

**THE DIFFERENCES BETWEEN MALE AND
FEMALE EIGHTH GRADE STUDENTS
USING IBM COMPUTER SKILLS**

By

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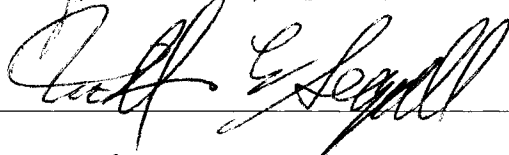
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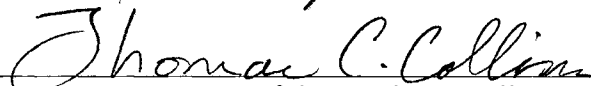
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CHAPTER I

THE RESEARCH PROBLEM

Introduction

Ten years ago in 1985 the researchers pointed to the statistics which showed the young females were lagging behind the males in math and science scores. The percentage of boys in higher level thinking math courses outnumbered the girls. Now the percentage of young females in college preparatory classes has increased and the percentage of young males has decreased. (Bushweller, 1994). A 1993 study by the U.S. Department of Education found that among high school seniors, more girls than boys (35 percent versus 31 percent) expect to continue their education beyond college. Psychologists and educators encourage communities to learn to cope with and appreciate the differences between boys and girls.

If males and females use computers differently, this could lead to differences in accumulated computer knowledge and, as a consequence, career opportunities (Linn, 1985; Lockheed, 1985). If, according to Kiesler (1985), girls find computers particularly alien or unpleasant, they will be relegated to the status of second class citizens in the world of computing. Conversely, if according to O'Brien (1994), females are demonstrating higher levels of academic achievement than males, researchers may need to concentrate on assisting the males to learn.

This study collected information to begin to determine if discernible differences exist between junior high male and female computer use. The study described computer skills used with three different basic computer

concepts: a word processor, a spreadsheet, and a database programs. Using a word processing program, the students learned how to create, save, and modify a document. Several researchers have found that the use of word processing software results in higher quality writing skills, due to the ease with which students can edit their work. The students learned to create and save a spreadsheet which involves using formulas and other math skills. One study that compared computer-assisted instruction with traditional learning found that the CAI students scored significantly higher on a test of basic math skills (Geiger, 1994). Using the database package, students learned how to create a name and address file, add, sort, list and modify records.

In years past, researchers seemed to have difficulty with the idea that boys and girls are equally capable of achieving the computer skills necessary to perform the basic computer tasks. There seemed to be a tendency for boys to be the predominant computer users (Jones, 1987) and so girls seemed reluctant to become involved with computer classes, perhaps because emphasis was on a machine. Girls have traditionally avoided most machines. The violent theme of most computer games still fail to appeal to the female computer use. Studies in 1985 showed that females were less likely to enroll in computer courses than males (Linn, 1985). Males showed considerably more interest in computers than females, and thus are better prepared to develop computer skills. Due to the perception that computers were math-based, females were less prepared for computer work than the males. Girls would be left behind in an increasingly technological society without these computer mastery skills.

Several studies have indicated that sex-related differences in computer use between males and females did exist (Collis, 1985, 1988; Lockheed, 1985). Males may use computers more than females for programming and

game playing, but such differences may not exist between males and females using computer applications. Even though females were poorly represented in courses with the greatest potential for higher cognitive skills, once enrolled in computer classes, they were very successful (Linn, 1985). In contrast now reports and studies are concerned with the male dropout rate, classrooms that discourage high energy learners like boys, and the high rate of males labeled learning disabled (O'Brien, 1994).

Statement of the Problem

If the computer provides access to new sources of information and possible new job opportunities, we, as educators, need to encourage both boys and girls to more effectively learn computer skills in their computer classes. Having taught at the Junior High level, this researcher believes that there are important questions regarding the competencies of both boys and girls in the use of three basic software programs: the word processing program, the spreadsheet program, and the database program.

Most of the students had never used Microsoft Works previously. Even the students with home computers were not spending their time on databases or spreadsheets. Those students who knew Microsoft Works had only written a letter. No students were found who chose to learn the spreadsheets or the databases on their own.

Purpose of the Study

This study was done in a suburban midwestern junior high school with eighth grade computer students. The purpose of the study was to determine if there was a significant difference in computer skills achievement between boys and girls measured by the Microsoft Works test. Microsoft Works is a standard computer application program consisting of three subprograms: word processing, spreadsheet, and database. The word processing portion is used for writing letters, creating stories, and building other larger documents. The spreadsheet program is an accounting worksheet program used to handle the mathematics of accounting. The data base program is used to build a large collection of information on a specific topic; such as, names and addresses so that the data is easily sorted or manipulated. Specifically, the study looked at the computer skills necessary to operate these programs rather than program mastery alone. Microsoft defines computer skills as the ability to use basic commands such as OPEN, CLOSE, PRINT or SAVE. This study attempted to determine if there was an equal ability of both boys and girls to perform these functions which enable effective use of the programs.

Definition of Terms

- * Database - A collection of related information.
- * Edit command - Edit menu command which allows changes to be made.
- * File - Information created by Works which is used to store data.
- * Format - Format command that changes the appearance of the work.
- * Menu - A list of commands that are available at a particular point in the program.

- * Open command - File menu command used to open a document from the disk or network.
- * Print command - Print menu command which prints the file currently on the screen.
- * Save command - File menu command used to save a document on disk or network.
- * Spreadsheet - Rows and columns of data on which calculations can be performed.
- * Word Processor - A computer application program that allows text to be entered, edited, and stored.

Significance of the Study

All students will be slighted in our educational system if they are not encouraged to pursue higher cognitive skills classes. A good foundation in problem-solving will be necessary to meet the demands of our future market place with appropriate jobs skills. Both boys and girls are very capable of accomplishing computer tasks. It has been argued elsewhere certain computer courses should be required for all students (Sanders, 1985).

Basic computer training could be provided for all students. In addition, increased optional computer time would benefit many students, as teachers and students work together to learn and develop computer skills. Improving the quality and emphasis of the computer course work will benefit females, as well as males. Most jobs in the twenty-first century will require computer expertise. Educators need to adequately prepare our students for future employment and a life time of learning.

Assumptions

Microsoft Works is a common computer application package since it is enclosed with every IBM PC machine currently sold. These skills are used in other packages such as Word Perfect, Excel, and dBase I, but the concepts are similar. The same concepts of Open, Close, and Save are also used on graphics packages such as Harvard Graphics or Express Publisher.

Word processing, spreadsheet, and databases are the three basic computer skills that students need to know to be computer literate. Most computer occupations begin with and continually make use of these three programs in job assignments. All business correspondence would use some form of word processing. All business accounting procedures are on spreadsheet programs. And all addresses of suppliers and customers would be built on a database. Thus, these three programs were selected as the ones most necessary for students to compete in future marketplaces.

Finally, the Microsoft Works Tutorial is a part of the total program that is associated with learning necessary skills on the computer. The Tutorial program will present the same set of skills, in the same order, in precisely the same way for each student learning each skill. Some students learn better this way and some do not, but they have equal opportunity to make use of the information available. The Tutorial idea can be used on other packages as well as help screens. This thought process can be introduced using these tutorials as we encourage the students to search for their own answers and learn at their own pace.

Limitations

One major limitation of this study is that the subjects were not randomly assigned initially. These students will not represent a true picture of a global population of eighth graders because this study selects for students who are interested in the computer. Additionally, this was an elective class which implies that the students voluntarily signed up to be in computers. Testing uninterested students on computer skills may not yield the same results.

Another limitation may be the various biases of the programs. The word processor program may be biased toward girls due to its writing basis (Lockheed, 1985). The spreadsheet program may be biased toward boys, because it is perceived to be mathematically based (Hawkins, 1985). The database is not perceived to be biased toward either boys or girls because it seems to be perceived more as a tool (Lockheed, 1985). In summary, the use of all three programs may balance the possible innate biases of each individual program.

A final limitation concerns the fact that a different group of 44 students will be tested each nine weeks during an average school year. Thus, the students tested the first nine weeks may be more eager or otherwise have different attitudes than those tested at the end of the school year. The study will demonstrate that the differences or lack of differences between the boys and the girls are maintained throughout the year.

Summary

In Chapter II the Review of Literature covers studies that include broad bases of computer teaching versus standard teaching methods. Several studies cover sex differences in secondary schools. Some differences are noted in the studies done ten years ago and those that are more current. These studies demonstrated that girls relate to the machines and work differently than the boys. Four examples of computers application curriculum that have worked well with girls are reviewed. Finally, some suggestions are covered for future females assistance.

In Chapter III the method for conducting the study is explained. The study compared test scores between girls and boys for seventy-five eighth grade computer students on three basic concepts of computer literacy: the word processor, the spreadsheet, and the data base. After teaching the students the three skills, they were tested using the corresponding introductory tests for Chapter 2,5,8 in the Microsoft Works textbook.

CHAPTER II

REVIEW OF LITERATURE

Introduction

A brief overview of differences between males and females using the computer is presented. If males and females approach the computer world differently, how does this behavior emerge in the computer classroom? Is one way of dealing with the computer challenge superior to another? A review of the literature that follows outlines previous studies that have been conducted concerning differences between males and females on IBM PC computers. The first group covers the overall hidden effects of computer use on boys and girls. The second group demonstrates some of the sex differences in secondary schools. The third group of studies suggests some applications that appear to be helpful to girls. And the last group mentions possible future assistance for females in computer classes.

Overall Hidden Effects

Broad ideas concerning computers in education range from the hidden effects of technology on boys and girls (Apple, 1988) to how the curriculum affects gender (Freedman, 1988). In the late 1970s and early 80s our society initiated a rather strong emphasis on acquiring necessary computer skills in our schools. The idea was to create a workforce more able to use technology efficiently. However, Apple (1988) questions whether the computer will

actually make teaching more creative and interesting and, thus, more effective. He admonishes educators to make certain that the computer is actually providing a heightened level of learning in comparison to the original methods that teachers have developed over many years. Another question that he raises is how will the computer change the pedagogical relationship in the classroom? Is this change necessarily an improvement?

"Two out of every three students currently learning about computers are boys. Even here these data are deceptive, because girls tend to be clustered in the general introductory courses, not the more advanced level ones (Apple, 1988.)"

Apple continues to note that computers have their basis in math and science in most schools, where gender differences are heightened even more due to the different treatment given girls. Our task as educators is to make wise use of computers to promote a bright future for coming generations of both male and female students.

Freedman (1988) studies a different set of general questions. She suggests that the computer as a learning method fails to value the personalized adaptation of the ideas by the teachers and their students. She notes that inside the classroom the principle adults are women, while outside the classroom the decision-makers are principally men. Therefore, some of the educational decisions may be biased in favor of one gender over the other.

On the other hand, Crist (1985) recommends an overall integration of humanistic psychology and computing to meet the goals of both teacher and students. In humanistic education the computer removes pressure from the teachers to be the authority so that both the students and the teacher can

become comfortable with interdependency in problem-solving efforts. Crist states that computing can be fun, because it feels good to control a sophisticated machine. The computer will also enable teachers to focus on learning as a process in "learning how to learn" rather than a product.

Sex Differences in Secondary Schools

The second major element found in the literature discussed sex differences in the secondary schools. Several studies published in the mid 1980s demonstrated that there were distinct sex-related differences in computer use between males and females. In 1985, a study was made to present empirical evidence regarding the learning styles of sex-related differences in computer use (Lockheed, 1985). A higher proportion of computer students were male than were female, particularly in computer programming courses. The results indicated that males use computers more than females for programming and game-playing, but not for other computer applications. Computers located in computer centers and video arcades with games built around wars, crimes, destruction and other male-oriented sports are dominated by males (Kiesler, 1985; Lockheed, 1985).

Girls can enjoy the computer, according to Lockheed, but they had no wish to fight the boys for a turn. Young women were not given adequate support to learn about computers. Girls were very interested in taking more word processing and art computer courses (Lockheed, 1985).

Collis (1985) joined with others to suggest strongly established sex differences existed in attitudes toward computers with females that were consistently less positive, less interested and less self-confident than males. Secondary school females may be perceived as less likely to participate in

computer activities or even use school computers. Males indicate more self-confidence about their potential with computers than do females. Students' attitudes toward math and science are mildly predicative of their attitudes toward computers. Males are more likely than females to have played computer games or otherwise to have used the computer outside of the classroom (Collis, 1988).

An additional sex-related difference article reiterated the idea that computers tend to be associated conceptually with math and science (Reisman, 1990). Thus, Hawkins (1985) notes that sex differences emerge in the relation to functions computers serve and the organization of learning settings. The females seem to be more negatively affected by the degree of competition. They appeared less confident where there was little feedback or praise. Conversely, the girls' interest increased when they were working on software that contained graphics tools that allowed them to create and design. The emergence of sex differences in relating to learning and achievement on the computer is a complex problem, including previous background of the girls, the expectation of different life goals, and the structure and purpose of the learning tasks (Hawkins, 1985).

Conversely, Bushweller (1994) was concerned about our males in school. Boys have a greater chance than girls of being born with genetic problems and a greater chance of developing slowly. Boys tend to be more hyperactive and aggressive. Much of the recent research in the area of gender equity appears to focus on girls and neglect boys. Some researchers argue that girls have made tremendous strides in terms of education. Higher percentages of girls than boys now take high school chemistry and biology classes. The number of women who receive doctorate degrees has

dramatically increased. Boys tend to brag more, but they appear to be less self-confident.

O'Brien states that:

"Female students tended to be more concrete in their learning styles than male students, and as a group were more homogeneous. . ."

He demonstrated that gender has an impact on the development of abstract thought (O'Brien, 1994). Male and female students tend to differ significantly in academic achievement as measured by grade point average.

In a final study of gender inequality in computing, Reisman (1990) indicated that males receive greater support and encouragement to be computer users from our society. She sees that the computer has conformed to society's standards by maintaining the status quo. The study demonstrated that males and females approach the computer in different ways. The males read the programs better; the females scored high marks in thinking abstractly about problem analysis. The males preferred structure with hard and fast rules. The females approached the problems as a communication problem. These studies do not suggest a superiority of one sex or the other in the ability to use the computers, just a difference in the way they approach learning.

Helpful Applications

More specifically, the next group of application articles discusses the fact that educators and researchers are beginning to develop various methods to address the sex inequities that exist. Clark (1986) conducted a study with elementary school girls using LOGO. The games provided opportunities to

learn LOGO commands and develop skills in estimating angles. The results showed that the LOGO experience had a positive effect on general ability and on the interest in learning mathematics. Noss (1988), also, showed good results in offering children the opportunity to succeed at mathematical tasks on the computer using LOGO. His results demonstrated differences between boys and girls on geometric skills were minimal.

Forsyth (1989) conducted a class with a geography type of software, in which no gender differences were found in either attitude or achievement. Girls and boys liked the game and were interested in playing again. It was a nonviolent game and only mildly competitive. Forsyth's conclusion centered on the fact that girls can enjoy and learn from the computer. Computer avoidance by females is not inevitable.

One study indicated that group learning is an efficient, valuable strategy for teaching computer applications, especially for girls (Kacer, 1991). Kacer investigated cooperative learning of application programs (e.g. word processing, spreadsheets, and databases). She used computer application programs in a group setting. She instructed teacher education students on AppleWorks for three weeks. Then she measured their attitudes about computers before and after the instruction. Kacer concluded that group learning is an efficient and valuable strategy for teaching computer applications, and that the promoted interaction of group learning may foster additional higher level learning skills.

In addition, another researcher, Signer (1991), made computerized assessment an integral part of remedial high school math. She developed a program called Math-R-Us for at-risk female minority urban high school students. When the students completed all of the math problems with high accuracy, a reward screen would appear. When the computer indicated an

error, the students would engage in conversation about the computer's mistake. The results of the study showed that girls exhibited greater self-confidence towards using computers and towards math after the intervention.

In addition, Owston (1991) conducted an extensive study concerning eighth grade students' writing skills on and off the computer. Computer prepared work was significantly better in overall quality and better on the competence and mechanics of the paper for both boys and girls. These observed differences may be due to the superior spelling, longer length, or the positive attitude of the students. The range of these projects indicates that educators have an interest in determining the best process of using computers as a tool to increase the knowledge and skills of both boys and girls (Owston, 1991).

Possible Future Assistance for Females

In the final group of studies concerning future educational possibilities, several researchers suggest different programs to assist girls with computers. One researcher adds seven suggestions for policy enactment by school boards to address the problems of sex equity in school computer use (Sanders, 1985). Although 40% of the boys used the computer in their free time, only 8 % of the girls used them. The girls say that the main reason for this is their friends are not there using the computers. Sanders (1985) demonstrates that media (television ads, and computer magazines) consistently portray computers as male-oriented.

Another factor tends to be the macho nature of many of the recreational games. Many games are based on the win/lose pattern, conflict situations and violence that the girls are not interested in. Sanders' solutions

increased optional access to computer time, or required students to take specific computer courses. Another idea was assigning women to the computer staff to provide the girls with role models.

Collis's suggestion for encouraging girls in computer use is to utilize the positive feelings that females have often demonstrated toward writing and communication. Efforts could be introduced that would use the computers' word processing capabilities as part of English classes, instead of solely promoting science and math activities (Collis, 1985).

Linn (1985) writes about possible future actions which foster equitable results from computer learning environments. She discusses potential advantages of computer use; such as, the interactive environment, and detailed feedback that computers could provide to the students. Males and females had similar general ability in computer programming, although males had more previous experience and more interest in computers. Linn (1985) concluded that middle school females perform as well as or better than males given a fairly structured computer learning environment. Yet females were over represented in the word processing courses and under represented in the programming courses.

Watson (1988) suggested various database activities students can accomplish even in a one computer classroom to prepare students to get the facts and use them afterwards. A database potentially allows students to go beyond the facts to higher level thinking skills so that they can explore the meaning of the facts. They can also use the data file to answer questions and test hypothesis of the specific facts that they collected.

Striebel (1988) presented a critical analysis of three approaches to computer education. He covers drill-and-practice, tutorial, and intellectual tools computer programs. All approaches have serious limitations with some

short-term benefits. The drill-and-practice approach shows a deterministic, behavioral technology, but it may alter the nature of learning secondary skills. The tutorial programs are also shaped by some other agent than the teacher and must be confined to computer algorithms which restricts personal learning. The intellectual tools limit the learner's mental landscape to objective, quantitative and procedural tools. Together these tendencies represent a shift towards technological education, which Streibel questions.

Finally, Davis (1992) described a new structure for electronic communications in education, in which computer nodes are linked together using national networks. Such systems are already in place. Davis reported on one link between the United Kingdom and Virginia University that has been very successful. Now educators need a way to enhance education and training by sharing information when and where appropriate.

Hypothesis

Based on research conducted by Apple (1988); Bushweller (1994); Clark (1986); Collis (1985, 1988); Crist (1985); Davis (1992); Forsyth (1989); Freedman (1988); Geiger (1994); Hawkins (1985); Kacer (1991); Kiesler (1985); Linn (1985); Lockheed (1985); Noss (1988); O'Brien (1994); Owston (1991); Reisman (1986); Sanders (1985); Signer (1991); Streibel (1988) and Watson (1988), the following hypotheses were formed:

Hypothesis One: There will be no significant difference between eighth grade boys and girls on Word Processing skills achievement as measured by Microsoft Works test.

Hypothesis Two: There will be no significant difference between eighth grade boys and girls on Spreadsheet skills achievement as measured by Microsoft Works test.

Hypothesis Three: There will be no significant difference between eighth grade boys and girls on Database skills achievement as measured by Microsoft Works test.

Hypothesis Four: There will be no significant difference between eighth grade boys and girls on overall computer skills achievement as measured by Microsoft Works test.

CHAPTER III

METHODOLOGY

Introduction

The population of two hundred and two participants for the study were eighth grade computer students in a midwestern public junior high school. They were assessed on common computer skills. The instrument used was the Microsoft Works test. Each student was taught computer skills using three common application programs from Microsoft Works; i.e., the word processor program, the spreadsheet program, and the database program. The analysis of data compares the boys and the girls test scores to determine if the boys or the girls are more skilled with computer use.

Subjects

Located near a larger city, this small bedroom community has a school district of over 5,000 students. There are six grade schools, one middle school, one junior high and one high school. The junior high school consisted of eighth and ninth grade students numbering close to 900. One hundred and sixty eighth grade computer students from this suburban midwestern junior high school were given instructions on Microsoft Works on IBM 386 PC computers. The students were not randomly selected initially, since the class assignments were already determined. The number of male students was close to the number of female students. The population

was predominately Caucasian. Approximately 30% of the students had home computers, which were largely used for games. They were tested first and second hour in the mornings. This was their first computer class on twenty-two networked IBM PC computers, since the previous school they attended had Apple II computers.

Instrument

The test was obtained from Microsoft Works. The tests corresponded to Chapters 2, 5, and 8 of the textbook An Introduction to Computing Using Microsoft Works by Bruce Presley and William Freitas, Lawrenceville Press, 1993. Only the introductory tests associated with Chapter 2 for word processing, Chapter 5 for databases, and Chapter 8 for spreadsheets were given. These tests measured the introductory skills necessary to achieve computer mastery on word processing, spreadsheets, and databases.

The Computer Competence Test Module 3A, which is published by the Psychological Corporation, for Applications was used. It was written in 1986 and normed on 6,880 junior and senior high school students. There is a Ready Score Answer Document with each module, directions for administration, and a manual included. The test has reliabilities ranging from .73 to .85. Validity studies are proceeding, which is the only apparent shortcoming of the test, yet a more current test would be preferred.

Procedure

The design in this study is a noncomparative design. The use of intact classrooms was necessary. This design lacked random sampling. After consulting with the school administrators to gain permission to conduct this study (Appendix A), it was conducted in the computer classroom where the IBM PC network was available. It is the only computer lab in the school. Written permission to have their child participate in the study was obtained from the students' parents or guardians, as well as the students themselves (Appendix A).

The study lasted three weeks with each group. The researcher met with each group for one hour every school day. The novelty effect seemed irrelevant due to the fact that the same subject material was used for all of the students in this class. This noncomparative study tested male and female eighth grade computer students and compared their computer skills on three common application programs.

The first week the students were introduced to word processing. They covered three lessons on the Works Tutorial program under word processing. These lessons included: Tour of Word Processing, Entering Text, and Editing. They completed two practice letters, which covered the necessary computer skills. At the end of the week they developed a letter of their own. Then they were administered the introductory word processing Microsoft Works Chapter 2 test.

The following week the students were introduced to spreadsheet skills. They completed three lessons on the Works Tutorial under spreadsheets and two practice assignments on spreadsheet skills. These Tutorial Lessons included: Introducing the spreadsheet, Entering text, and Adding formulas.

At the end of the week they entered a spreadsheet with formulas of their own, and were tested on the introductory spreadsheet Chapter 8 test.

Finally, the students covered databases in a similar manner. They covered the Tutorials and built a database of 30 cars including information on the cars' features. At the end of the week they were tested on the introductory database Chapter 5 test. The same teacher taught all of the computer skills and the same tests were used.

Summary

All three tests scores had means and standard deviations calculated. Frequencies were charted on each test separately for boys and girls to see if there is significant difference between the means of the boys and the girls groups on each part: (1) word processing; (2) spreadsheet; (3) databases. Frequencies were charted on each of the three tests for the students overall.

CHAPTER IV

DATA ANALYSIS

Introduction

The purpose of the study was to determine if there was a significant difference in computer skills achievement between males and females measured by the Microsoft Works test. Microsoft Works Introductory Tests were given in three areas: word processing, spreadsheet, and database. Copies of the tests can be found in Appendix B. Specifically, the study looked at the computer skills necessary to operate these programs rather than program mastery alone. This study attempted to determine if there was an equal ability for both boys and girls to manipulate the machine. Tests were given to two hundred eighth graders in their computer class at one week intervals. Only seventy-five consent forms were returned, consequently, only these test results were used. The results are comprised of thirty-three females' scores and forty-two males' scores.

Statistical Comparisons

In Appendix C charts can be found of Frequency Distributions. The males' Word Processing Test 1 scores in one point intervals were somewhat positively skewed as shown in Table I. There were fewer scores in the 10-17 point range than in the 20-25 point range. The males' Spreadsheet Test 2 scores in one point intervals were more normally distributed, although more students were still in the 20-25 point range. The males' Database Test 3 scores were lower overall than the other two tests. The scores were more

positively skewed with an unusually large portion of students scoring in the 13-14 point range.

The females' Word Processing Test 1 scores in one point intervals were positively skewed as shown in Table II. There were fewer scores in the 10-19 point range than in the 20-27 point range. The females' Spreadsheet Test 2 scores in one point intervals were also skewed positively with more students in the 17-18 point range. The number of students who scored 17 and 22 were quite high in comparison to the other scores. Like the male test results, the females' Database Test 3 scores were lower overall than other two tests. The scores were more normally distributed with a unusually large portion of students scoring in the 11-13 point range.

The Frequency Distribution for both males and females together on Test 1, the Word Processing test, was positively skewed as shown on Table III. The majority of the students scored between 20 and 25 points. On the second test, the Spreadsheet test, the distribution was also positively skewed. Most of the students scored between 16 and 23 points. The third group of tests, the Database test, showed a normal distribution of points with the highs between 12 and 15 points. These scores were noticeably lower than the other two test results.

Table IV shows the Frequency Analysis for Test 1, 2, and 3 for all of the students overall with reference to global normal distribution.

The data in Appendix D in Table V shows a summary of the overall mean scores for the total population, as well as the mean scores for males and females separately. In the Word Processing Test, shown as Test 1, the females had a slightly higher score than the males mean score, 23.03 and 21.69, respectively. The Spreadsheet test results, shown as Test 2, showed females and males with very similar scores, 19.79 for females and 18.76 for

males. Finally, the Database tests appeared the most difficult for the students to master with mean scores for the males, 12.20, and the females' score 13.15 about equal.

Table VI shows the means with the standard deviations for the three tests in table form. For the boys on the Word Processing Test 1 the mean was 21.69 with a standard deviation of 4.16. Spreadsheet Test 2's mean was 18.76 with a standard deviation of 4.76. And the results for Database Test 3 showed a mean of 12.21 (sd=3.85). For the females on Word Processing Test 1 the mean was 23.03 with a standard deviation of 2.64. Spreadsheet Test 2's mean was 19.79 with sd of 3.04. And Database Test 3 showed a mean of 13.15 (sd=2.52).

In dividing the students by quarters, the first quarter students had the highest scores. The third quarter students had the lowest. This phenomenon has been observed by teachers that the students third quarter grades are often the lowest. The first quarter are usually the highest when the students are new to school. After the New Year holidays the students seem to relax or not be as concerned with their work.

In the first quarter no rewards for returning the forms were offered to the students and fourteen out of forty-four or thirty-two percent were returned. During the second quarter bonus points were offered for returning the form. Eighteen forms out of forty-four were returned or forty-one percent. Free time on the computer game of their choice was offered to the third quarter group. Twenty seven forms out of forty-four or sixty-one percent were returned. The particular mix of the students in the class could be a contributing factor or the reward system may have played a part in the forms' return.

For a year before the study an informal survey of the students was taken with a show of hands. There were students who had computers at home, but no one was working on the spreadsheet or the databases. Only a few students had seen a word processor. Most of the students had no previous experience on this software. The students, for the most part, had never even heard of spreadsheets or databases. Their previous experience consisted of reading and writing simple stories on Apple IIe equipment in the middle school with emphasis on writing. So no formal pre-test was given.

CHAPTER V

RESULTS, RECOMMENDATIONS, AND SUMMARY

Introduction

Although more research needs to be conducted concerning the differences between male and female computer competency, this study shows no statistically significant difference between males and females concerning computer skills. In the Word Processing Test 1 the females slightly outperformed the males. The Spreadsheet Test 2 showed females and males had equal performance. And the Database Test 3 appeared the most difficult for both groups of students, but it also showed equal performance.

Results

The results of the study indicate that both males and females are capable of learning the skills necessary to operate a computer. In some ways the students appeared to be more adept at functioning on the machines than they did taking the paper-and-pencil Microsoft tests. They can click on words to make the computer operate as they wished without really understanding why they performed this activity. They shared their information quickly and easily with their neighbor on the computer, but, of course, were not assisting each other during the test. Their understanding of letter writing skills appeared to be more advanced than their knowledge of database manipulation.

Initially, the researcher assumed due to the tests biases that the females would outperform the males on the word processor. Conversely, the males would outperform the females on the spreadsheet software due the math bases of the spreadsheet. The students would perform similarly on the database since no biases could be determined. With the word processing test results skewed towards the females, the spreadsheet test skewed toward the males, and the database test results similar, the overall test results would be equal.

However, based on the mean scores on Test 1 the males and females showed equal ability to learn word processing skills, which supports Hypothesis One. The mean scores on Test 2 demonstrated that both males and females are equally capable of learning the necessary skills required on spreadsheets, which supports Hypothesis Two. Finally, the mean scores on Test 3 the database were similar as noted in Hypothesis Three. Moreover, the males' test scores and the females' test scores overall for all three tests were not significantly different which supports Hypothesis Four.

Recommendations for Further Research

The study of the differences between males and females in computer competency has barely begun. Recommendations for further research that have been prompted by this study include:

- (a) conducting a study using students from a different age group than eighth graders. High school students may show different results.
- (b) conducting a similar study but use the actual work done on the computer and compare the results by number of assignments finished or other chosen factors.

- (c) repeating the same study using other testing instruments associated with the same computer skills.
- (d) repeating the same study using more than one week intervals to see if additional time spent on the subject would increase overall competencies.

Summary

This study collected information to determine if discernible differences exist between junior high male and female computer use. The study described computer skills used with three different basic computer concepts: a word processor, a spreadsheet, and a database programs. Using a word processing program, the students learned how to create, save, and modify a document. The students learned to create and save a spreadsheet. Using the database package, students learned how to create a file, add, sort, list and modify records.

The study concluded that there was not a significant difference between the ability of the males and the ability of the females to demonstrate computer skills. The Word Processing Test results, the Spreadsheet Test results and the Database Test results showed that the students performed similarly. Both males and females are equally capable of learning the associated computer skills

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APPENDIXES

APPENDIX A
LETTER TO PRINCIPAL

January 1, 1994

Mr. Ted Vancuren, Principal
Owasso Junior High School
13901 East 86th Street North
Owasso, Oklahoma 74055

Dear Mr. Vancuren:

I am working on my Masters at Oklahoma State University. I plan to conduct a study this year as a part of my thesis. With your permission the study will be run in the computer classroom as part of the regular assignments and the tests will be done there. Three tests will be given on Word Processing, Spreadsheets, and Databases. The test results will be completely confidential in the study, because we will use numbers instead of names for the students.

I have enclosed a copy of the consent form for the study and a copy of the tests that will be used. Thank you for your assistance on this project.

Sincerely,

Carol A. Guertin
301 Gundersen
Oklahoma State University
Stillwater, OK 74078

CONSENT FORM

"I, _____, hereby authorize or direct

Carol Guertin to perform the following procedures:"

1. Give Microsoft Works test Chapter 2 on Word Processing.
2. Give Microsoft Works test Chapter 8 on Spreadsheets.
3. Give Microsoft Works test Chapter 5 on Databases.

The study will take three weeks and run simultaneously with the regular classroom procedures. The tests will be introductory in nature and will be given after a week of instructions and practice. The scores will be completely confidential. The study will use numbers for the students rather than names.

We are attempting to correlate these students grasp of computer skills, in order to revise our instructions as necessary, to maximize the students' computer skills in the short time that they are participating in the computer class. This work is done as part of an investigation entitled The Differences Between Boys and Girls using IBM Computer Skills. The purpose of the procedure is to determine if there is a significant difference in computer skills achievement between boys and girls as measured by the Microsoft Works test.

I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying my teacher.

I may contact Carol Guertin at the school 272-6274 should I wish further information about the research. I may also contact Terry Maciula, University research services, 001 Life Sciences East, Oklahoma State University, Stillwater, OK 74078; Telephone :(405) 744-5700.

I have fully read and understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____

Signed: _____
(Signature of Subject)

Parent: _____
(or Guardian)

APPENDIX B

TESTS

Chapter Two Test
version a

Part I Answer each of the following by choosing the best answer.

- __1. The best way to terminate Works' current operation is to:
- a) press the Delete key.
 - b) press the Enter key.
 - c) press the Escape key.
 - d) turn the computer off.
- __2. You have just started Works and the Quick Start dialog box is displayed. To type a letter to a friend in a new word processor document, you would follow which sequence of steps:
- a) select **Word Processor** and then start typing.
 - b) select **Create a New File**, then **Word Processor**, and then start typing.
 - c) press Escape and then start typing.
 - d) To type a new letter you would start typing because a blank word processor screen is automatically displayed.
- __3. When a single character is deleted from a sentence, Works:
- a) moves any characters over to the left one space to fill the space.
 - b) inserts the message "character deleted".
 - c) leaves a blank space where the character was.
 - d) Single characters may not be deleted, only complete words.
- __4. Screen scroll is used to:
- a) bring unseen parts of a document into view.
 - b) increase the length of a page.
 - c) decrease the length of a page.
 - d) add text to a document.
- __5. Word processor documents should be saved on disk:
- a) to allow the Save command to be used.
 - b) so that they can be given a name.
 - c) so that they can be accessed again at a later time.
 - d) Word processor files should never be saved on disk, only printed.

__6. To end the current paragraph and insert a blank line before beginning the next paragraph:

- a) press Enter once.
- b) press Enter once and the space bar once.
- c) press Enter twice.
- d) press Escape once and Enter once.

__7. A word processor can do each of the following except:

- a) correct grammar errors as they are typed.
- b) move paragraphs.
- c) insert text.
- d) store documents on disk.

__8. To transfer a previously saved file from disk to the computer's memory:

- a) press the Alt key and then type the file name.
- b) select the Dos command from the File menu.
- c) select the **Create New File** command from the File menu.
- d) select the **Open Existing File** command from the File menu.

__9. Press the Delete key:

- a) deletes a line of text.
- b) erases the character to the left of the cursor.
- c) erases the character directly over the cursor.
- d) deletes the word directly over the cursor.

__10. Word wrap is when:

- a) a word is too long to fit on a line and is deleted.
- b) the computer hyphenates a word at the end of a line.
- c) the computer determines where one line of text ends and the next begins.
- d) the typist determines where one line of text ends and the next begins.

__11. If a previously saved file is edited:

- a) the changes will automatically be saved in the file.
- b) the file must be saved again to retain the changes.
- c) the file will only have to be saved again if it is more than one page in length.
- d) Previously saved files may not be edited.

- ___12. To insert a word into the middle of a sentence:
- a) move the cursor to the location of the insertion, press the Enter key, and type the new word.
 - b) move the cursor to the beginning of the sentence into which the insertion is to be made and start typing.
 - c) move the cursor to the location of the insertion and type the new word.
 - d) It is impossible to insert text into the middle of a sentence without retyping the whole sentence.
- ___13. All of the following file names are valid except:
- a) 1PERIOD
 - b) PERIOD1
 - c) 1STPERIOD
 - d) MORNCLAS
- ___14. The proper way to quit Works is to:
- a) press the Escape key.
 - b) select the **Exit Works** command from the File menu.
 - c) turn the computer off.
 - d) select the **Create New File** command from the File menu.
- ___15. A menu is a list of:
- a) programs from which you may choose.
 - b) default commands.
 - c) files which you may open.
 - d) commands from which you may choose.
- ___16. If Works is not exited properly:
- a) the computer will be damaged.
 - b) no problems should occur.
 - c) the disk may be erased.
 - d) files may be damaged or lost.
- ___17. If the computer is turned off before a document has been saved on disk, the document can be retrieved by:
- a) turning the computer back on and selecting **Open an Existing File** from the Quick Start dialog box.
 - b) pressing the Enter key immediately after the computer has been turned off.
 - c) turning the computer back on.
 - d) The document cannot be retrieved; it has been lost.

__18. Each document stored on disk is called a:

- a) data base.
- b) file.
- c) processor document.
- d) report.

__19. When handling disks you should observe all of the following rules except:

- a) keep the disk away from magnetic fields.
- b) never touch the disk's magnetic surface.
- c) always store the disk in a hot place.
- d) do not bend the disk.

__20. It is a good practice to save a large document after each page is typed so that it:

- a) may be edited.
- b) may be retrieved in case the power goes off or the computer is accidentally turned off.
- c) can be removed from the computer's memory.
- d) It is not possible to save an incomplete document on disk.

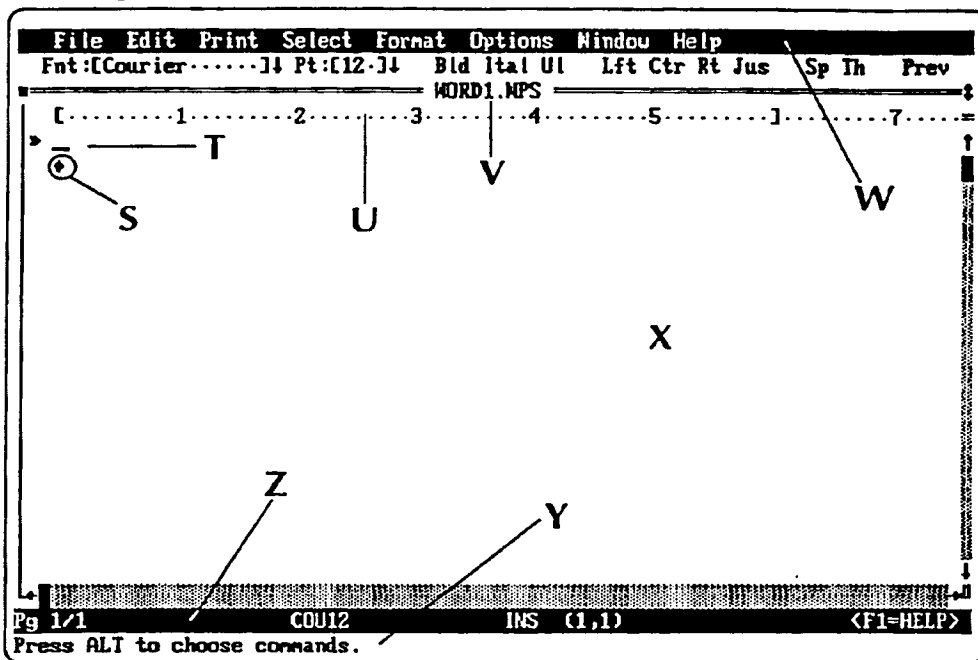
__21. The initial option highlighted in a dialog box is called the:

- a) menu bar option.
- b) first option.
- c) automatic option.
- d) default option.

__22. Works requires that you name all files saved on disk:

- a) to distinguish one file from another, allowing specific files to be selected from disk.
- b) to allow a listing to be made of file names.
- c) to allow letters to be named for the people who will receive them.
- d) Works does not require files to be named.

Questions 23 through 30 refer to the Word Processor screen shown below:



23. The part of the screen labeled S is the: 27. The part of the screen labeled W is the:

- | | |
|------------------------|------------------|
| a) Work area. | a) Menu bar. |
| b) Message line. | b) Message line. |
| c) File name. | c) Ruler. |
| d) End of file marker. | d) Work area. |

24. The part of the screen labeled T is the: 28. The part of the screen labeled X is the:

- | | |
|------------------------|------------------|
| a) Menu bar. | a) Status line. |
| b) Ruler. | b) Ruler. |
| c) Cursor. | c) Message line. |
| d) End of file marker. | d) Work area. |

25. The part of the screen labeled U is the: 29. The part of the screen labeled Y is the:

- | | |
|---------------|------------------|
| a) Menu bar. | a) Status line. |
| b) Ruler. | b) Menu bar. |
| c) Cursor. | c) Message line. |
| d) File name. | d) File name. |

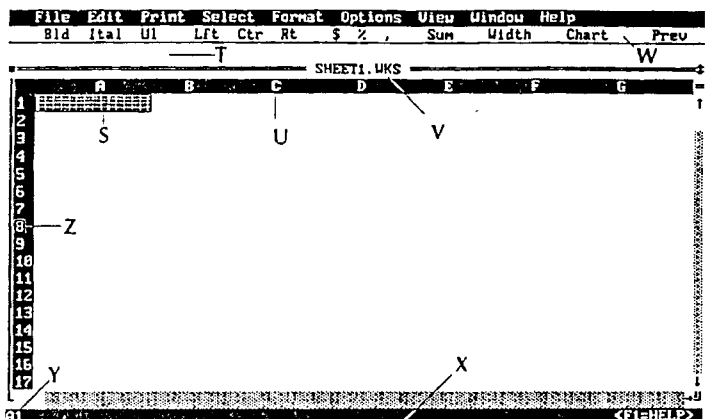
26. The part of the screen labeled V is the: 30. The part of the screen labeled Z is the:

- | | |
|------------------|------------------|
| a) Ruler. | a) Status line. |
| b) Message line. | b) Message line. |
| c) File name. | c) File name. |
| d) Work area. | d) Work area. |

Chapter Eight Test version a

Part I Answer each of the following by choosing the best answer.

Questions 1 to 8 refer to the spreadsheet screen shown below:



- __1. The part of the screen labeled **S** is:
- the cell cursor
 - the Cell indicator.
 - a row number.
 - a column letter.
- __2. The part of the screen labeled **T** is:
- the cell cursor.
 - the Formula line
 - the Tool bar
 - the Menu bar.
- __3. The part of the screen labeled **U** is:
- the cell cursor.
 - the Cell indicator.
 - a row number.
 - a column letter.
- __4. The part of the screen labeled **V** is:
- the row name.
 - the Cell indicator.
 - a file name.
 - the Message line.
- __5. The part of the screen labeled **W** is:
- the Message line.
 - the Formula line.
 - the Status line.
 - the Tool bar.
- __6. The part of the screen labeled **X** is:
- the file name.
 - the Status line.
 - the Formula line.
 - the Message line.
- __7. The part of the screen labeled **Y** is:
- the column letter.
 - the Formula line.
 - the Cell indicator.
 - the file name.
- __8. The part of the screen labeled **Z** is:
- the row number.
 - the column letter.
 - the Cell indicator.
 - the file name.

- ___9. A spreadsheet is:
- a) a computerized calculator.
 - b) a business financial report.
 - c) rows and columns of data.
 - d) columns of calculated data.
- ___10. Each of the following is an advantage of using a computerized spreadsheet except:
- a) the ability to perform calculations on stored data.
 - b) the ability to automatically redo calculations when data is changed.
 - c) the ability to quickly edit data.
 - d) All of the above are advantages of using a computerized spreadsheet.
- ___11. The intersection of a row and column is a:
- a) cell indicator.
 - b) value.
 - c) cell.
 - d) label.
- ___12. To "scroll" the screen means:
- a) to bring rows and columns into view
 - b) entering data into cells which are not visible.
 - c) displaying labels and values.
 - d) to erase the contents of the screen.
- ___13. The formula =ROUND(K32, 3) is entered into cell E2 of a spreadsheet. What will be displayed in E2 if the number 48.32571 is stored in K32?:
- a) =ROUND (K32, 3)
 - b) 48.32
 - c) 48.325
 - d) 48.326
- ___14. C35 is:
- a) the value stored in column C.
 - b) the value stored in row 35.
 - c) the name of the cell in row C and column 35.
 - d) the name of the cell in column C and row 35.

- ___15. To enter data into a spreadsheet cell:
- a) the cell is given a name and the data entered from the keyboard.
 - b) the cell's row is selected and the data entered from a file.
 - c) the cell cursor is moved to the cell and the data entered from the keyboard.
 - d) The data may be entered by all of the above methods.
- ___16. If the data entered into a cell is a label, Works will display it on the Formula line preceded by:
- a) a comma (,).
 - b) a quotation mark (").
 - c) the word "Label:".
 - d) nothing.
- ___17. If a mistake is made in entering data into a cell it may be corrected by:
- a) returning the cell cursor to the cell and entering the correct data.
 - b) entering the cell name followed by the correct data.
 - c) moving the cell cursor to the top of the column containing the mistake and entering the row number followed by the correct data.
 - d) moving the cell cursor to the cell, typing the correct data, and pressing the Alt key.
- ___18. A cell can be formatted each of the following ways except:
- a) left aligned, italic, and bold.
 - b) left aligned, bold, and centered.
 - c) bold, underlined, italic, and centered.
 - d) right aligned, underlined, and bold.
- ___19. If changes are made to a previously saved spreadsheet:
- a) the spreadsheet must be saved again to retain the changes.
 - b) the changes will automatically be saved.
 - c) the Close command must be selected from the File menu.
 - d) It is not possible to store changes in a spreadsheet that has been previously saved.
- ___20. A "range" is:
- a) a row of cells.
 - b) cells from both rows and columns.
 - c) a group of adjacent cells from a row or column.
 - d) a group of cells defined by selecting the Open Existing File command from the File menu.

__21. Formulas are:

- a) a series of numbers that can be evaluated.
- b) built in equations used to calculate values.
- c) ranges of cells used to calculate values.
- d) mathematical statements used to calculate values.

__22. The formula

$$=2 * 5 + 7 * 3$$

will produce the result:

- a) 31
- b) 51
- c) 72
- d) ERR

Questions 23 to 25 assume that cell C3 stores a value of 5 and cell D9 a value of 3.

__23. The formula

$$=C3/ D9$$

will produce the result:

- a) 5 / 3
- b) 1.6666667
- c) C3 / D9
- d) ERR

__24. The formula

$$=2 * C3 + 3 * D9$$

will produce the result:

- a) 19
- b) 39
- c) 2 * C3 + 3 * D9
- d) ERR

__25. The formula

$$=C3 + D9 / 0$$

will produce the result:

- a) 5
- b) 8
- c) 5 + 8
- d) ERR

__26. If ##### appears in a cell:

- a) the formula was entered incorrectly.
- b) the column is too narrow to display the contents of the cell.
- c) the cell had been formatted for numbers.
- d) the cell contents are secret and not able to be seen.

27. To correct a long formula without retyping it, move the cell cursor to the cell containing the formula,

- a) press the F2 key, make the corrections, and press Enter.
- b) type Edit, make the corrections, and press Enter.
- c) make the corrections and press Delete.
- d) press the F2 key, make the corrections, and press Delete.

__28. To erase whatever is stored in a cell, move the cell cursor to the cell and:

- a) press the Delete key and then Alt.
- b) select the Close command from the File menu.
- c) press the Delete key and then Enter.
- d) press the F2 key and then the Delete key.

Chapter Five Test
version a

Part I Answer each of the following by choosing the best answer.

- __1. Which is an example of a numeric field entry?
- a) 01089-3247
 - b) 2016F
 - c) 3.17
 - d) 3/19/95
- __2. Conditions such as 'equal to' or 'greater than' are used to perform a(n):
- a) update.
 - b) search.
 - c) sort.
 - d) query.
- __3. Each of the following would be considered a data base except:
- a) a file box of recipe cards.
 - b) a copy of *People* magazine.
 - c) the library card catalog.
 - d) an office Rolodex for phone numbers.
- __4. Numeric fields contain only numbers, and character fields contain:
- a) only letters.
 - b) only letters and symbols.
 - c) letters, symbols, and numbers.
 - d) only words.
- __5. A complete set of information for a single item in a data base is called a(n):
- a) record.
 - b) file.
 - c) entry.
 - d) field.

- ___6. Printed information taken from specific fields of a data base is called a:
- a) search.
 - b) report.
 - c) sort.
 - d) query.
- ___7. Each of the following is a field type except:
- a) entry.
 - b) character.
 - c) numeric.
 - d) date.
- ___8. The order and position in which different fields appear in a record is called the:
- a) field list.
 - b) sort.
 - c) report.
 - d) form.
- ___9. Which of the following will differ from record to record?
- a) searches
 - b) fields
 - c) entries
 - d) field widths
- ___10. Works requires each field name to end with a:
- a) period (.).
 - b) dash (-).
 - c) colon (:).
 - d) semicolon (;).
- ___11. When a user asks to see all records which meet certain criteria, the operation being performed is called a:
- a) search.
 - b) query.
 - c) sort.
 - d) report.

___12. Ordering records in a data base is called:

- a) sorting.
- b) querying.
- c) reporting.
- d) finding.

___13. A query would be performed to answer each question except:

- a) Which students are from DE?
- b) List all students under five feet tall.
- c) Which records contain a 35?
- d) Which students have GPAs of 2.6?

___14. A data base is:

- a) any data which is stored on a computer.
- b) a group of unrelated pieces of information.
- c) data of any type.
- d) a group of related pieces of information.

___15. Changing the information stored in a field is called:

- a) updating the data base.
- b) deleting the field.
- c) changing the field.
- d) arranging the file.

___16. On the Status line is the following: X1.30" Y1.00". This refers to the:

- a) width of the field.
- b) name of the file.
- c) current cursor position.
- d) height and width of the form.

___17. Each of the following should be considered in selecting a field name except that it:

- a) be the shortest name which accurately describes the contents of the field.
- b) end with the letters "name".
- c) describe the data stored in the field.
- d) be different from any other field name.

__18. When a user asks to see the next record which contains some specific text in any field, the operation being performed is called a:

- a) search.
- b) query.
- c) sort.
- d) report.

__19. Sorting records is based on the value of a:

- a) selection field.
- b) date field.
- c) key field.
- d) value field.

__20. Each of the following is a valid field name except:

- a) Complete address:
- b) Phone:
- c) location:
- d) Account Numbers:

__21. The best way to reposition a field within a form is to:

- a) delete the field and then enter a new field in the new position.
- b) use the Move Field command.
- c) highlight the field and then use the arrow keys to select a new position.
- d) If the field name is retyped in the correct location, the old one is automatically deleted.

__22. The data in a single field in a specific record is called a(n):

- a) field name.
- b) file.
- c) entry.
- d) record.

__23. The size of a single record in a data base is determined by:

- a) its arrangement.
- b) the number of names it contains.
- c) the view being used.
- d) the number of fields it contains.

___24. When designing a form using Works, you should do all the following except:

- a) add fields in any order as you think of them.
- b) place more important and frequently used fields first.
- c) group related fields together.
- d) plan carefully beforehand.

___25. Each of the following is an important question to ask when designing a data base, except:

- a) What operations will be performed on the sorted information?
- b) Will the data base need to be copied?
- c) Who will use the data base?
- d) What information should be stored?

APPENDIX C

STATISTICAL COMPARISONS
TABLES

FREQUENCY ANALYSIS FOR
TEST RESULTS

Table I

Frequency Analysis for Test 1, Male Examinees, with Reference to Global Normal Distribution

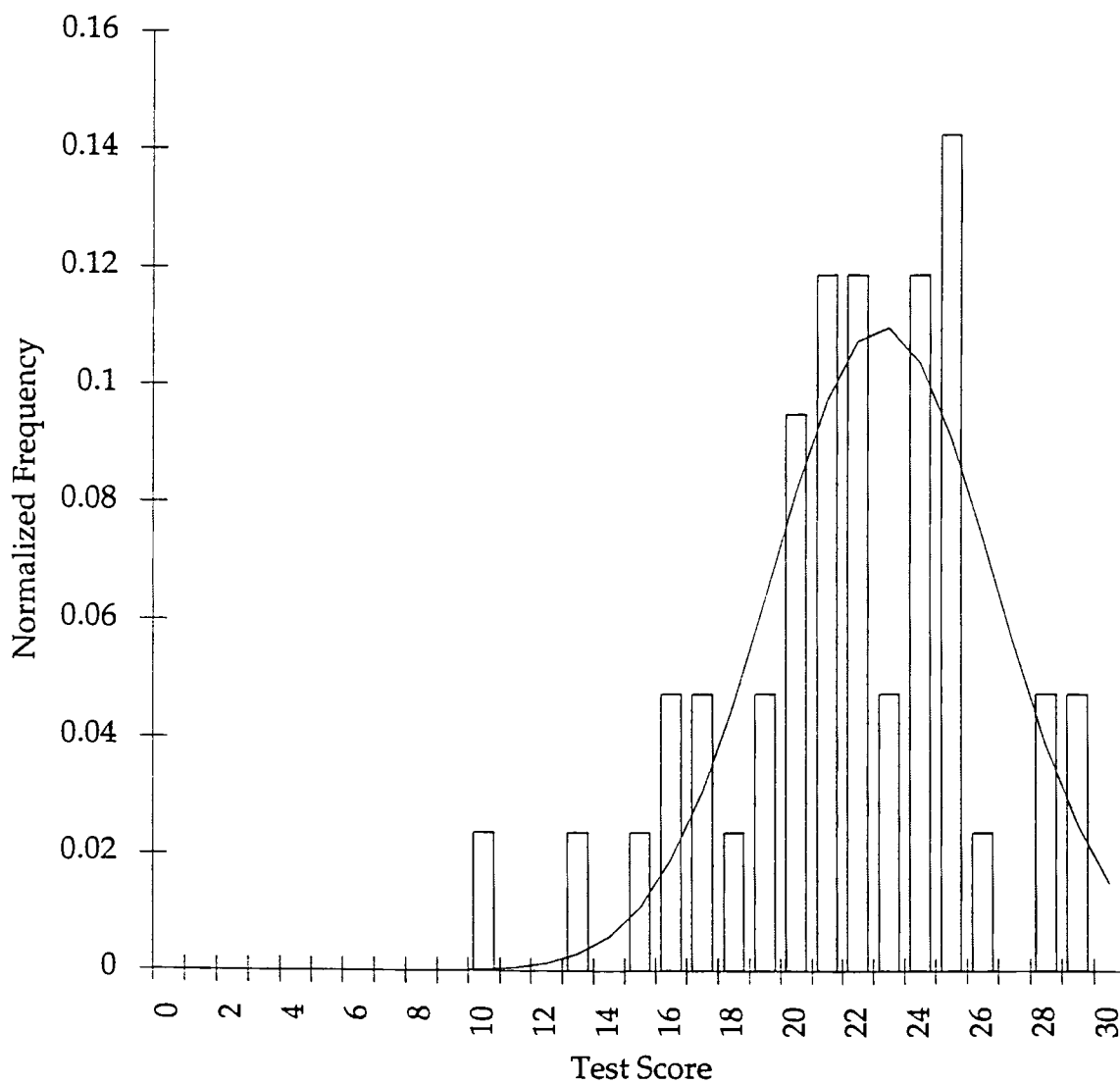


Table I (cont.)

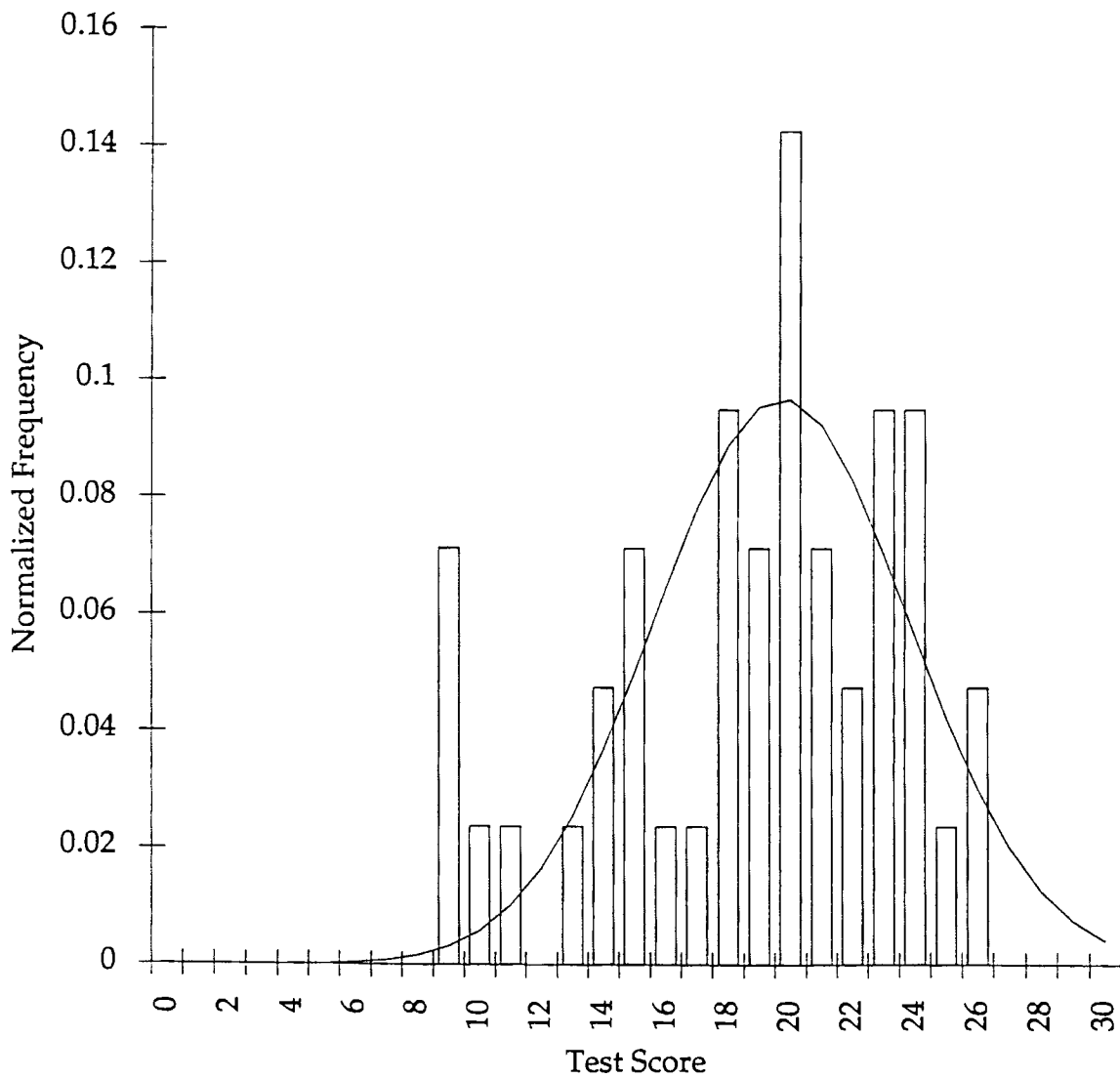
Frequency Analysis for Test 2, Male Examinees, with
Reference to Global Normal Distribution

Table I (cont.)

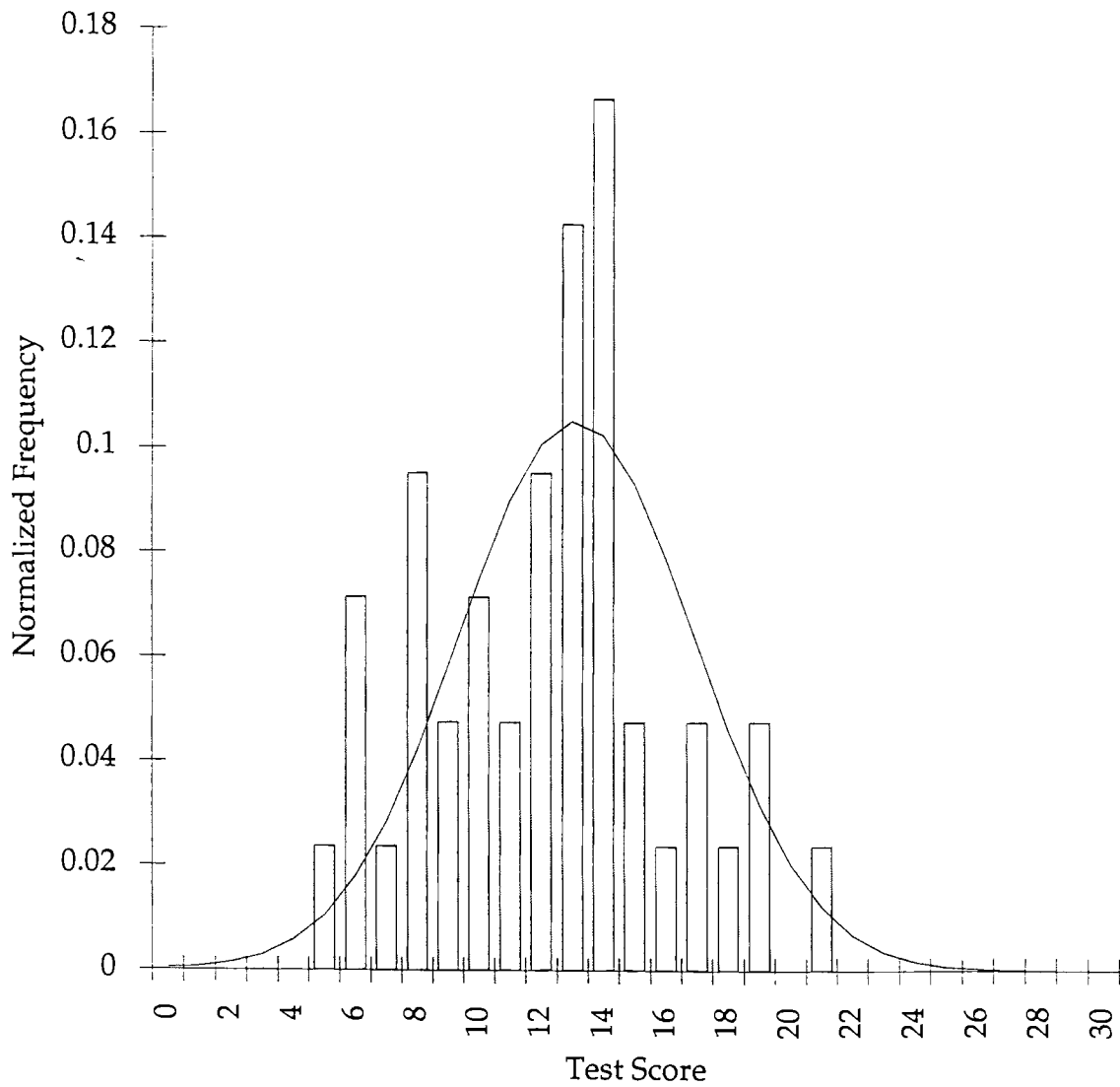
Frequency Analysis for Test 3, Male Examinees, with
Reference to Global Normal Distribution

Table II

Frequency Analysis for Test 1, Female Examinees, with Reference to Global Normal Distribution

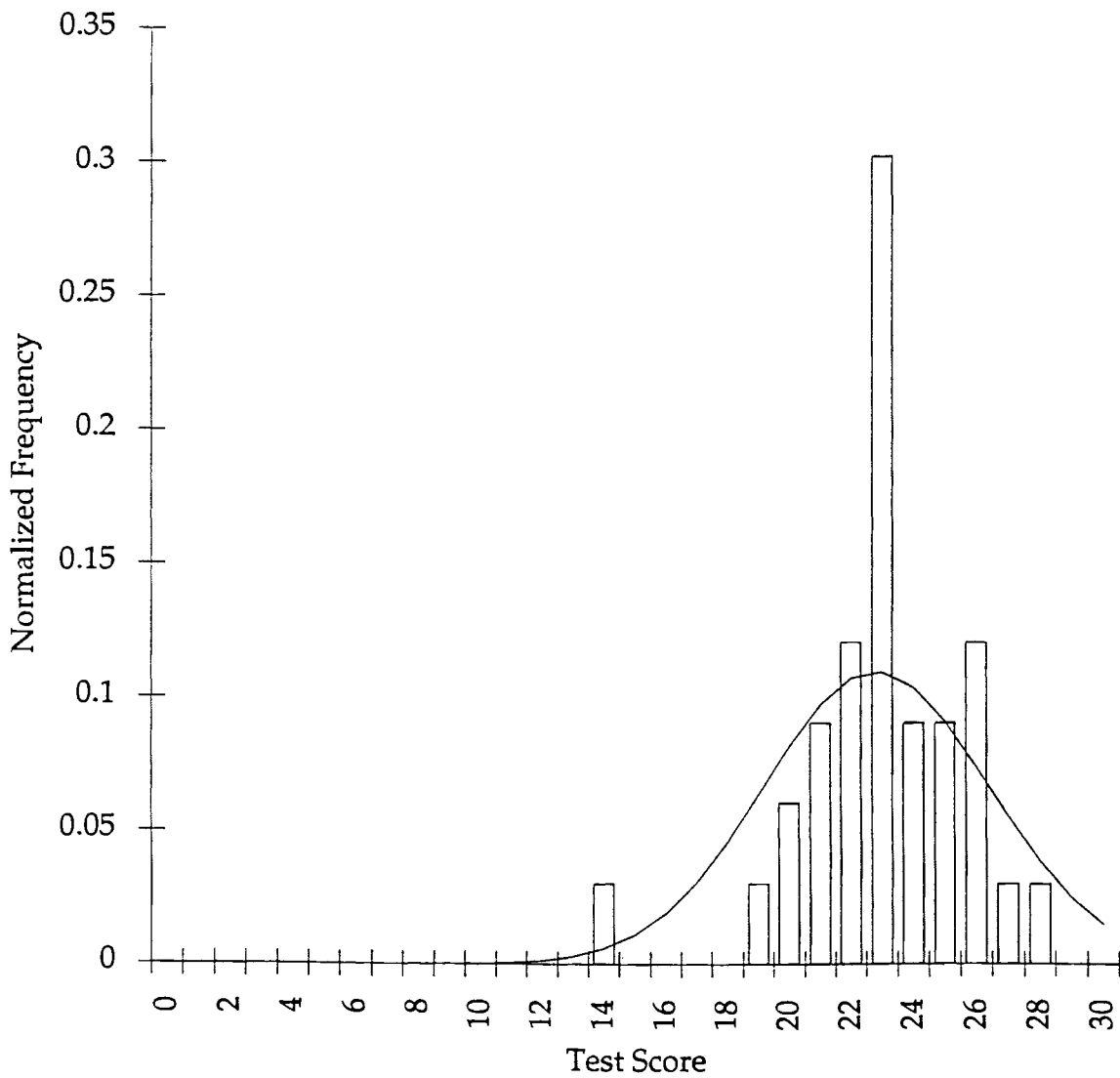


Table II (cont.)

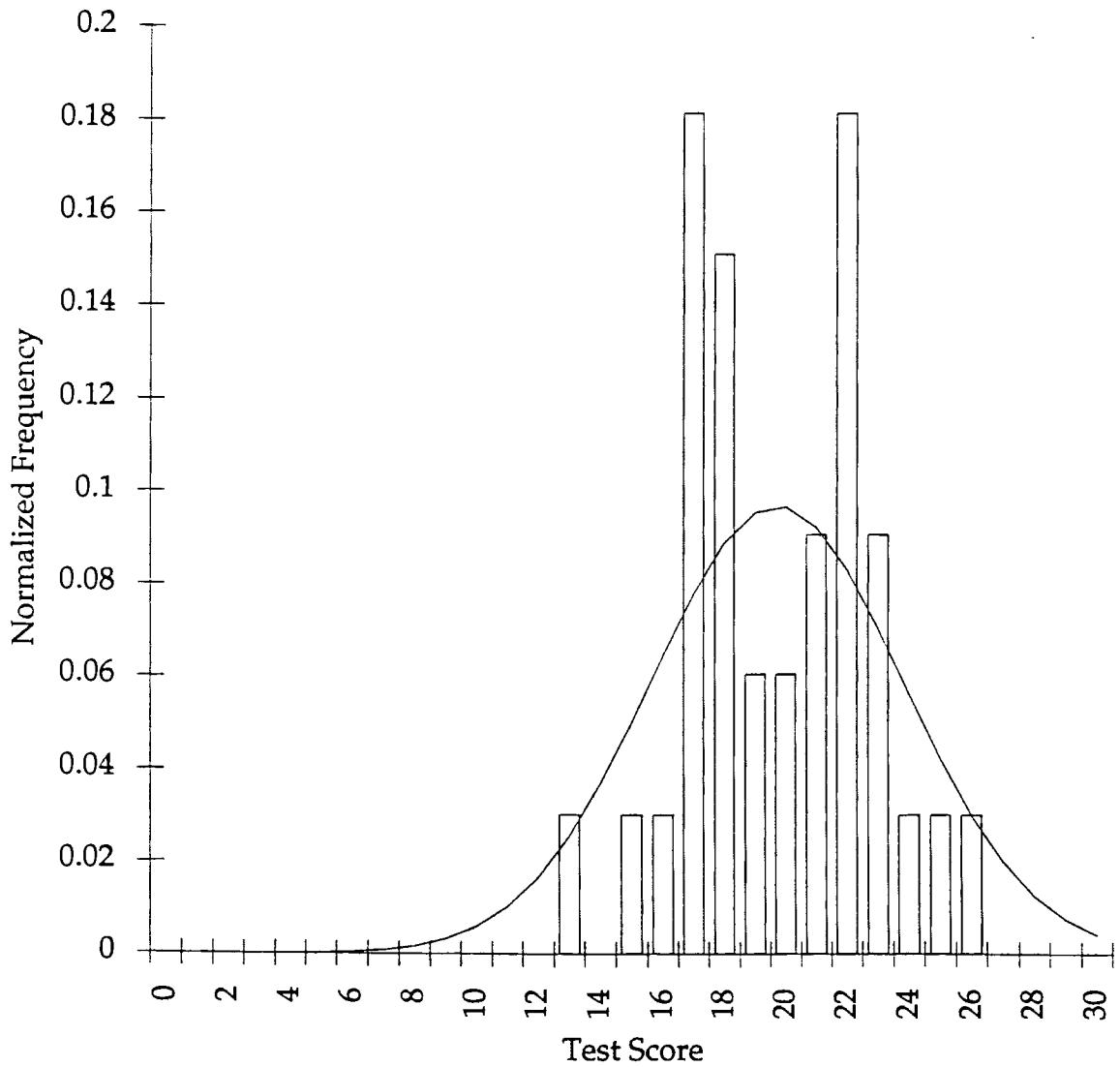
Frequency Analysis for Test 2, Female Examinees, with
Reference to Global Normal Distribution

Table II (cont.)

Frequency Analysis for Test 3, Female Examinees, with
Reference to Global Normal Distribution

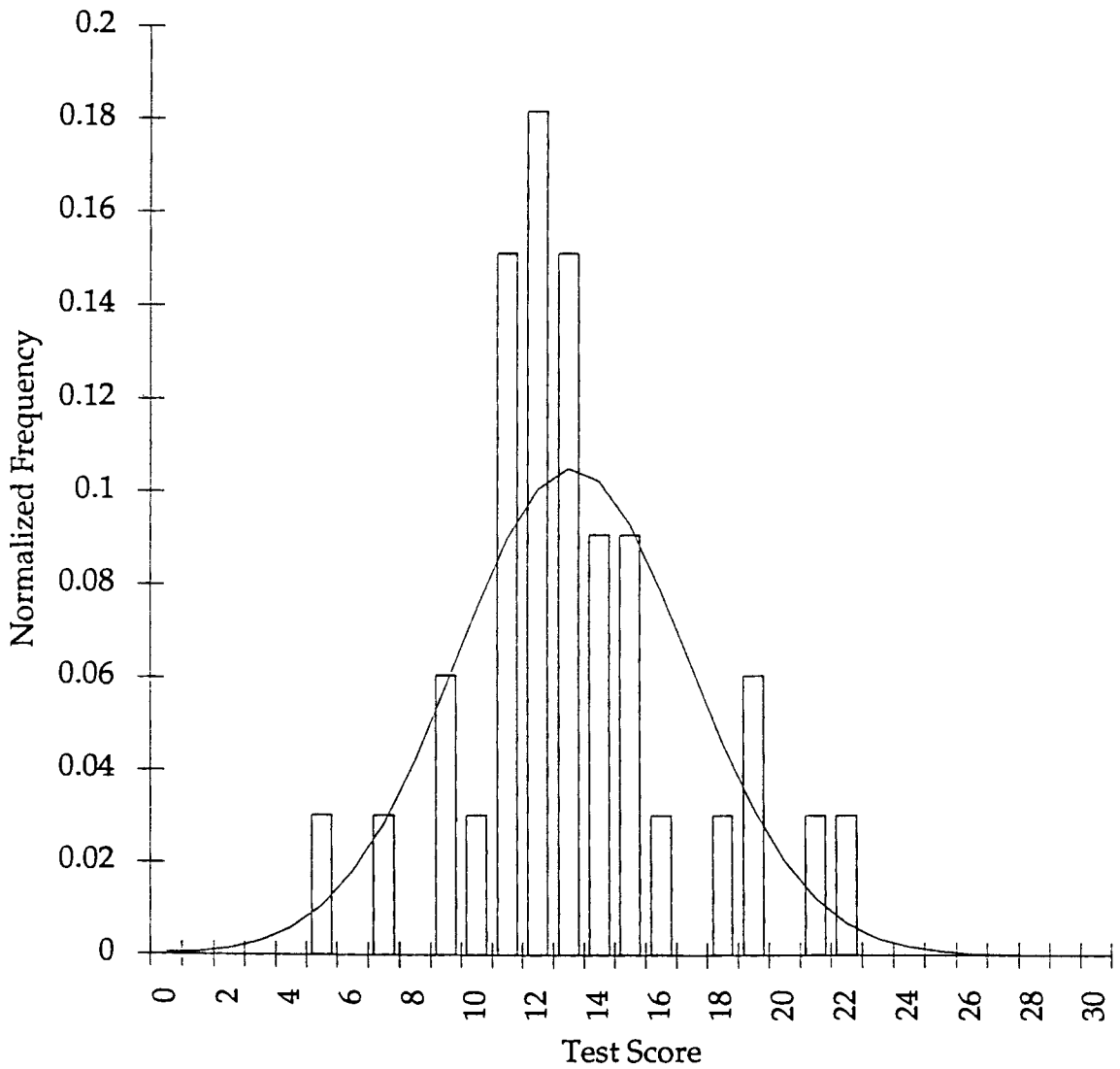


Table III

Frequency Analysis for Test 1, both Sexes, with Reference to Normal Distribution

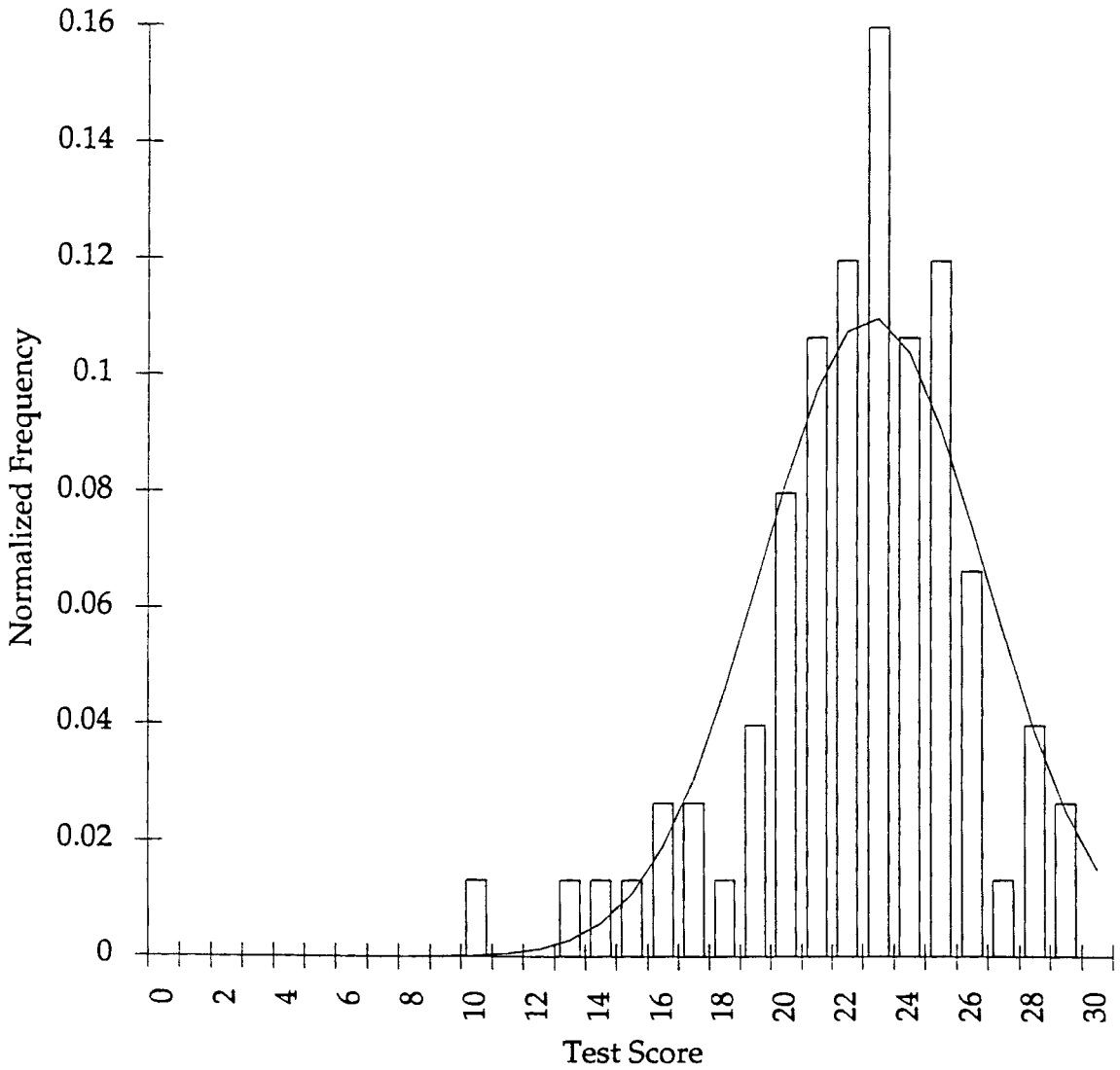


Table III (cont.)

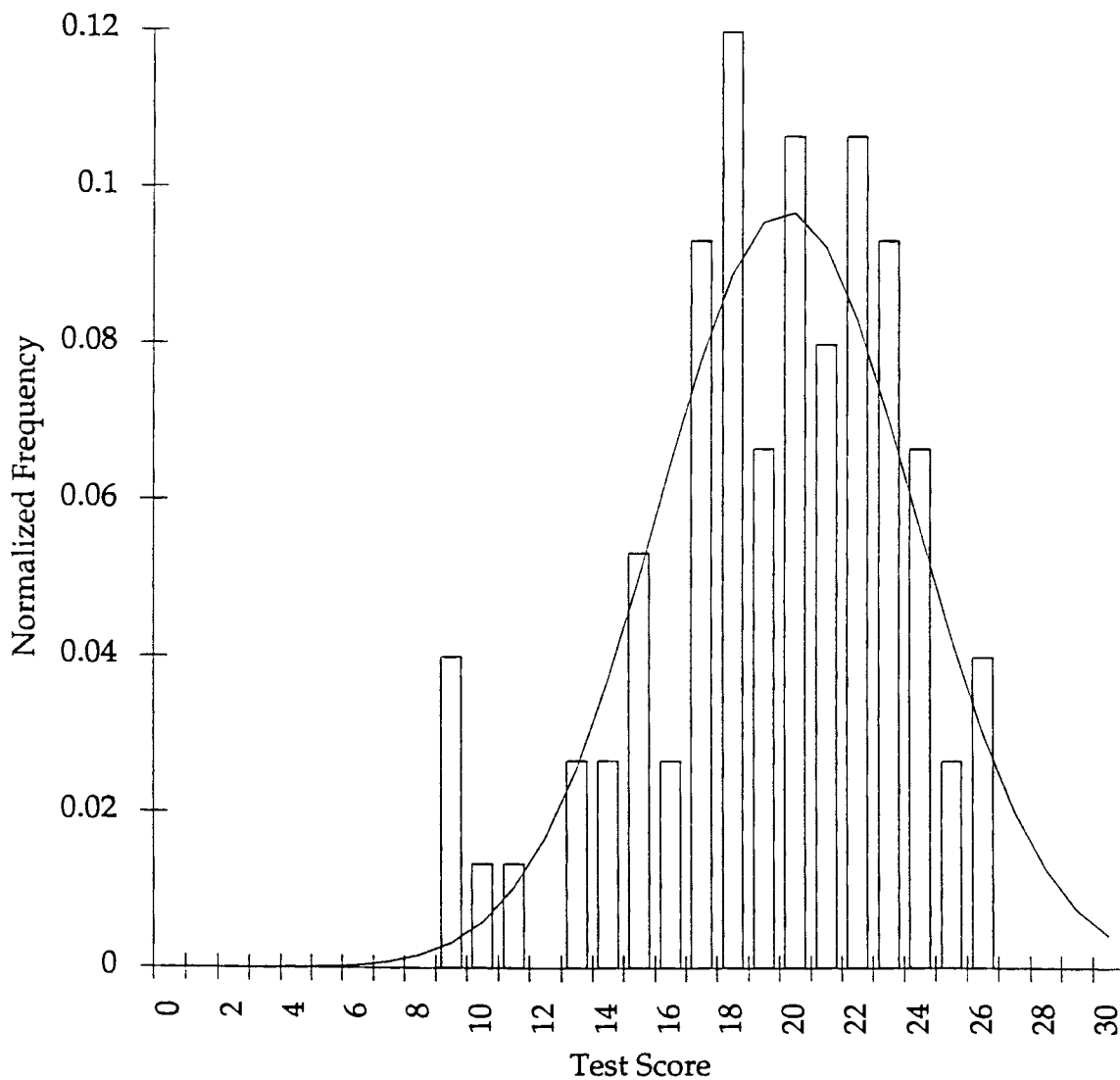
Frequency Analysis for Test 2, Both Sexes, with
Reference to Normal Distribution

Table III (cont.)

Frequency Analysis of Test 3, both Sexes, with
Reference to Normal Distribution

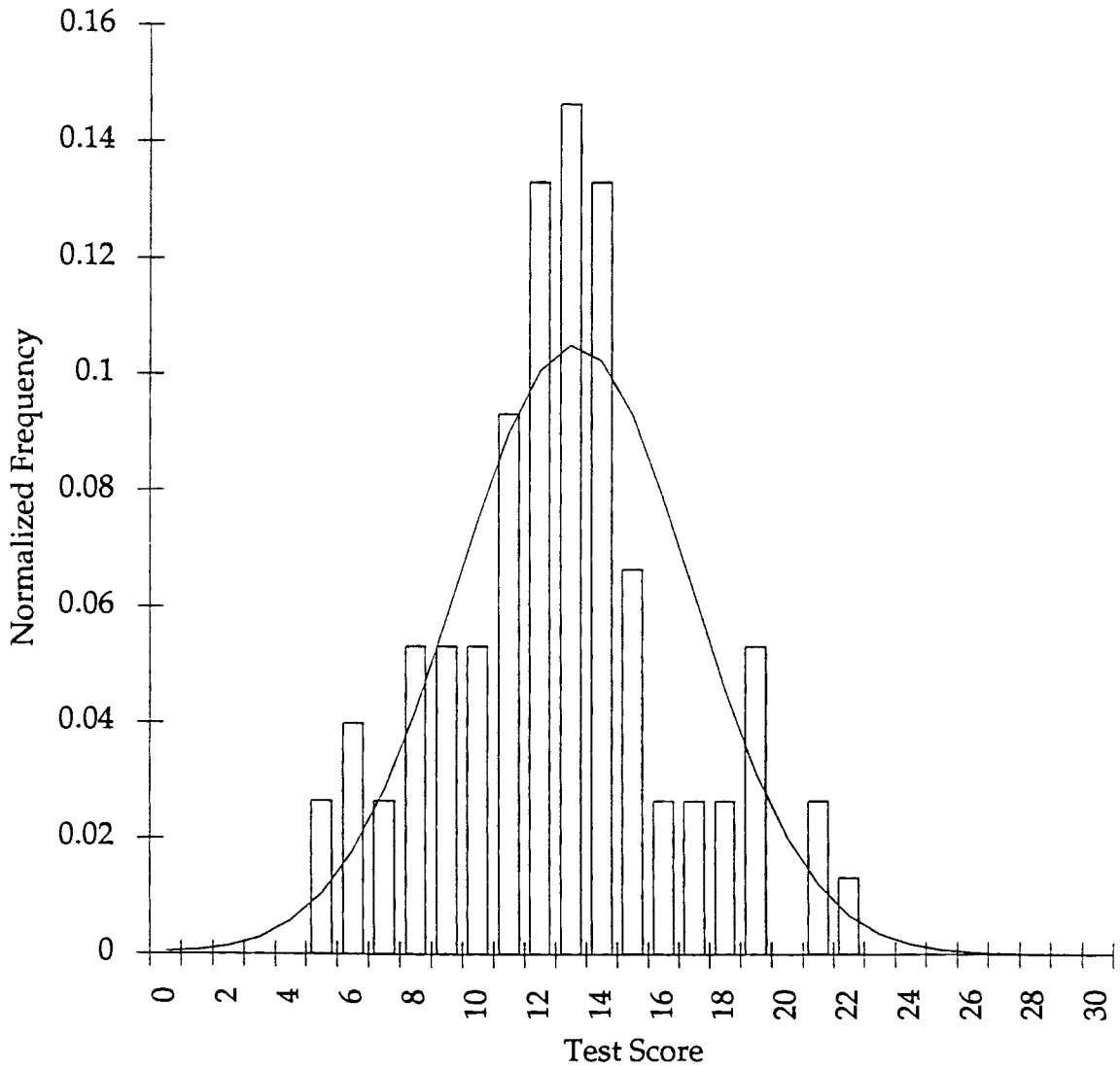
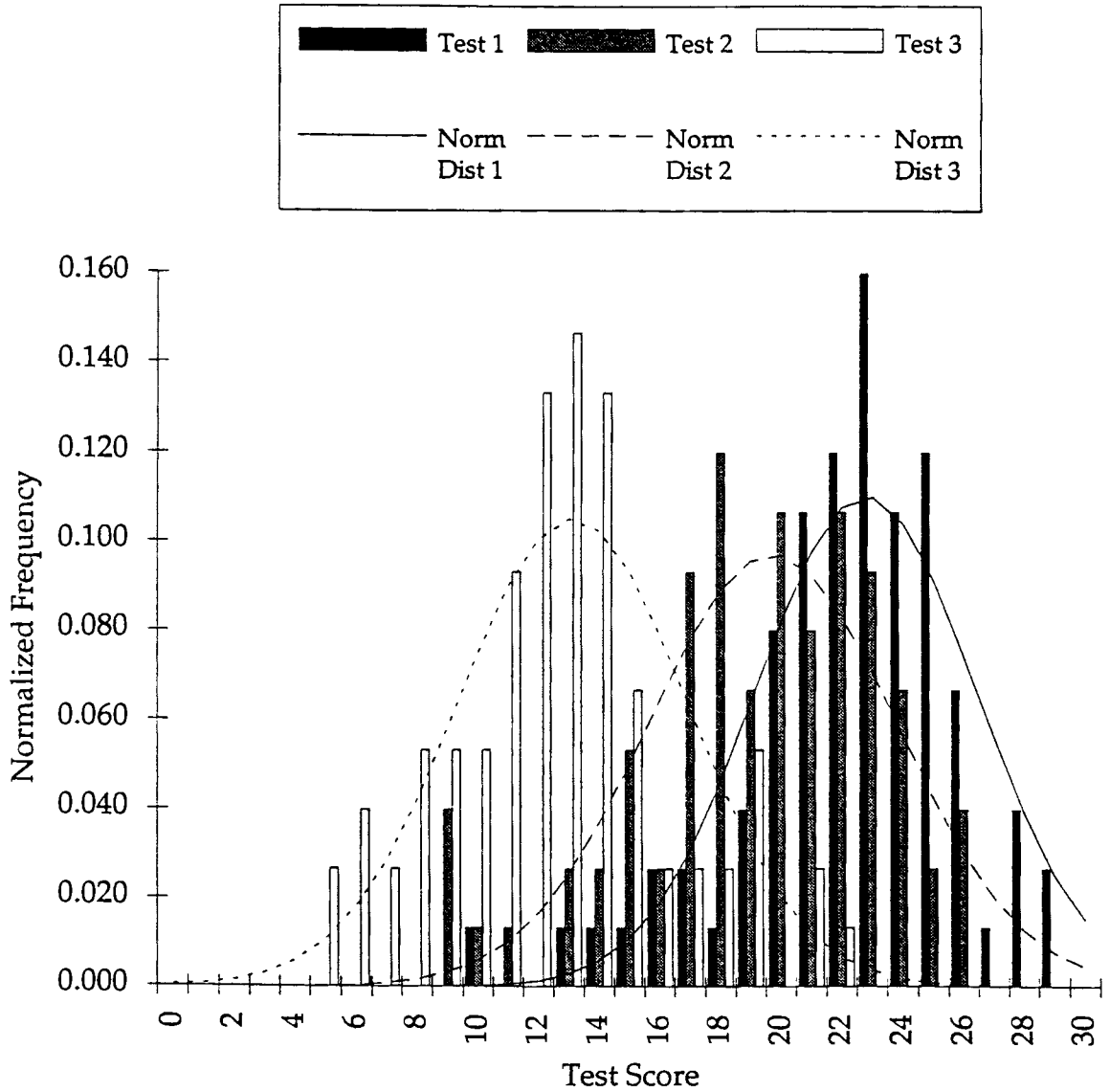


Table IV

Frequency Analysis for Tests 1, 2, and 3, All Examinees,
with Reference to Global Normal Distributions



APPENDIX D

TABLES

MEAN SCORES FOR MALES AND FEMALES
OVERALL AND DIVIDED BY GROUPS

Table V

MEAN SCORES FOR MALES AND FEMALES
Female Test Scores

Student#	Test 1	Test 2	Test 3	Average
S1	24	18	11	17.67
S4	24	22	15	20.33
S5	25	21	5	17.00
S6	21	18	13	17.33
S11	26	22	12	20.00
S15	26	23	19	22.67
S17	23	19	19	20.33
S19	27	25	22	24.67
S20	20	17	12	16.33
S22	26	21	21	22.67
S25	14	16	9	13.00
S26	23	17	14	18.00
S27	21	15	9	15.00
S30	23	18	11	17.33
S32	19	20	7	15.33
S33	23	17	14	18.00
S34	22	22	14	19.33
S37	23	21	11	18.33
S40	24	22	16	20.67
S42	21	23	12	18.67
S44	23	17	15	18.33
S45	28	26	15	23.00
S47	22	17	13	17.33
S48	26	22	13	20.33
S51	23	17	13	17.67
S53	25	23	18	22.00
S57	25	24	12	20.33
S58	23	18	13	18.00
S65	22	20	12	18.00
S66	23	19	11	17.67
S67	23	13	12	16.00
S68	20	18	11	16.33
S69	22	22	10	18.00
Average	23.03	19.79	13.15	
Total	33			

**Table V (cont.)
Male Test Scores**

Student#	Test 1	Test 2	Test 3	Average
S2	20	18	10	16.00
S3	13	13	7	11.00
S7	15	11	6	10.67
S8	20	18	13	17.00
S9	24	21	21	22.00
S10	20	20	12	17.33
S12	24	14	8	15.33
S13	29	24	19	24.00
S14	21	20	13	18.00
S16	22	20	8	16.67
S18	25	22	17	21.33
S21	16	9	6	10.33
S23	19	15	14	16.00
S24	26	25	18	23.00
S28	21	19	14	18.00
S29	25	21	15	20.33
S31	10	10	5	8.33
S35	25	15	8	16.00
S36	21	19	12	17.33
S38	24	26	15	21.67
S39	21	20	11	17.33
S41	22	15	10	15.67
S43	23	21	9	17.67
S46	25	23	12	20.00
S49	24	24	19	22.33
S50	22	23	14	19.67
S52	21	16	9	15.33
S54	19	20	13	17.33
S55	18	22	14	18.00
S56	23	24	14	20.33
S59	22	20	13	18.33
S60	28	19	6	17.67
S61	16	9	8	11.00
S62	20	17	11	16.00
S63	17	9	13	13.00

**Table V (cont.)
Male Test Scores**

Student#	Test 1	Test 2	Test 3	Average
S64	28	23	17	22.67
S70	22	14	10	15.33
S71	17	18	16	17.00
S72	25	24	14	21.00
S73	29	23	13	21.67
S74	25	26	14	21.67
S75	24	18	12	18.00
Average	21.69	18.76	12.20	17.55
Total	42			

Table VI
Means and Standard Deviations

Student#	T1	T2	T3	Average	F/M	StDev	Score	Test 1	Test 2	Test 3	Norm Dist 1	Norm Dist 2	Norm Dist 3	
S1	24	18	11	17.67	F	6.51	0	0.000	0.000	0.000	0.000	0.000	0.000	
S4	24	22	15	20.33	F	4.73	1	0.000	0.000	0.000	0.000	0.000	0.001	
S5	25	21	5	17	F	10.58	2	0.000	0.000	0.000	0.000	0.000	0.001	
S6	21	18	13	17.33	F	4.04	3	0.000	0.000	0.000	0.000	0.000	0.003	
S11	26	22	12	20	F	7.21	4	0.000	0.000	0.000	0.000	0.000	0.006	
S15	26	23	19	22.67	F	3.51	5	0.000	0.000	0.030	0.000	0.000	0.011	
S17	23	19	19	20.33	F	2.31	6	0.000	0.000	0.000	0.000	0.000	0.018	
S19	27	25	22	24.67	F	2.52	7	0.000	0.000	0.030	0.000	0.001	0.029	
S20	20	17	12	16.33	F	4.04	8	0.000	0.000	0.000	0.000	0.002	0.042	
S22	26	21	21	22.67	F	2.89	9	0.000	0.000	0.061	0.000	0.003	0.058	
S25	14	16	9	13	F	3.61	10	0.000	0.000	0.030	0.000	0.006	0.075	
S26	23	17	14	18	F	4.58	11	0.000	0.000	0.152	0.001	0.010	0.090	
S27	21	15	9	15	F	6.00	12	0.000	0.000	0.182	0.001	0.017	0.101	
S30	23	18	11	17.33	F	6.03	13	0.000	0.030	0.152	0.003	0.026	0.105	
S32	19	20	7	15.33	F	7.23	14	0.030	0.000	0.091	0.006	0.037	0.102	
S33	23	17	14	18	F	4.58	15	0.000	0.030	0.091	0.011	0.050	0.093	
S34	22	22	14	19.33	F	4.62	16	0.000	0.030	0.030	0.019	0.065	0.079	
S37	23	21	11	18.33	F	6.43	17	0.000	0.182	0.000	0.031	0.078	0.062	
S40	24	22	16	20.67	F	4.16	18	0.000	0.152	0.030	0.046	0.089	0.046	
S42	21	23	12	18.67	F	5.86	19	0.030	0.061	0.061	0.064	0.096	0.032	
S44	23	17	15	18.33	F	4.16	20	0.061	0.061	0.000	0.082	0.097	0.020	
S45	28	26	15	23	F	7.00	21	0.091	0.091	0.030	0.098	0.092	0.012	
S47	22	17	13	17.33	F	4.51	22	0.121	0.182	0.030	0.108	0.083	0.007	
S48	26	22	13	20.33	F	6.66	23	0.303	0.091	0.000	0.110	0.071	0.004	
S51	23	17	13	17.67	F	5.03	24	0.091	0.030	0.000	0.104	0.056	0.002	
S53	25	23	18	22	F	3.61	25	0.091	0.030	0.000	0.091	0.042	0.001	
S57	25	24	12	20.33	F	7.23	26	0.121	0.030	0.000	0.074	0.030	0.000	
S58	23	18	13	18	F	5.00	27	0.030	0.000	0.000	0.056	0.020	0.000	
S65	22	20	12	18	F	5.29	28	0.030	0.000	0.000	0.039	0.013	0.000	
S66	23	19	11	17.67	F	6.11	29	0.000	0.000	0.000	0.025	0.008	0.000	
S67	23	13	12	16	F	6.08	30	0.000	0.000	0.000	0.015	0.004	0.000	
S68	20	18	11	16.33	F	4.73								
S69	22	22	10	18	F	6.93								
							MALE SCORE	Freq 1	Freq 2	Freq 3	Norm Dist 1	Norm Dist 2	Norm Dist 3	
Average	23.03	19.79	13.15	13.15				0	0.000	0.000	0.000	0.000	0.000	0.000
StDev	2.64	3.04	3.68	2.52				1	0.000	0.000	0.000	0.000	0.000	0.001

Table VI (cont)

S61	16	9	8	11	M	4.36	5	0.000	0.000	0.027	0.000	0.000	0.011
S62	20	17	11	16	M	4.58	6	0.000	0.000	0.040	0.000	0.000	0.018
S63	17	9	13	13	M	4.00	7	0.000	0.000	0.027	0.000	0.001	0.029
S64	28	23	17	22.67	M	5.51	8	0.000	0.000	0.053	0.000	0.002	0.042
S70	22	14	10	15.33	M	6.11	9	0.000	0.040	0.053	0.000	0.003	0.058
S71	17	18	16	17	M	1.00	10	0.013	0.013	0.053	0.000	0.006	0.075
S72	25	24	14	21	M	6.08	11	0.000	0.013	0.093	0.001	0.010	0.090
S73	29	23	13	21.67	M	8.08	12	0.000	0.000	0.133	0.001	0.017	0.101
S74	25	26	14	21.67	M	6.66	13	0.013	0.027	0.147	0.003	0.026	0.105
S75	24	18	12	18	M	6.00	14	0.013	0.027	0.133	0.006	0.037	0.102
Average	21.69	18.76	12.21	17.56			15	0.013	0.053	0.067	0.011	0.050	0.093
StDev	4.16	4.76	3.85	3.71			16	0.027	0.027	0.027	0.019	0.065	0.079
Total	42						17	0.027	0.093	0.027	0.031	0.078	0.062
							18	0.013	0.120	0.027	0.046	0.089	0.046
Overall							19	0.040	0.067	0.053	0.064	0.096	0.032
Average	22.28	19.21	12.63				20	0.080	0.107	0.000	0.082	0.097	0.020
StDev	3.61	4.10	3.78				21	0.107	0.080	0.027	0.098	0.092	0.012
							22	0.120	0.107	0.013	0.108	0.083	0.007
							23	0.160	0.093	0.000	0.110	0.071	0.004
							24	0.107	0.067	0.000	0.104	0.056	0.002
							25	0.120	0.027	0.000	0.091	0.042	0.001
							26	0.067	0.040	0.000	0.074	0.030	0.000
							27	0.013	0.000	0.000	0.056	0.020	0.000
							28	0.040	0.000	0.000	0.039	0.013	0.000
							29	0.027	0.000	0.000	0.025	0.008	0.000
							30	0.000	0.000	0.000	0.015	0.004	0.000

VITA

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