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A Study of Computer Anxiety among Business College Accounting Students

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A STUDY OF COMPUTER ANXIETY
AMONG BUSINESS COLLEGE ACCOUNTING STUDENTS

Submitted to the School of Education
of
Old Dominion University
In Partial Fulfillment of the Requirements for
The Degree of Master of Science in Education

by
Barbara Scott

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This research paper was prepared by Barbara Scott under the direction of Dr. John M. Ritz in VTE 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science in Education.

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TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGMENTS	ii
LIST OF TABLES	v
CHAPTER	
I. INTRODUCTION	1
STATEMENT OF THE PROBLEM	2
RESEARCH GOALS	2
BACKGROUND AND SIGNIFICANCE	3
LIMITATIONS	4
ASSUMPTIONS	4
PROCEDURES	5
DEFINITION OF TERMS	5
OVERVIEW OF CHAPTERS	6
II. REVIEW OF LITERATURE	8
COMPUTERS IN EDUCATION	8
COMPUTERS IN BUSINESS EDUCATION	10
STUDENT REACTIONS TO COMPUTERS	11
RELATED STUDIES	16
SUMMARY	17
III. METHODS AND PROCEDURES	19
DESCRIPTION OF POPULATION	19
DESCRIPTION OF INSTRUMENT	20
DATA COLLECTION	21

TABLE OF CONTENTS (Cont.)

CHAPTER	<u>Page</u>
III.(Cont.)	
TREATMENT OF THE DATA	22
SUMMARY	22
IV. FINDINGS	24
POPULATION	24
COMPUTER EXPERIENCE AND AGE RANGE	25
COMPUTER ANXIETY LEVELS	25
COMPUTER HARDWARE AND ENVIRONMENT FACTORS	29
COMPUTER SOFTWARE AND INSTRUCTION FACTORS	32
STUDENT COMMENTS	32
SUMMARY	35
V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	36
SUMMARY	36
CONCLUSIONS	37
RECOMMENDATIONS	39
BIBLIOGRAPHY	43
APPENDIX	47

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Computer Experience and Age Range	26
2. Computer Anxiety Levels Before and After Computer Applica- tion Experience	27
3. Change in Student Anxiety as Measured by Shift in Likert Scores After Computer Experience	28
4. Computer Hardware and Environment Factors No Previous Computer Experience	30
5. Computer Hardware and Environment Factors Computer Experience	31
6. Software and Instruction Factors No Previous Computer Experience	33
7. Software and Instruction Factors Computer Experience	34

CHAPTER I

INTRODUCTION

In recent years, the greater affordability of microcomputers has increased their use in homes and in small businesses. This trend has placed pressure on educational institutions to keep pace with the demand for computer knowledge by creating more computer coursework. Also, competition for and retention of students in postsecondary institutions will require quality computerized programs (Alexander, 1985, p. 15; Bialaszewski and Associates, 1986, p. 34). This trend is especially important for colleges that train students for careers in business since students must become competent in microcomputer use. The importance of computer use in accounting careers, for instance, indicates a need to alleviate any fears and frustrations that may be held by the adult learner when adapting to computer use.

Proprietary business colleges, such as Kee Business College, have been attempting to provide these educational experiences. Kee dates its origins to 1938, and is presently owned and operated by National Education Corporation. The college, with three Tidewater locations (Norfolk, Portsmouth and Newport News) offers coursework in the fields of accounting, data processing, business computer management and secretarial (general, legal and medical). Each field offers hands-on computer experience.

The accounting program at Kee's involves a nine-month curriculum. This curriculum includes Accounting I, Sole

Proprietorship; Accounting II, Partnership; Accounting III, Corporation; and Payroll Accounting as well as coursework in grammar, correspondence, math, typing, ten-key, data processing and career development.

The accounting program utilizes computer applications in Accounting II, III and Payroll. These applications provide the student with experience in the computerized areas of payables, general ledger and payroll. The computerized programs utilize actual business accounting software. Although the student will need to adapt to the employers' computer system, providing the student with a positive experience in using computerized accounting will make the adjustment easier.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the anxieties of business college accounting students toward microcomputer usage. The study looked at computerized accounting in Accounting II and determined student anxiety areas.

RESEARCH GOALS

This study attempted to answer the following research questions:

- (1) What were the factors that lead to computer anxiety among business college accounting students?
- (2) What areas in computerized Accounting II applications

caused problems?

- (3) How could these computer anxiety factors be alleviated?

BACKGROUND AND SIGNIFICANCE

Business colleges dominated business education during the nineteenth century and continue to have an impact. One of the most famous schools was Bryand and Stratton who by 1863 had fifty schools in operation (Douglas, 1963, p. 9 and Nanassy and Associates, 1977, p. 139). Some of the characteristics of past and present business colleges that have helped them be successful were: (1) the training was job-oriented, (2) many disadvantaged students found success there, (3) automated and/or individualized instruction, and (4) a well organized graduate placement service (Nanassy and Associates, 1977, p. 142-143).

For the accounting training at Kee Business College to be job oriented the student must complete work in computerized accounting due to the growing number of computerized accounting applications. Gerver (1984, p. xviii) stated that adult learners may have trouble learning about computers. Adults may not want to be "technocentered" and can be baffled by computer terminology. She also expressed the need for further research in the area of adult learners and computer use (xv).

This study originated as a result of the observation that many Kee Business College accounting students had difficulty in adapting to computer use. The need to study computer anxiety was supported in the literature. Several researchers have indicated that computer

anxiety compares to test anxiety and math anxiety and needed to be prevented and/or remediated to provide a successful educational experience (Cambre and Cook, 1984, p. 7; Bellando and Winer, 1985, p. 26).

This study surveyed student opinions about anxieties they had when working with computerized accounting. This study also sought to recommend preventions and instructional strategies that could facilitate anxiety free learning. This information can be useful for accounting instructors or for anyone using computer-based instruction.

LIMITATIONS

This study was limited to investigating Accounting II students' opinions at three Kee Business Colleges. The schools used in the study were in Norfolk, Portsmouth and Newport News. Participants in the study were Winter Quarter 1987, accounting students only. The study separated the student responses indicating no prior experience from those indicating previous microcomputer experience. The group involved in the study may have been unique in that students who attend business colleges tended to be women and/or disadvantaged students.

ASSUMPTIONS

This study was conducted assuming that there were students who had no previous experience in using the microcomputer. The study assumed there was a difference in level of anxieties and areas of difficulty for students who indicated no past computer experience and

in those indicating previous computer experience.

The study assumed there were a number of students who are afraid of computers. It also assumed that a number of students found some difficulty when adapting to computerized accounting procedures.

PROCEDURES

The method of collecting data was in the form of a survey questionnaire. The study was conducted in March 1987. The population included in the survey was the day Accounting II classes from the Kee Business Colleges of Norfolk, Portsmouth and Newport News. The survey was approved by the President of the schools.

This information survey dealt with computer anxieties in general and as it related to computerized accounting applications. Students were asked to rank the items according to the degree that the items created anxiety concerning computer hardware, computer environment, computer software, and computer instructional aspects.

This study sought to survey computer anxious individuals. Data was tabulated separately for respondents indicating no previous computer experience and for those who indicated past computer experience. The Likert responses for two questions regarding student anxiety levels before and after the accounting computer application were tabulated. The mean score of the student rankings of each variable under the two headings of computer hardware-environment and computer software-instruction were calculated.

DEFINITION OF TERMS

The following list of terms were provided to aid the readers'

understanding of the study:

- (1) accounting - the art of analyzing and recording financial transactions.
- (2) adult learner - any student beyond eighteen years of age.
- (3) AMOS - Alpha-Microcomputer Operating System (computer system used at Kee Business College).
- (4) anxiety - painful or apprehensive uneasiness of mind; worried about success.
- (5) computer anxiety - mixture of fear, apprehension, and hope, felt when planning to interact with a computer.
- (6) computer assisted instruction (CAI) - using a computer for teaching purposes. This term usually refers to drill and practice and tutorial examples.
- (7) computer based instruction - can be the same as CAI, or it can mean the entire instructional process is by means of the computer.
- (8) computerized accounting - processing and storing accounting data by computer.
- (9) microcomputer - a small computer system with more limited memory (usually from 16000 to 128000 characters of information) and with an attached terminal and monitor screen. These are usually individual units in one location.
- (10) proprietary or private business college - college owned and operated to produce a profit.

OVERVIEW OF CHAPTERS

The study originated from the desire to provide the best possible learning environment for students. The growing uses for computers in all areas of business requires the business student to adapt positively and efficiently to the requirements of this environment.

Instructors of adults in courses utilizing computers need to be

aware of the effects of computer anxiety. The middle aged adult learner, in particular, can find computer terminology and machinery baffling.

Computer anxiety has been compared to math anxiety and test anxiety in nature. Math and test anxiety has been researched for many years and computer anxiety is a growing natural extension of this research.

The goal of this research is to provide more information about computer anxiety in relationship to computerized accounting. This information will produce implications and recommendations for instructional strategies concerning computer anxiety.

The information that was provided in Chapter I is an introduction to the research study. Chapter II (Review of Literature) analyzes the pertinent studies that have been done on the research topic. The method and procedures by which the study was carried out will be presented in Chapter III. Chapter IV (Findings) will provide the analysis and results of the study. Finally, in Chapter V the study will conclude with a summary, conclusion and recommendation section.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this review of literature was to discuss the current research findings related to computer anxiety. Literature in this area was so limited that the review was expanded to include articles relating to student attitudes toward computers as well as related studies of math anxiety and test anxiety.

This review of literature will first provide background information by discussing the role of computers in education. The literature review then addresses computers in business education with specific attention drawn to current uses in accounting coursework. The major portion of the literature review will concern students' reactions to computers. Topics included in this section are: definitions of anxiety and computer anxiety; current readings on computerphobia; student attitudes toward computers and computerized instruction; and factors of personality, sex, age and computer experience. Finally the chapter will conclude with related studies of math and test anxiety.

COMPUTERS IN EDUCATION

Articles began to appear concerning computer use in instruction around the mid-1960's. McEwing and Roth (1985) stated that current school districts have increased their purchases of microcomputers about 50 percent per year. This rapid growth in software and

hardware provided a great challenge to educators in dealing with computer based instruction (CBI) (p. 19).

Bork (1978) stated that computer programs used to aid learning cover a wide variety of methods such as drill and practice, games, tutorials, simulations and statistical analysis. A major advantage to this method of instruction was the need for students' to "interact with the material" (p.190). Rockart and Scott-Morton (1975) have noted that for the past ten to fifteen years computer uses in teaching was dominated by the "Skinnerian model of learning with an emphasis on fill-in-the blank computer page turners." They expressed the strong opinion that computer assisted instruction projects had not received careful unbiased evaluation. Many of the computer projects disappeared leaving little impact when funding disappeared (p. 278).

Stevens (1982) surveyed educators' opinions of computers in education using a random sample of K-12 Nebraska teachers and all student teachers and staff members of the University of Nebraska-Lincoln Teachers College. More educators viewed computers as advantageous and beneficial. Student teachers showed more anxiety and were less likely to see advantages to computers in education. They also felt less qualified and less enthusiastic about teacher training programs including computer coursework. The author indicated a possible reason for student teacher response could be a technological generation gap (p. 14). Several readings during this literature search indicated that teachers' attitudes were crucial in determining students' attitudes towards computers (Clement, 1981, p.28; Stevens, 1982, p.1).

The above section discussed teaching with computers to supplement instruction. As well as supplemental instruction, business educators must focus on the teaching of computer operations. The role of computers in business education will be discussed in the following section.

COMPUTERS IN BUSINESS EDUCATION

Iannizzi (1980) described increases in computer technology as drastically affecting business students' coursework. Students must be able to explore alternative procedures and machines. She described future business offices as utilizing "integrated data and word processing centers, microfilming, computer conferencing, and electronic mail" (p. 217-18). Smiley (1981) stated that microcomputer and micrographics applications will require skills in "preparation, editing, and verification of management and financial reports" (p.50).

Opinions about the manner in which data processing procedures should be incorporated into accounting vary. Smiley (1981) and Bettinger and Bettinger (1986) indicated the need for greater progress in integrating accounting and data processing (p. 37 and p. 34). Alexander (1985) indicated a second semester data processing course with an accounting application section would be the best approach (p. 18). Bialaszewski and Associates (1986) identified many colleges that are trying to provide the students with computerized accounting applications. They cited several surveys of accounting firms and accounting association members which indicated an increasing need for entry-level accountants to have computer

application experience (p. 34). Bettinger and Bettinger (1986) indicated many institutions had not yet integrated any computer software into elementary accounting courses. Only 32 percent of respondents were actually using accounting applications, although several planned to. Software choices were varied with most of the computerized practice sets being in-house creations. Some of the current packages included spreadsheet functions, data base systems, and word processing in an integrated software package (p. 34-36).

This growing computer impact on the business curriculum must also focus on the positive and negative reactions of students to computers. Research on this topic will be discussed in the following section.

STUDENT REACTIONS TO COMPUTERS

Clement (1981) indicated students' attitudes about using computers are crucial to the learning environment (p. 28). The student reaction or attitude of anxiety can produce positive and negative results. A background of information concerning the psychological impact of anxiety in general is outlined.

Anxiety

Sieber (1977) summarized the definitions of anxiety as indicating a:

disturbing feeling that arises as a result of the lack of a clear standard of one's own, or of the possibility of failing to meet some perceived external standard (often one that is vaguely sensed rather than clearly defined) (p.12).

This basic human emotion can not be totally avoided. The negative

results are discomfort and nonproductive striving. Positive results can be a more satisfying view of life (p. 13). Sieber also related anxiety as having "physiological, phenomenological and behavioral manifestations." Some coping skills are bravado, escape, focus on the fear instead of the problem, or on how to avoid the problem instead of methods to solve the problem (p. 21). Also anxiety has been shown to aid learning and performance in simple tasks but can hinder complex tasks (p. 19).

Sieber (1977) citing Spielberger's 1966 research indicated the brightest students who had high anxiety scores obtained higher grades than did those with low anxiety scores. Students with less ability and high anxiety scores earned lower grades (p. 19). It would be interesting to know if the students perceived the coursework as difficult or not.

Computer Anxiety

Cambre and Cook (1984) condensed the research definitions of computer anxiety to include complex feelings of "fear, apprehension, hope and personal threat in dealing with computers." Computer anxiety is considered an anxiety state that can change over time (p. 12). O'Neil and Richardson (1977) indicated a higher state of anxiety occurred during difficult computer based learning tasks. They cited several studies which confirmed the reliability of their scale (p. 141).

Computerphobia was defined by Jay (1981) as resistance to talking or even thinking about computers, fear or anxiety which can cause physical side effects, and hostile or aggressive symptoms of

frustrations (p. 47). Maurer and Simonson (1985) and Jay (1981) identified some general behaviors of computer anxiety as follows:

- (1) avoiding computers and general computer areas;
- (2) unusual caution or fear of damaging the computer;
- (3) negative comments about computers;
- (4) attempts to cut short computer sessions;
- (5) feeling threatened by those who understand computers

(Maurer and Simonson, 1984, p. 5) (Jay, 1981, p. 47).

Personality Factors

Hoffman and Waters (1982) examined the relationship between personality types and student performance in computer-assisted instruction. Sensing types were found to complete the computer assisted program earlier. The extraverted, intuitive and perceptive types tended to drop out of the program. They concluded that learning by computer-assisted instruction seemed to favor those that are able to quietly concentrate, pay attention to detail, can easily memorize facts, and can stay with a single task until completion. This was also the definition of the Sensing type (p. 20-21). Lawton and Gerschner (1982) in their literature review listed a learning style for computers included: keyboard manual dexterity; attention to detail and accuracy; ability to learn visually; can sit still; can work alone; and has diagnostic and intuitive abilities (p. 51).

Belando and Winer (1985) researched computer anxiety and its relationship to personality types. The 1978 Vocational Preference Inventory of John Holland was used. Results indicated realistic types were more involved in math and computer classes. Artistic and

social types showed more negative attitudes toward computers and math. This was the second Texas Tech University study to show an overall low/mild computer anxiety. The subcategories reporting higher levels of anxiety were the creative, expressive and unconventional types. The authors expressed the opinion that the overall low anxiety scores could be due to individuals viewing computers as tools instead of objects for scientific information (p. 13).

Rockart and Scott-Morton (1975) stated that persons who were "less mature in academic style, sensitive and esthetic and not scientifically oriented" have a higher success rate when using computer-assisted instruction. Those who were "autonomous, independent thinkers and scientifically oriented in thinking" succeeded better with traditional instruction (p. 93). This would not conflict with the above statements since it described success rates and would depend upon the type of computer-assisted instruction used.

Coovert and Goldstein (1980) in their locus of control research determined that external subjects (those people who perceive events of their lives as out of their personal control) were more likely to have computer anxiety. They indicated that job satisfaction was related to the degree of perceived internal control (p. 1171).

Lee's (1970) research indicated how an individual perceived and gave meaning to computers depended upon their "fundamental values, personality and orientation in life." He indicated that people view the computer in one of two ways- as either a tool or as a superhuman thinking machine (p. 59).

Rubin (1983) listed the reasons behind computerphobia in the general public were: getting comfortable, lack of time, who's in charge, denying stupidity, fear of losing power, fear of breaking the computer, and unclear documentation (p. 56-57).

Sex, Age and Computer Experience Factors

Lloyd and Gressard (1984) surveyed high school, community college and liberal arts college students with a wide variety of backgrounds and found no significant difference between sex groups on computer attitudes (p. 14). Current findings by Massey and Englebrecht (1986) supported this finding (p. 39). Lloyd and Gressard (1984) also found a relationship between age and computer experience. Students 21 years or older with less than one week of computer experience showed more confidence with computers than those 16 to 18 (p. 14). Several researchers have indicated that computer experience related positively to attitudes toward computers (Lloyd and Gressard, 1984, p. 11; Cambre and Cook, 1984, p. 22; Massey and Englebrecht, 1986 p. 38).

Reydenburge, et. al. (1984) study regarding sex differences in attitudes differed with the findings above. This study of undergraduates indicated females held a greater fear of computers than males. Three out of four also labeled the computer as male. The author indicated supportive literature for this stereotyping (p. 8-10). Two out of three studies reviewed by Cambre and Cook (1984) showed gender as significant in computer anxiety (p. 31).

The research of Jackson and Yamanaka (1985) indicated that women who did not enjoy computers had lower technical goals and a lower

understanding of technical terms. Of particular interest was the fact that a majority of the women surveyed believed other women had more computer knowledge than themselves.

Tavris (1986) described the roots of computer anxiety in a recent Vogue magazine article. She disagreed with the current focus on the reasons girls and women were turned off by computers which are math phobia, computer anxiety or some other neurosis. Her interviews with experts in the field described the problem as being the "culture of computers." This culture was described as "macho, male-oriented and is at best uninteresting to girls and women and at worst actively irritates them." She suggested that educators and employers need to make the culture of computing more appealing to females (p. 262).

Some other areas that may aid in the understanding of computer anxiety is test and math anxiety. The following section briefly discusses this topic.

RELATED STUDIES

Gressard and Lloyd (1984) investigated the effects of math anxiety and computer attitudes using high school and college students in their survey population. They concluded that math anxiety was a small but important factor in computer anxiety (p. 7).

Bellando and Winer (1985) measured computer anxiety and its relationship to math anxiety and reported a significant correlation. Females scored a higher correlation than males (p. 20-21).

Cambre and Cook (1984) said that test anxiety has been studied for the past thirty years and that it consisted of two main factors: worry and emotionality. Emotionality did not relate to academic

performance but worry was found to limit performance. They found that math anxiety research was correlated with "gender, prior math exposure, math achievement, trait anxiety, test anxiety, attitudes toward math, parents' and teachers' attitudes toward math" (p. 9). Computer anxiety research can draw from test and math anxiety.

In a final point about mathematical and computer skills, McEwing and Roth (1985) stated that the mathematical step-by-step problem solving process can cause frustration when students communicate with computers. Humans may often use mental leaps and bypass steps in solving problems. Student adjustment to this process may need refinement (p. 19).

SUMMARY

Computer anxiety research is limited at this time. This limitation severely affects any interpretation of the research. Many studies reviewed did not build on previous research. The research studies reviewed sought to identify computer anxious individuals or potentially anxious individuals and did not identify many causes of anxiety. The studies that did look at anxiety variables looked at gender, math ability, personality types, age levels and previous experience.

Identifying computer anxious individuals has served many useful educational and industrial purposes. However, to expand this topic to get at more specific causes of computer anxiety will greatly enhance the learning process of students who choose the computer environment as a career. The next chapter will examine the procedures used in this study in an attempt to obtain this

information on the causes of computer anxiety.

CHAPTER III

METHODS AND PROCEDURES

This chapter will describe the methods and procedures used in conducting the study. The chapter includes a description of the population and a description of the instrument used in gathering the data and how it was constructed. The procedures used for collecting and treating the data will also be described.

DESCRIPTION OF POPULATION

Students enrolled in Accounting II day classes at the Kee Business Colleges of Norfolk, Portsmouth and Newport News constituted the population for this study. The study was conducted during March 1987. The entire population of 93 Accounting II day students were included in the survey. The study reported separately the responses from the students indicating no previous computer experience and those indicating past computer experience. Studies have indicated that the more exposure a person had to computers the less anxious he became.

Business college students were a unique population. A majority of the population was made up of female disadvantaged minority students. The population in this study consisted of 72 females and 11 males. Most of the population was between 18-21 years of age.

The students in this survey population were utilizing the Alpha Micro Operating System (AMOS). The computer application used was a standard business accounts payable software. The student instruction

sheets were in-house prepared. The student had to input vendors' names and addresses, invoices, credit memos, account numbers and designate specific vendor payments. Print outs included Vendor File, Voucher Register, Cash Requirements Report, Pre-Check Writing Edit List, Checks, and an Aged A/P Trial Balance. The accounting application was intended to provide the student with office style accounting computer experience. Each subsequent accounting course at Kee Business College utilized a different computerized accounting application. It was very important for the student's initial computer experience to be well planned and as positive as possible.

DESCRIPTION OF INSTRUMENT

The instrument utilized in this study was in the form of a questionnaire/survey format. The survey was designed so that as little writing as possible would be required. The introduction to the questionnaire explained the purpose and use of the questionnaire responses. For background purposes and to better define the population, the respondent was asked to indicate his/her sex and age.

The questionnaire solicited a response to a question concerning past history of computer use. The respondent was asked to answer yes or no to having had computer exposure prior to entering Accounting II. To better verify his/her response of yes, the student was asked to explain his/her response and give examples such as high school, work, etc. As indicated previously, the data from students reporting prior exposure to computers were tabulated separately.

The student was asked to evaluate his/her level of anxiety

before and after the computer applications on a five point Likert Scale with one indicating very comfortable and five indicating very uncomfortable feelings. The questionnaire then divided the computer problem areas into two groups: hardware and computer environment and software and instructional aspects. The computer problem areas were obtained by utilizing the researcher's personal teaching experience, input from teachers in the field of computerized accounting (Kee Business College, Tidewater Community College) and opinions of former Accounting II students in the quarter prior to the survey. The survey was refined to include only the variables most commonly suggested. The students were asked to prioritize their opinions from one to ten concerning computer hardware and environment items and one to twelve concerning computer software and instruction factors. Rank number one indicated a strong problem area and the higher number choice represented the least experienced problem. Space was provided at the end of the questionnaire for comments regarding the students' computerized accounting experience. This allowed the student to express any other opinion not supplied in the closed question format. A copy of the survey is found in the Appendix.

DATA COLLECTION

The survey questionnaire was administered in March 1987. A convenient time was arranged with each instructor after the computerized portion of Accounting II was completed. The researcher called each instructor prior to the date agreed upon to confirm the survey appointment time. The researcher personally conducted the research survey in each accounting class. A thank you letter was

sent to each instructor following the classroom survey. A copy of the research findings was sent to each campus and to the President of the school.

TREATMENT OF THE DATA

The data responses for sex and age level were provided to better define the population. A five point Likert scale was used to obtain information regarding levels of anxiety before and after the computer application experience. The range of the Likert scale was from one (indicating very comfortable) to five (indicating very uncomfortable). The responses for each campus and an overall total were tabulated as well as the percentage of the population selecting each Likert category.

The mean score of the student rankings of each variable under the heading of computer hardware-environment and computer software-instruction were calculated. All questionnaire items were tabulated separately for students with no computer experience and for those with computer experience.

A final section allowed the students to make comments about computerized accounting. A list of these comments was compiled for refinement of the computerized accounting coursework or for use in any subsequent studies.

SUMMARY

The methods and procedures by which the research was conducted were presented in Chapter III. The population, instrument, and data collection and treatment procedures were discussed.

The population included Kee Business College day Accounting II students during the Winter Quarter of 1987. The entire population of 93 students was surveyed. The instrument used was a self-designed survey questionnaire. This survey obtained information regarding anxiety levels before and after the computer application experience, difficulties in computer hardware, environment, software and instructional aspects. The findings of this survey will be presented in the next chapter.

CHAPTER IV

FINDINGS

The problem of this study was to determine the anxieties of business college accounting students toward microcomputer usage. The study looked at computerized accounting in Accounting II and sought to determine student anxiety areas. This effort was to provide information and teaching suggestions regarding computer anxiety difficulty areas.

POPULATION

The total number of surveys administered were 93, of which 83 were useable. Of the useable surveys 40 came from the Newport News campus, 27 from the Norfolk campus and 16 from the Portsmouth campus.

There were 72 female and 11 male respondents. No previous computer experience was indicated by 39 respondents and 44 indicated previous computer experience. The response on each campus were - Newport News, 25; Norfolk, 9; and Portsmouth, 5 indicating no previous computer experience. Students who indicated computer experience were: Newport News, 15; Norfolk, 18; and Portsmouth, 11. Since there were so many students who had previous computer experience their totals are reported to highlight differences and similarities.

The findings of the survey will be presented in five sections. These sections will relate to: the age distribution regarding

previous computer experience; the level of anxiety related to before and after computerized accounting exposure; rankings of computer hardware and environment variables; rankings of computer software and instruction variables; and a summary of the student comments from the open format question.

COMPUTER EXPERIENCE AND AGE RANGE

The survey requested respondents to indicate his/her age range by selecting a choice of 18-21; 22-25; 26-30; 31-35; 36-40; and above 40. The data was tabulated separately based on computer experience (Yes, No selection). Table 1 revealed the findings overall and on each campus regarding age and former computer experience.

COMPUTER ANXIETY LEVELS

The survey requested that students answer two Likert style questions regarding their comfortableness with using a computer before and after the accounting computer application. The two questions asked the student to select from a five-point Likert scale. The Likert scale selections were: 1-very comfortable; 2-moderately comfortable; 3-not certain; 4-moderately uncomfortable; and 5-very uncomfortable.

Table 2 provided a summary of the Likert scale responses regarding anxiety levels of students before and after the computerized accounting application. Table 3 related the changes in computer anxiety as measured by the shift in Likert scores from before to after the accounting computer application for respondents who had no previous computer experience.

TABLE 1
COMPUTER EXPERIENCE AND AGE RANGE

Age Range	Total	No Computer Experience			Total	With Computer Experience		
		N. News	Norf.	Ports.		N. News	Norf.	Ports.
18-21	14	13	0	1	23	11	7	5
22-25	10	6	3	1	9	2	5	2
26-30	8	4	3	1	6	1	3	2
31-35	4	0	3	1	4	1	1	2
36-40	2	2	0	0	1	0	1	0
over 40	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Grand Total	39	25	9	5	44	15	18	11

TABLE 2
COMPUTER ANXIETY LEVELS BEFORE AND AFTER
COMPUTER APPLICATION EXPERIENCE

Anxiety Selection	No Computer Experience (n=39)		Newport News		Norfolk		Portsmouth	
	Before	After	Bef.	Aft.	Bef.	Aft.	Bef.	Aft.
1- Very Comfortable	0 (0%)	9 (23%)	0	8	0	0	0	1
2-Moderately Comfortable	13 (33%)	17 (43.5%)	10	8	2	6	1	3
3- Not Certain	14 (36%)	8 (20.5%)	8	5	5	3	1	0
4-Moderately Uncomfortable	8 (21%)	5 (13%)	7	4	0	0	1	1
5- Very Uncomfortable	4 (10%)	0 (0%)	0	0	2	0	2	0
Anxiety Selection	With Computer Experience (n=42)		Newport News		Norfolk		Portsmouth	
	Before	After	Bef.	Aft.	Bef.	Aft.	Bef.	Aft.
1- Very Comfortable	23 (55%)	22 (53%)	5	3	9	10	9	9
2-Moderately Comfortable	15 (36%)	19 (45%)	6	11	7	6	2	2
3- Not Certain	4 (9%)	1 (2%)	3	0	1	1	0	0
4-Moderately Uncomfortable	0	0	0	0	0	0	0	0
5- Very Uncomfortable	0	0	0	0	0	0	0	0

*81 responses with 2 students not responding to an after computer application question (1 student from Norfolk and 1 from Newport News)

TABLE 3
CHANGE IN STUDENT ANXIETY AS MEASURED
BY SHIFT IN LIKERT SCORES AFTER COMPUTER EXPERIENCE

Change in Likert Score*	Total** n=39	Newport News	C A M P U S Norfolk	Portsmouth
-2	1	1	0	0
-1	1	1	0	0
0	10	6	3	1
+1	20	14	2	4
+2	5	3	2	0
+3	2	0	2	0
+4	0	0	0	0

* positive numbers indicate lower anxiety (more comfortable)

** totals include only students with no previous computer experience
since those with computer experience showed minimum improvement
(see Table 2)

Data was also calculated relating age and anxiety level responses. Out of a total of 15 students 26 years of age and older, there were three students who selected very uncomfortable and four who selected moderately uncomfortable before using a computer. Out of a total of 14 students in the 18-21 year old range, no student selected very uncomfortable and two selected moderately uncomfortable before using a computer. The students with past computer experience, regardless of their age, grouped themselves around very comfortable and moderately comfortable feelings toward computer useage before the Accounting II computer application.

COMPUTER HARDWARE AND ENVIRONMENT FACTORS

The third section in the survey asked the respondents to rank in order from one to ten a list of hardware and environment factors that may have caused difficulty when working with the computer. Rank number one indicated the area that caused the student the most difficulty and rank number ten indicated the area of least difficulty.

Table 4 related the mean value of the ranking of each of the ten hardware and environment factors from students indicating no previous computer experience. Table 5 presented the mean value from students indicating past computer exposure. Tables 4 and 5 listed in rank order the hardware and environment factors based on the mean value calculated.

TABLE 4
COMPUTER HARDWARE AND ENVIRONMENT FACTORS
NO PREVIOUS COMPUTER EXPERIENCE

Ranking	Factors	Mean Score n=39
1	Unsure of how to operate the computer	2.92
2	Did not fully understand keyboard commands	3.97
3	Waited a long time for the printer	5.18
4	Printer failed to work properly	5.41
5	Afraid the computer would breakdown	5.67
6	Computer was down too often	5.79
7	Computer room was crowded	6.10
8	Computer did not do what it was supposed to do	6.26
9	Computer room atmosphere was threatening	6.64
10	Computer screen bothered the eyes	6.82

TABLE 5
COMPUTER HARDWARE AND ENVIRONMENT FACTORS
COMPUTER EXPERIENCE

Ranking	Factors	Mean Score n=44
1	Printer failed to work properly	4.34
2	Computer room was crowded	4.77
3	Waited a long time for the printer	4.91
4	Did not fully understand keyboard commands	5.16
5	Afraid the computer would breakdown	5.61
6	Computer was down too often	5.77
7	Computer did not do what it was supposed to do	5.86
8	Unsure of how to operate the computer	6.05
9	Computer room atmosphere was threatening	6.09
10	Computer screen bothered the eyes	6.30

COMPUTER SOFTWARE AND INSTRUCTION FACTORS

The next section in the questionnaire asked the students to rank the computer software and instruction factors from one to twelve. Rank number one indicated an area with a high level of difficulty and twelve represented the lowest difficulty factor.

Table 6 indicated the mean value of the rankings of each of the twelve software and instruction factors from students indicating no previous computer experience. Table 7 itemized the mean value from the students with past computer experience. The software and instruction factors were listed in the rank order that was obtained from the mean value calculated.

STUDENT COMMENTS

The survey included an open format question to allow the students the freedom to list any additional factors that they felt were important problem areas in computerized accounting. The problem areas mentioned were: (1) not enough time to understand what they were doing; (2) lack of enough teachers for the number of questions at the terminals; (3) afraid they would do something wrong and wanted a trial run; (4) didn't know what they were doing; (5) needed lectures on basic commands and computer functions; (6) slow computer and printer; (7) language was very different; (8) not enough printers or computers; (9) and told not to do certain things but not why. One student comment expressed her point very vividly by stating "it was like an instructor asking me to take out the #4 piston on a 747 plane (which I've never seen) and giving me instructions in half English, half Spanish (I know some spanish)."

TABLE 6
SOFTWARE AND INSTRUCTION FACTORS
NO PREVIOUS COMPUTER EXPERIENCE

Ranking	Factors	Mean Score n=38*
1	Computerized accounting terminology was unclear	4.24
2	Computer terms were unclear	5.50
3	Hard to locate and correct errors on computer	5.76
4	Too rushed to complete assignments	6.00
5	Needed to understand computer programming	6.16
6	Could not relate computerized accounting to manual style accounting	6.45
7	Afraid of losing the data that was entered	6.76
8	Written instructions for simulation were confusing	7.03
9	Accounting menu choices were confusing	7.13
10	Teacher did not fully explain the system operation to my level of understanding	7.21
11	Had unanswered questions	7.32
12	Could not understand printout data	8.37

*1 student did not complete the software and instruction section

TABLE 7
SOFTWARE AND INSTRUCTION FACTORS
COMPUTER EXPERIENCE

Ranking	Factors	Mean Score n=42*
1	Afraid of losing the data that was entered	4.43
2	Too rushed to complete assignments	4.50
3	Hard to locate and correct errors on computer	5.55
4	Written instructions for simulation were confusing	6.07
5	Computerized accounting terminology was unclear	6.26
6	Accounting menu choices were confusing	6.33
7	Needed to understand computer programming	6.81
8	Could not relate computerized accounting to manual style accounting	7.12
9	Had unanswered questions	7.14
10	Computer terms were unclear	7.14
11	Could not understand printout data	7.74
12	Teacher did not fully explain the system operation to my level of understanding	8.50

*2 students did not complete the software and instruction section

SUMMARY

This chapter presented the statistical information gathered from the survey of Accounting II students. Survey results were presented in seven tables. These tables tabulated the results separately for the respondents indicating no past computer experience and for those indicating previous computer exposure. The information presented in Chapter 4 related to age distribution; level of anxiety before and after the computer application; rankings of perceived difficulty in hardware and environment factors; rankings of perceived difficulty in software and instruction factors and additional student comments.

The final chapter of this research study will provide a summary of the study. Chapter 5 also draws conclusions from the survey data and provides recommendations for strategies to assist students with the transition into computerized accounting.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

Computerized accounting was an important aspect of the accounting student's career training. Accounting firms and businesses were asking students to have as much familiarity as possible with computerized accounting procedures. This study originated from the desire to provide the best possible learning environment for accounting students when dealing with computers.

The problem of this study was to determine the anxieties of business college accounting students toward microcomputer usage. The study looked at computerized accounting in Accounting II and determined student anxiety areas. The study attempted to answer the research questions: (1) what were the factors that lead to computer anxiety among business college accounting students; (2) what areas in computerized Accounting II applications caused problems; and (3) how could these computer anxiety factors be alleviated.

Data was collected using a questionnaire/survey format. The survey was conducted in March, 1987 at the Kee Business College campuses of Newport News, Norfolk and Portsmouth. Accounting II day students were the respondents. The Accounting II computer application was an accounts payable business application. The researcher personally administered the survey at each campus and had the approval of the President of the schools.

A total of 23 questionnaires were utilized in the study. The

questionnaire solicited information dealing with previous computer experience, anxiety levels before and after the computerized accounting application, rankings of difficulty factors in hardware and environment and in software and instruction. Data was tabulated separately for students indicating past computer experience.

CONCLUSIONS

The research showed that most of the students in this population fell into the typical college age range of 18-21. There was a slight trend of older students (26 and above) who indicated no past computer experience. Analysis indicated 38 percent of the students with no computer experience were 26 years of age and older versus 27 percent for students with computer experience.

In the before computer experience data of students with no past computer experience the older student showed a slightly higher degree of anxiety. The students with past computer experience, regardless of their age, grouped themselves around very comfortable and moderately comfortable feelings toward computer useage before the Accounting II computer application.

It was found that a large percentage of students with no past computer experience were moderately comfortable (33 percent) with the computer. The remaining categories were: 0 percent very comfortable; 36 percent not certain; 21 percent moderately uncomfortable and 10 percent very uncomfortable. These perenctages represented a wide range of selection among the no computer experience respondents.

The data showed that a majority of the students with no computer

experience displayed some improvement in their anxiety levels from before to after the computer application. These students showed an improvement of one Likert scale number indicating that after the computerized accounting application these students should find using a computer much easier. The students with past computer experience showed no noticeable improvement.

The assessment of experienced and nonexperienced computer users regarding computer hardware and environment factors had differences and similarities. Students who had no previous computer experience indicated computer operation and keyboard commands as high difficulty areas. Students with computer experience centered their attention on printer problems and overcrowded rooms. Both groups placed fear of computer breakdown fairly high in their rankings. Both groups did not see computer atmosphere and viewer screens as major problem areas.

There was a wider range of mean values in the responses of students with no computer experience (2.92-6.82) in comparison to students with computer experience (4.34-6.30). This appeared to indicate there were less extreme consensus with the computer experienced students.

The software and instruction factors indicated that students who had no previous computer experience assigned the highest difficulty ranks to terminology (computer and computerized accounting). Although they ranked the teacher's explanation of the system operations low (rank ten out of twelve) the students felt they needed a better understanding of terminology. Computer experienced students (perhaps due to past experiences) ranked the loss of data as their

highest difficulty area. Both groups felt they were too rushed to complete the assignments (rank four for nonexperienced and two for experienced).

RECOMMENDATIONS

Some recommendations to improve computerized Accounting based on the research findings were presented. Although computers were becoming more user "friendly", instructors must interpret many areas of terminology for the novice student. This was especially true in computer accounting. Students ranked computer operation, computer terms as well as accounting software terminology as difficulty areas. One way to improve this area would be to preview the computer functions, computer terms and accounting terms before the application begins. Another way was to provide several stops during the computer application to discuss material and provide a review of the computer application when it was completed.

Students indicated that they wanted to spend more time on the accounts payable simulation. Trial and error was the way many of us have adapted to computer problems and the student needed the computer time to develop similar abilities. The problem, of course, was limited computer terminals and computer time allotted to the accounting students. Administrators of the school needed to schedule as much time as possible for the accounting students. Instructors needed to present the simulation in more than a one shot process. A smaller project could be walked through step-by-step and then allow students to complete a similar problem on their own. Access to computer manuals with specific questions to look up would also aid

the student as he/she adapted to a business environment.

Students listed understanding computer operations and correcting of errors as high difficulty areas. Instruction in computer logic would aid the students' ability to "think" at the terminal. Students had a problem understanding that a person intuitively skips many steps in the thinking process to arrive at a solution but a computer must take each individual step (McEwing and Roth, 1985 p. 19).

Students ranked number five to the understanding of computer programming. Accounting students do not need to become computer programmers but familiarizing themselves with the logic process would help them deal with computer technicians and programmers on the job.

Student's level of ease with the computer was largely due to the attitude expressed by the instructor. The more comfortable and at ease with the material the instructor was the better the learning environment. According to the findings of this research the instructors were doing an excellent job in this area. However, according to the comment sections more instructors for the large number and variety of questions would be helpful. This researcher found it helpful to use advanced students to help with this area whenever it was possible.

Further research in computer anxiety of business college students in other disciplines would add to this research. Some examples were: word processors used in English classes; diagnostic and medical record computer procedures for medical assistants and legal, medical or general secretarial transcription.

Hopefully, this research shed some light on computer anxiety areas in general and specifically with computerized Accounting II.

Instructional strategies presented were recommended as an outgrowth of the findings of this research.

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APPENDIX

COPY OF THE QUESTIONNAIRE USED IN THIS STUDY

COMPUTERIZED ACCOUNTING SURVEY

Directions:

The purpose of this questionnaire is to determine the areas in computerized accounting that cause difficulty. If these problem areas can be identified, then better strategies for teaching computerized accounting can be devised.

Please answer the following questions carefully since your responses will help future accounting classes. Thank you for your input.

Questions:

- (1) Have you ever used a computer before your computer experience in Accounting?
YES OR NO

If YES please describe past experience. (such as in what course, number of times, at work, etc.)

- (2) Before your computer experience in Accounting, which of the following describes how comfortable you were in using a computer?

1	2	3	4	5
very	moderately	not	moderately	very
comfortable	comfortable	certain	uncomfortable	uncomfortable

- (3) Which of the following would describe how comfortable you are now with using a computer after your computer experience in Accounting?

1	2	3	4	5
very	moderately	not	moderately	very
comfortable	comfortable	certain	uncomfortable	uncomfortable

- (4) **HARDWARE AND COMPUTER ENVIRONMENT FACTORS:** The following are items that may cause difficulty in working with a computer. Please rank each of the items with a number from 1 to 10. Rank #1 will be given to the item that produced the most difficulty and rank #10, the item that produced the least difficulty. Be certain to place a different rank number (1-10) next to each item.

- _____ Unsure of how to operate the computer
- _____ Printer failed to work properly
- _____ Afraid the computer would breakdown
- _____ Computer screen bothered the eyes
- _____ Did not fully understand keyboard commands
- _____ Computer room was crowded
- _____ Computer room atmosphere was threatening
- _____ Computer was down too often
- _____ Computer did not do what it was supposed to do
- _____ Waited a long time for the printer

- (5) SOFTWARE AND INSTRUCTION FACTORS: Please rank each of the items with a number from 1 to 12. Rank #1 will be given to the item that produced the most difficulty and rank #12, the item that produced the least difficulty. Be certain to place a different rank number (1-12) next to each item.

_____ Computer terms were unclear (example: home, delete, logon, etc.)
 _____ Accounting menu choices were confusing
 _____ Computerized accounting terminology was unclear (example: vendors, master file maintenance, system initialization, etc.)
 _____ Could not understand printout data
 _____ Too rushed to complete assignments
 _____ Hard to locate and correct errors on computer
 _____ Teacher did not fully explain the system operation to my level of understanding
 _____ Could not relate computerized accounting to manual style accounting (understand the flow of information)
 _____ Needed to understand computer programming
 _____ Written instructions for simulation were confusing
 _____ Afraid of losing the data that was entered
 _____ Had unanswered questions

- (6) Please list other variables which led to problems in computer usage.

- (7) Please check your age and sex category.

AGE	_____ 18-21	SEX	_____ Female	_____ Male
	_____ 22-25			
	_____ 26-30			
	_____ 31-35			
	_____ 36-40			
	_____ above 40			

- (8) Campus you are enrolled _____.