,550.00	8,008.00
17	83.00	6,889.00	5,063.00	6,806.00
19	83.00	6,889.00	4,980.00	7,470.00
20	84.00	7,056.00	5,460.00	7,463.40
21	84.00	7,056.00	4,704.00	7,980.00
22	71.00	5,041.00	4,118.00	6,390.00
23	90.00	8,100.00	4,770.00	7,650.00
25	70.00	4,900.00	3,850.00	6,300.00
Σ	1,688.00	143,776.00	93,764.00	149,918.20

Number Assigned	Overall IST Avg. (Y_4)	[Overall IST] Squared	[(X_1)(Y_4)] ASVAB multiplied times IST Avg	[(X_2) (Y_4)] Mth121 multiplied times IST Avg
1	90.30	8,154.09	3,882.90	8,488.20
2	90.33	8,160.11	4,878.00	8,039.67
3	85.93	7,384.54	4,726.33	7,304.33
5	94.00	8,836.00	5,546.00	8,445.90
6	86.30	7,447.69	4,142.40	7,853.30
7	82.47	6,800.75	4,535.67	7,009.67
8	83.13	6,911.15	5,403.67	7,648.27
10	93.67	8,773.44	4,683.33	8,992.00
11	79.60	6,336.16	4,696.40	7,012.76
12	85.00	7,225.00	4,930.00	6,970.00
13	89.03	7,926.93	5,074.90	7,981.84
15	79.77	6,362.72	4,387.17	6,700.40
16	89.77	8,058.05	4,488.33	7,899.47
17	85.37	7,287.47	5,207.37	7,000.07
19	86.20	7,430.44	5,172.00	7,758.00
20	85.37	7,287.47	5,548.83	7,584.83
21	86.97	7,563.20	4,870.13	8,261.83
22	79.10	6,256.81	4,587.80	7,119.00
23	85.53	7,315.95	4,533.27	7,270.33
25	81.60	6,658.56	4,488.00	7,344.00
Σ	1,719.43	148,176.54	95,782.50	152,683.86