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Title: An Analysis of the Attitudes of Traditional-Aged and Non-Traditional-Aged Females About Computers in Word Processing Classes at Oregon's Community Colleges.

Abstract approved _Redacted for Privacy
Dr. Margaret McDonnall Belike

Today's office worker is being expected to operate computers in order to increase office productivity. While learning the new technology is a positive challenge for most people, some students experience a negative computer attitude when faced with computer training. This study sought to determine if there were significant differences about computer attitudes among females enrolled in introductory computer word processing classes in Oregon's community colleges.

A sample of 125 traditional-aged females and 125 non-traditional-aged females was surveyed using the Computer Attitude Scale (CAS) developed by Brenda Loyd and Clarice Gressard. A t-test was used to compare groups on the CAS total scale and four subscales. No significant difference at the .05 level was found between the two groups on the total scores in the CAS. No significant differences were found on the two subscales: Computer Confidence

and Computer Usefulness. However, on the Computer Anxiety Subscale, the non-traditional-aged group scored significantly lower than the traditional-aged group. There was also a significant difference on the Computer Liking subscale with the traditional-aged group scoring lower than the non-traditional-aged group.

The implications of the study resulted in the recommendations that the instructors be alert to students' attitudes about computers as they are exposed to new office technology and that those instructors who gather, design, and scientifically test successful strategies in relieving negative attitudes share their methods with other teachers. It was also recommended that a correlation study between computer attitudes and word processing performance be made. Further recommendations for scientific studies included students' attitudes about technology other than word processing, the affect of age difference on students' attitudes, the affect of the amount of time of previous employment of students' attitudes, and the affect of previous computer experience on students' attitudes.

An Analysis of the Attitudes of Traditional-Aged and Non-Traditional-Aged Females About Computers in Word Processing Classes at Oregon's Community Colleges

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Typed by Deborah K. Safley for Judith A. Fletcher

Dedicated to

Carlton,

"...the wind beneath my wings."

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CHAPTER ONE

Introduction

The computer has reached America's offices, and the demand for its uses is growing daily. Word processing is rapidly replacing typewriting, and desktop computers are becoming standard equipment. A majority of office workers, whose mastery of typing skills and knowledge of proper formatting once made them productive members of the office team, are becoming aware that their knowledge and skills are no longer up-to-date. Now, they are forced to become as proficient at computer word processing production as they have been at typing production. Young people seeking their first jobs in the office occupations and those re-entering the work force are finding that positions now require some degree of skill in computer word processing. Office workers, therefore, must join countless others in the quest for computer literacy and knowledge of computer operation.

It has been found that public school and college students, as well as their teachers, generally have a positive attitude about these computers. However, many experts have found that a number of people in these groups are experiencing anxiety, lack of confidence and/or just plain dislike when

are experiencing anxiety, lack of confidence and/or just plain dislike when confronted with this new technology (Toris, 1984; Dambrot, Watkins-Malek, Silling, Marshall, & Garver, 1985; Cambre & Cook, 1987; Lewis, 1988). This is further discussed in journal articles by Jay (1981), Kilpatrick (1984), and Rappaport (1985). Knight (1979) argued that these negative feelings are basically caused by "future shock." Kilpatrick (1984) stated that some people regard computers as "modern-day Houdinis" that arouse a feeling of uncertainty when persons are faced with trying to comprehend and control them. Gross (1983) spoke of the "resistance to change" that adults experience when asked to learn to use computers. Both Jay (1981) and Baylor (1985) discussed some people's desire to avoid talking about or even thinking about computers.
It has been observed that some students in Oregon's community college introductory word processing classes, who are office workers or potential office workers, have a negative computer attitude. However, there is no scientific evidence to tell instructors how widespread it is or even if it exists. Therefore, instructors need to be able to identify if students have a negative attitude about computers. If they do, instructors need to help these students attain the best possible attitude about the new technology as they emerge from their training in preparation for work in an office.

This study singled out women in Oregon's community colleges who were enrolled in beginning word processing classes. It examined the attitude they had about computers by asking the following questions: 1) Are students

anxious about computers? 2) Do students have confidence in their ability to work with computers? 3) Do students like computers? and 4) Do students really believe computers are useful? Women were labelled "traditional-age females" if they were 21 years of age or younger. Those whose ages were 22 or older were labelled "non-traditional-aged females" for the purpose of identifying the two groups studied.

Purpose of the Study

The purpose of the study was to determine if there was a significant difference in computer attitudes between the traditional-aged or the non-traditional-aged females enrolled in Oregon's community colleges' introductory word processing classes.

Need for the Study

Women in the work force and those seeking employment in the office occupations need to be able to operate computers for word processing and other purposes in the office. When they suffer a negative attitude about computers, their ability to learn is hindered. Teachers need to understand better the attitudes of their female students in order to design a curriculum that is responsive to those attitudes.

Statement of the Problem

Problems addressed in this study were the following:

1. Do non-traditional-aged women have a more positive or a more negative attitude about computers than traditional-aged females when they begin a word processing course?
2. Do non-traditional-aged women have a higher or lower level of anxiety about computers than traditional-aged females when they begin a word processing course?
3. Do non-traditional-aged women have a higher or lower level of confidence in using computers than traditional-aged females when they begin a word processing course?
4. Do non-traditional-aged women have a higher or lower level of liking about computers than traditional-aged females when they begin a word processing course?
5. Do non-traditional-aged women have a different level of perception of the usefulness of computers than traditional-aged females when they begin a word processing course?

Hypotheses Tested

The following null hypotheses were tested for the presence or absence of a significant level of negative computer attitude in the two selected groups:

Ho1. There is no significant difference on scores between traditional-aged and non-traditional-aged females on overall attitudes about computers as measured by the Computer Attitude Scale (Loyd & Gressard, 1985) when those students begin a word processing course.

Ho2. There is no significant difference in the scores between traditional-aged and non-traditional-aged females for the computer anxiety attitude as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho3. There is no significant difference in the scores between traditonal-aged and non-traditional-aged females for the computer confidence attitude as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho4. There is no significant difference in the scores between traditional-aged and non-traditional-aged females for the computer liking attitude as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho5. There is no significant difference in the scores between traditional-aged and non-traditional-aged females for the computer usefulness attitude as measured by the Computer Attitude Scale when those students begin a word processing course.

Delimitations

1. Only females were included in this study.
2. There was no attempt to determine the computer attitude of individually identified students in the classes in which the Computer Attitude Scale was administered.
3. The attitudes measured were limited to those illicited by the Computer Attitude Scale.
4. No attempt was made to study statistically: a) prior college education, b) major area of study, or c) prior experience with computers.
5. There was no attempt to study differences in age beyond the division of students under the age of 22 and those 22 years of age and older.
6. There was no attempt to define the type of computer being used in those classes where the Computer Attitude Scale was being administered.
7. No attempt was made to define the type of software being used or the type of hardware being used in those classes in which the Computer Attitude Scale was being administered.

Limitations

1. The study was limited to those females who were enrolled in community college introductory word processing courses at the time the Computer Attitude Scale was administered.

2. The study was limited to those intact classes which could be reached as a result of cooperation by administrators and business educators in the State of Oregon.
3. The population of the intact classes for Fall and Winter quarters were assumed to be characteristically the same.
4. The population was limited to an intact group of students who were enrolled in the courses in which the instrument was being administered.
5. It was not possible to control the effects on the outcome of the scores that were generated by variables such as interaction of students as they entered the classroom, physical proximity to the computers in the room, introductory comments made by the instructor to the class before the test was administered, and differences in the physical setting.
6. The assumption was made that students were answering the questions on the survey honestly.

Definition of Terms

Community College. A two-year college, usually non-residential, in the State of Oregon that is supported by district, state, and federal government.

Computer. A desk-top microcomputer, sometimes known as a personal computer. Examples of common computers in use in colleges today are: Apple II+ and IIE, IBM PC, IBM compatibles, and HP 150.

Computer Attitude Scale. An instrument developed by Brenda H. Loyd and Clarice Gressard (1985) for the purpose of measuring computer attitudes. Contains components of overall computer attitude questions designed to measure computer anxiety, computer confidence, computer liking, and computer usefulness.

Computer Confidence. Confidence in the ability to use or learn about computers.

Computer Liking. Liking computers or enjoying working with them.

Computer Usefulness. The importance of or usefulness of computers in today's world.

Microcomputer. A small computer intended for use by one person; a personal computer.

Microcomputer Applications. Programs written in computer language to produce word processing, spreadsheets, graphics, and other computer generated uses.

Non-traditional-aged Females. Students whose ages were 22 or older and who have enrolled in a community college class after a period of time spent in some other pursuit.

State Anxiety. Subjective, consciously perceived feelings of apprehension and tension brought by certain events which can be acted upon and changed (Spielberger, 1966).

Technology. The hardware and software that provide increased productivity in the output of typewritten documents.

Traditional-aged Females. Students under the age of 22 who have enrolled in a community college class.

Trait Anxiety. "A relatively stable condition of anxiety" (Dreger, 1978, p. 1094).

Word Processing. The production of printed documents with automated computer typing and text-editing equipment.

Word Processor. A keyboard-operated terminal usually with a video display and a magnetic storage device for use in word processing; also software to perform word processing.

CHAPTER TWO

Related Literature

Since computers have come into the lives of so many Americans, there has been much discussion in the literature about their impact on people. A great deal of investigation has centered on the reactions of people toward computers and on how to help people to accept, understand, and even come to embrace the latest in automation. Anxiety in general and computer anxiety in particular have been the subject of extensive research. Several groups have been studied in detail concerning anxiety. They include businessmen, teachers, and students of various ages. Males and females have also been compared to see which gender has a greater degree of acceptance of this technology.

Anxiety

Epstein (1972) analyzed many of the definitions of anxiety and distilled them into the statement that anxiety is a "state of diffuse arousal following the perception of threat, or alternately, as unresolved fear." When defining computer anxiety, writers refer to the idea that computers are personally threatening to some people. These persons believe computers will replace their jobs, monitor their work or reveal their weaknesses to their peers and superiors. In those people, even a conversation about computers arouses anxiety (Knight, 1979). The words "fear," "hostility," "frustration," "discomfort," "avoidance," and

"resistance" are some of the descriptors used in discussions of those who have anxiety.

Computer anxiety has many synonyms in both research and applied literature. Jay (1981) gets credit by many researchers for first using the term "computerphobia" in print. Kilpatrick (1984) called it "computer phobia," and those who retreat from computers are called "phobics" by Toris (1984). The article in Business Week, "How to Conquer Fear of Computers" (1982) referred to the phenomenon of computer anxiety as "cyberphobia"; Feldman, Hollander, and Rezmovic (1985/86) used the term "technophobia." Whatever name is used, computer anxiety is apparently the latest form of anxiety to receive attention by researchers. Dukes, Discenza, and Couger (1989) found a high correlation among four different measuring tools and concluded that computer anxiety is a very robust concept. Following is a brief discussion of types of anxiety, locus of control, anxiety's relationship to mathematics, persons who are affected, and places where anxiety occurs.

State Anxiety

Several researchers, including C.D. Spielberger (1966), found it useful to divide anxiety into two types: "trait" or a chronic tendency that appears to be characteristic of certain personality types and "state" anxiety which is a condition brought on by certain events which can be acted upon and changed (Cambre & Cook, 1985). The theory has been advanced that computer anxiety

is a "state" anxiety. Many articles in the literature seem to confirm that belief by suggesting that a negative computer attitude can be altered by proper instruction (Knight, 1979; Jay, 1981; "How to Conquer Fear of Computers," 1982; Herbert, 1984; Kilpatrick, 1984; Sink & D'Abrosca, 1985; Feldman, Hollander, and Rexnovik, 1985/86).

Locus of Control

Coovert & Goldstein (1980) believed Rotter's (1966) perceived measure of locus of control to be "one of the best predictors of attitude toward computers." Their research revealed that externalizers (people who believe they have no personal control over the events of their lives) are most likely to feel computer anxiety. Hochreich (1975) further refined the concept of externally-oriented people into two groups: defensive external persons, for whom a verbal technique of defense is reflected; and congruent external persons, who believe that most of what happens to them is entirely outside their control. Schill, Ramanaiah, and Tores (1982) advanced the theory that placing defensively external persons in anxiety-provoking situations will cause a state of stress; their defensiveness then precludes their seeking assistance. Such are the people, it is suggested, who have difficulty when they are expected to work with computers.

Math Anxiety

Several researchers have tested the theory that computer anxiety may be related to math anxiety (Dambrot, Watkins-Malek, Silling, Marshall, and Garver, 1985; Lindbeck & Dambrot, 1986; Gressard & Loyd, 1987). Math anxiety is described as having fear or tension when facing situations regarding the learning of mathematics. In each study done, it was found that subjects who suffered anxiety when confronted with a computer also suffered from math anxiety. Cotton and Manariono-Lettet (1985) reported that some teachers regard mathematics as an anxiety-producing area. If they have little mathematics background or dislike for math, they may believe that the computer is another mathematical tool. Dambrot, Watkins-Malek, Silling, Marshall, and Garver (1985) also found that lack of math experience contributed to a less positive computer attitude. It would appear that there is scientific evidence to support a relationship between math anxiety and computer anxiety.

Computer Attitudes in Schools

Schools are one of the places where negative attitudes about computers are found. Several research studies in recent years (Loyd & Loyd, 1985; Ernest & Lightfoot, 1986; Lindbock & Dambrot, 1986; Madsen & Sebastiani, 1987) have been directed toward classroom teachers in the public schools since they are the ones who will need to expose today's youth to computer education. Gressard and Lloyd (1985) advocate that public schools are the place to

introduce computers and teach computer literacy to the next generation who will be living in a computerized society. However, many researchers reported that not only some of the students but some teachers themselves have a negative attitude about computers (Jay, 1981; Loyd & Gressard, 1984a; Madsen & Sebastiani, 1987; Kotrlik & Smith, 1989) and resist the idea that computer knowledge must be added to an already crowded curriculum. They also plead lack of time to learn computer skills and to incorporate computers into their curriculum.

Computer Anxiety among Females in Schools

Studies have been done that demonstrate a greater amount of computer anxiety among females from junior high through college age (Raub, 1981; Vredenburg et al., 1984; Dambrot, Watkins-Malek, Silling, Marshall, and Garver, 1985; Herkimer, 1985; Kotrlik & Smith, 1989). Studies, including those done by Brenda H. Loyd and Clarice Gressard, the authors of the Computer Attitude Scale, showed no significant difference between males and females (Oetting, 1983; Loyd & Gressard, 1984a; Baylor, 1985; Gressard & Loyd, 1987). Research by Rosen, Sears, and Weil (1987) found that women had no more anxiety than men, but women did exhibit a much more negative attitude regarding computers. A study of part-time MBA students who were also employed full time in government and industry showed no difference in gender when computer anxiety and computer attitude were measured (Igbaria &

Parasuraman, 1989). However, very few systematic studies have been done measuring computer attitudes in adults (Lewis, 1988) let alone studies targetting students who are non-traditional-aged females.

Computers in the Workplace

Negative attitudes about computers have been seen in many occupations into which computers are introduced. Many business magazines, such as Business ("Applying Business Methods and Techniques," 1987), have reported negative attitudes in office employees from clerical workers through middle management and into upper management levels. Although the computer in the office has created anxiety, it has created many opportunities for employment and advancement, especially for women (Hensen, 1980). Authors, therefore, have speculated on some of the reasons for these negative feelings generated in people in the various occupations.

Feldman, Hollander, and Rezmovic (1985/86) suggested that when computers are introduced to the workplace, the negative reactions generated by their appearance are caused by several myths about computers. Among those myths was the belief that computers are "behemoths, fed and taken care of by specially trained, unapproachable, technical gurus" (Rappaport, 1985). It was believed by some that a computer has superior intelligence and was "able to control" people (Feldman, Hollander, and Rezmovic, 1985/86). Also, the "feeling that one could break or damage the computer or somehow ruin what is

inside" (Jay, 1981) caused reluctance to become acquainted with them. The frustration of being expected to change the way things have always been done produced a resistance to the introduction of computers ("How to conquer fear of computers," 1982; Gross, 1983; "Applying Business Methods and Techniques," 1987). Those in professional positions were fearful of being embarrassed in front of their peers by making errors or having difficulty learning the new technology (Lewis, 1988). Besides the fear that "Big Brother" was able to monitor their productivity closely, it was believed that jobs now done by humans would be replaced by computers and robots (Jay, 1981; Feldman, Hollander, and Rezmovic, 1985/86; "Applying Business Methods and Techniques," 1987). Such reactions to computers as these have not been exclusive to the workplace.

Older Consumers and Computer Technology

Anxiety about the computer has not been just experienced by workers in business and industry. To many older adults, the realities of mechanized banking procedures, computer-generated bills, computerized grocery checking, and even computer applications of their home appliances have been quite anxiety-producing (Sink & D'Abrosca, 1985). Temple and Gavillet (1987), when conducting a computer confidence course for senior citizens, found that one of their control groups--labelled "nonparticipants"--scored very high in a test of computer anxiety. One study reported that large numbers of people have quite

a pessimistic attitude about credit data banks (Ahl, 1975). Ahl (1975) also stated that a considerable portion of the population believed computers were consuming jobs and "dehumanizing society."

Although the threat to adults from the advent of computerization has frequently been alluded to in the literature, what scientific research has been done yields mixed findings. Herkimer (1985) found a positive correlation between older females and high computer anxiety levels. Also, Loyd & Gressard (1984a) believed age may significantly affect computer attitudes because of the developmental and socialization differences involved. Baylor (1985), on the other hand, found no significant differences between the anxiety levels of adults in the 21 to 40 age group and the 41 to 70 age group. Rosen, Sears, and Weil (1987) reported that their research demonstrates that almost every societal group is at risk for computer anxiety.

The Adult Learner

Non-traditional, and even some traditional, female community college students could be identified as "adult" learners. Whitbourne and Weinstock (1979), while agreeing that there are no clear-cut criteria that identify one as an adult, stated the following:

> The word adult can be defined according to chronological age, the achievement of age-related or developmental tasks, or psychological qualities such as "maturity" (p. 3).

The differences between traditional-aged students and non-traditional-aged students has been explained with a philosophy of adult education. Malcolm Knowles (1980) coined the term andragogy, as contrasted with pedagogy (the art and/or science of teaching children and adolescents [Random House, 1983]) in an attempt to define the unique qualities of the adult learner. One of those qualities is that, as persons mature, they become more independent and self-motivated. Secondly, persons develop a pool of experience to which they can relate new learning concepts. In addition, persons' willingness to learn is directly related to their vocational or social goals. Finally, Knowles observed that time perspectives change as persons mature from one of future application to the need for immediate usage.

Adult learners, though by no means grouped into one sharply defined behavior pattern, do tend to approach new learning tasks somewhat differently than do children or adolescents. Motivational readiness must be present for an adult to apply the incentive to learn the new technology necessary to use computers as word processors. The pressures in the computer age which surround the adult--their method of employment, the jobs they wish to perform, the movement of society around them, and the interaction with close family members--could serve to motivate readiness to learn.

Too much "arousal or motivational readiness" may, however, cause the adult to become slower as a result of anxiety or stress. Adults may also be concerned about performing well to maintain their self-esteem. This stress may

also hinder task accomplishment (Whitbourne & Weinstock, 1979; Carlock 1989).

Physical characteristics may affect the success of the adult learner at the microcomputer. Diminished hearing can become a problem if the instructor must compete with a dot-matrix or daisy-wheel printer. Decreased eyesight when viewing print on the computer screen or glare on a monitor can create great physical discomfort for the mature student. Both these physical problems can result in negative attitudes towards computers. All the factors that differentiate adult learners from children and adolescents then produce a particular kind of student who is attempting to master some part of computer technology.

Measurement Tools

Several measurement tools have been developed to measure computer attitudes. Among them are those of Reece & Gable (1982), Rohner & Simonson (1983), Mauer (1983), Oetting (1983), Loyd & Gressard (1984b), Maurer & Simonson (1984), Toris (1984), and Baylor (1985). These instruments were developed for the purpose of aiding in the evaluation of new programs or of identifying problems with implementation of curriculum changes (Loyd & Gressard, 1984b).

The Computer Attitude Scale developed by Brenda H. Loyd and Clarice Gressard (1984b) is one example of a survey that has been demonstrated as

appropriate for measuring attitudes. Gressard and Loyd (1985) described the Computer Attitude Scale as a Likert-type instrument. The first version was successfully tested for reliability and factorial validity that same year, and identified as a proper means of testing computer attitudes. The term "attitude" was broken down into categories of computer anxiety (the anxiety experienced when confronting or thinking about confronting a computer), computer liking (how favorably the subject regarded the use of computers), and computer confidence (how confident the subject was that he or she could successfully manipulate computers). Three hundred and fifty-four students in high school, community college, and a small liberal arts college students participated in this first reported study. They found that students who were unfamiliar with computer use were significantly more anxious as a group, and that students over 21 had more confidence when working with computers than those in the 16-18 age group. The subjects of 13 to 15 years of age and those with more computer experience also had significantly higher computer liking scores. Loyd and Gressard wanted to expand their instrument to identify further the elements of computer attitude.

In 1985 the version which was used in this study was successfully tested for reliability and validity by Brenda and Douglas Loyd on a group of 114 elementary and secondary teachers. Another subscale was added: that of computer usefulness (or how useful the subject believed a computer would be to his or her regular activities). The subjects, whose age ranged from 23 to 60,

were enrolled in computer classes. It was discovered that all four subscales related closely enough so that the total score could be used as a general measure of anxiety towards computers (Loyd & Loyd, 1985). The Scale consists of 40 items which present statements of attitudes about computers and the use of computers (see Appendix A). Four main types of attitudes are represented in the form of four subscales: 1) anxiety or fear of computers called by the authors "Computer Anxiety"; 2) liking of computers or enjoying working with computers called "Computer Liking"; 3) confidence in ability to use or learn about computers called "Computer Confidence"; and 4) "Computer Usefulness" or the importance of or usefulness of computers in today's world.

Summary

Generally, computers have been well received by those who come in contact with them. However, computer anxiety and a negative attitudes about computers also appear to be part of the computer age. Studies have pointed to its similarity to math anxiety and have reported its effect on both genders as studied on public school and college students. Applied literature speaks of problems of negative attitudes in adults. However, little scientific research has been done on this age group.

CHAPTER THREE

Methods and Procedures

The following methods and procedures were followed in the completion of this study.

Instrument

Loyd and Gressard's Computer Attitude Scale (1984b) was used in this study. The Scale consists of 40 declarative statements which verbalize attitudes about computers and the use of computers (see Appendix A). Four main types of attitudes were represented in the form of four subscales: 1) "Computer Anxiety" or anxiety or fear of computers; 2) "Computer Liking" or liking of computers or enjoying working with computers; 3) "Computer Confidence" or confidence in ability to use or learn about computers; and 4) "Computer Usefulness" or the importance of or usefulness of computers in today's world.

There were ten statements to which participants responded in each subscale. The 40 questions were intermingled, with half positively worded and half negatively phrased. Accumulative total of the four subscales represented the subject's Computer Attitude.

Step 1. All items were coded as follows: "strongly agree"=1; "slightly agree"=2; "slightly disagree"=3; and "strongly disagree"=4.

Step 2. Answers to the positively worded questions were reversed (i.e., 1=4, 2=3, etc.) so that an answer of "strongly agree" to a positive question (e.g., "I like working with computers") yields a score of 4. An answer to the same question of "slightly agree" would yield a score of 3. This reversal of numbers resulted in a higher score on the Computer Anxiety subscale if lower anxiety was indicated. Reversing the numerical answers to positively worded questions for the subscales Computer Confidence, Computer Liking, and Computer Usefulness resulted in higher scores being received for more positive attitudes (more confidence, liking, usefulness) about computers. Loyd and Gressard (1985) stated that a score of 25 on a subscale was considered a neutral computer attitude. Accordingly, each subscale of ten questions could yield 40 points for a possible total of 160 points. The study was tested for reliability and validity in 1985 and identified as a proper means of testing computer attitudes (Loyd & Gressard, 1985).

Statistical Design

The following null hypotheses were tested for the presence or absence of a significant level of negative computer attitude in the two selected groups:

Ho1. There is no significant difference in overall attitudes scores toward computers between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho2. There is no significant difference in the computer anxiety attitude scores between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho3. There is no significant difference in the computer confidence attitude scores between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho4. There is no significant difference in computer liking attitude scores between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course.

Ho5. There is no significant difference in the computer usefulness attitude scores between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course.

Selection of the Sample

The study was limited to female students enrolled in introductory community college word processing classes in the state of Oregon during fall and winter terms of the 1987-1988 school year. Males enrolled in these classes were also administered the instrument so that no Hawthorne effect occurred

from their exclusion. However, their tests were excluded from the population when the researcher received the instruments.

The thirteen community colleges who have established independent campuses in the state of Oregon were selected for the study. Each of these schools has a Business Education Department whose curricula includes an introductory course in which an intact group of students are first introduced to computer use for word processing. Treaty Oak and Tillamook Bay Community College Service Districts were excluded.

The heads of business departments in each of the selected Oregon community colleges were first contacted by letter and asked for their cooperation in the administration of this instrument by the business educators who teach the classes that had been selected for this study (see Appendix B). It was vital that each selected community college participate in order to measure the desired population. A return-addressed post card was included with the letter requesting whether or not the college department heads would participate (see Appendix C). It also asked for the name of the instructor(s) who would be involved and the number of surveys needed for each instructor's classes. Telephone calls were made to those departments who had not returned the post card three weeks prior to the beginning of fall term 1987. Once permission was granted and the appropriate instructor(s) identified, these cooperating teachers were sent the survey instruments along with a letter giving

the instructions for the identification of the desired classes and details of the test administration (see Appendix D).

Eleven of the thirteen community colleges (Blue Mountain, Central Oregon, Chemeketa, Clatsop, Linn-Benton, Lane, Mount Hood, Rogue, Southwestern Oregon, Treasure Valley, and Umpqua Community Colleges) were reached in time to administer the instrument fall term 1987; two schools Chemeketa and Portland Community Colleges, administered their tests winter term 1988. In addition, more instruments were needed to insure a large enough population of traditional-aged females from which a random sample could be drawn. Therefore, the other eleven schools that participated fall term were asked to administer the tests to another group during winter term 1988. Eight schools agreed to administer the survey to winter term students who were enrolled in beginning computer word processing classes (see Appendix E).

Instructors were asked to administer the Computer Attitude Scale to all students at the beginning of class on the first day of the beginning word processing course. The students were seated in the same room as the computers to be used for instruction in the course if possible. Every precaution was used to insure the students that their responses would be anonymous. No name or identifying number was requested on the survey instrument. Students were advised that the survey was to assess the attitude of the group about computers and that the results of the survey would assist the instructor in planning his/her approach to instruction. The students were to be informed

that similar classes in the other community colleges in the state were receiving the identical test at approximately the same time. The length of time needed to complete the instrument was five minutes for the 40-item survey.

Collection and Treatment of Data

Completed instruments were returned in the mailing carton in which they were sent. Five hundred and twenty-six usable responses were returned. Surveys were separated based on gender and age. After consulting Cohn's Table and conferring with Dr. Wayne Courtney, Oregon State University College of Education, it was determined that samples of 125 were needed from each of the two groups being tested: traditional-aged female students and non-traditional-aged female students. Consequently, every fourth survey of each of the two designated groups was extracted until the sample size for each group had been selected. The scores of the Computer Attitude Scale were then tallied on a computer spreadsheet program (Lotus 1-2-3) which also calculated totals, means, standard deviations, and variances.

Bruning and Kintz (1977) stated that the t-test was commonly used to determine a difference in performance between two groups of subjects on some variable such as a test score. A two-tailed t-test was used on each of the five null hypotheses to determine if a significant difference existed between the mean scores achieved on the Computer Attitude Scale and subscales by non-

traditional-aged and traditional-aged female word processing students. The mathematical formula for testing total and subscale means is the following:

Display of t-test used

$$\frac{x_1 - x_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where x = mean, s^2 = variance, and n = sample size.

The 95% confidence interval was used.

CHAPTER FOUR

Findings of the Study

The t-test for comparisons of two independent group means was used to test for differences between the traditional-aged females measured and the non-traditional-aged females being measured at the same time. The mean total scores on the Computer Attitude Scale (CAS) and each of the mean scores on the four subscales were compared. Each of the five t-tests measured the difference between the means of traditional-aged females and non-traditional-aged females.

The means and standard deviations for the two measured groups of female students are presented in Table 1 for the total scores on the CAS.

TABLE 1. Means, Standard Deviations, and t-scores of Computer Attitude Scale Total Scores.

COMPUTER ATTITUDE SCALE	Traditional-aged Females		Non-Traditional-aged Females			
	mean	SD	mean	SD	df	t-score
Total	132.69	16.44	133.98	16.63	248	-0.62

The total score can range from 40 to 160. The mean score for the traditional-aged female sample was 132.69 with a standard deviation of 16.44. For the

non-traditional-aged female sample the mean was 133.98 with a standard deviation of 16.63.

Display of calculated t-test:

$$\frac{132.69-133.98}{\sqrt{\frac{270.27}{125}+\frac{276.56}{125}}}=-0.62$$

The tabular value of the t-test for this sample size was 1.96. The t-score of -0.62 for the total group scores was not significant at the 0.05 alpha level. Consequently, Ho1, the hypothesis that stated there was no significant difference in attitudes between traditional-aged female students and non-traditional-aged female students as measured by the Computer Attitude Scale when those students begin a word processing course, was retained.

The means for each of the subscales of the CAS (Computer Anxiety, Computer Confidence, Computer Liking, and Computer Usefulness) are presented in Table 2.

TABLE 2. Means, Standard Deviations, and t-scores of Computer Attitude Scale Subscale Scores.

COMPUTER ATTITUDE SCALE	Traditional-aged Females mean	SD	Non-Traditional Females mean	SD	df	t-score
Anxiety	33.07	5.58	31.58	6.07	248	2.04*
Confidence	31.92	5.07	32.13	5.16	248	0.32
Liking	31.94	5.09	33.68	5.12	248	-2.68*
Usefulness	35.75	3.32	36.29	4.64	248	-1.06

*Significant at 0.05 alpha level

The score on each subscale can range from 10 to 40, and 25 is considered a neutral attitude about computers. The mean score on the Computer Anxiety subscale for traditional-aged females was 33.07 with a standard deviation of 5.58, while the mean score for the non-traditional-aged females was 31.58 with a standard deviation of 6.07. The tabular value of the t-test for this sample size was 1.96.

Display of calculated t-test:

$$\frac{33.07-31.58}{\sqrt{\frac{31.14}{125}+\frac{36.84}{125}}}=2.04$$

The t-score for subscale Computer Anxiety of 2.04 was statistically significant. As a result, Ho2, the hypothesis that there is no significant difference in the scores on the Computer Anxiety subscale of the Computer Attitude Scale

between traditional-aged and non-traditional-aged females was rejected. Therefore, the non-traditional-aged females experienced significantly more anxiety than traditional-aged females.

The mean score on the Computer Confidence subscale for traditional-aged females was 31.92 with a standard deviation of 5.07; the mean score for the non-traditional-aged females was 32.13 with a standard deviation of 5.16. The tabular value of the t-test for this sample size was 1.96. The t-score of 0.32 for the subscale Computer Confidence was not statistically significant.

Display of calculated t-test:

$$\frac{31.92-32.13}{\sqrt{\frac{25.70}{125}+\frac{26.63}{125}}}=0.32$$

Accordingly, Ho3, the hypothesis that there is no significant difference in scores on the Computer Confidence subscale of the Computer Attitude Scale between traditional-aged and non-traditional-aged females, was retained. Thus, each group had equal confidence in their ability to manipulate computers.

The mean score on the Computer Liking subscale for traditional-aged females was 31.94 with a standard deviation of 5.09; the mean score for the non-traditional-aged females was 33.68 with a standard deviation of 5.12. The tabular value of the t-test was 1.96. The t-score of -2.68 for the Computer Liking subscale, when compared to the tabular value of 1.96, was statistically significant at the 0.05 alpha level.

Display of calculated t-test:

$$\frac{31.94-33.68}{\sqrt{\frac{25.91}{125}+\frac{26.21}{125}}}=-2.68$$

Accordingly, Ho4, the hypothesis that there is no significant difference in the scores on the Computer Liking subscale of the Computer Attitude Scale between traditional-aged and non-traditional-aged females, was rejected. In this instance, the non-traditional-aged females had a greater liking for computers than their traditional-aged counterparts.

On the Computer Usefulness subscale, the mean score for traditional-aged females was 35.75 with a standard deviation of 3.32; the mean score for non-traditional-aged females was 36.29 with a standard deviation of 4.64. For this sample size, the tabular value of the t-test was 1.96. The t-score of -1.06 for the subscale Computer Usefulness was less than the tabular value of 1.96.

Display of calculated t-test:

$$\frac{35.75-36.29}{\sqrt{\frac{11.02}{125}+\frac{21.53}{125}}}=-1.06$$

Thus, Ho5, the hypothesis that there is no significant difference in the scores on the Computer Usefulness subscale of the Computer Attitude Scale between traditional-aged and non-traditional-aged females as measured by the Computer Attitude Scale when those students begin a word processing course, was

retained. Both groups were equally aware that computers would be of great use to them.

The means in the subscales--Anxiety, Confidence, Liking, and Usefulness--were higher in every case than the neutral score of 25, referred to on page 31.

Summary

The total scores on the Computer Attitude Scale were not significantly different between sample groups of traditional-aged females and non-traditional-aged females. The scores were also more than 30 points above the neutral score of 100 on the survey. The subscale score of Computer Anxiety was significantly different with the non-traditional-aged females scoring higher anxiety than traditional-aged females. The subscale score of Computer Liking was significantly different with traditional-aged females scoring lower, indicating less liking of computers than non-traditional-aged females liking of computers. The hypotheses that predicted no significant differences between the two groups on these two scales were rejected. However, the scores on the subscales of Computer Confidence and Computer Usefulness were not significantly different, and the hypotheses that predicted such an outcome were retained.

CHAPTER FIVE

Summary, Conclusions, Implications, and Recommendations

Summary

A sample of 125 traditional-aged female community college students and 125 non-traditional-aged female community college students were administered the Computer Attitude Scale survey on the first day of beginning word processing classes. It was found that there was no significant difference between the traditional-aged females and the non-traditional-aged females in their total scores on the CAS survey. The CAS consists of four subscales: Computer Anxiety, Computer Confidence, Computer Liking, and Computer Usefulness. No significant differences were found on the subscales Computer Confidence and Computer Attitude. However, there was a significant difference on the subscales Computer Anxiety and Computer Liking.

Conclusions

The mean total scores of both sample groups was over 130 out of a possible 160 points. Gressard and Loyd stated that 25 out of a possible 40 points on a subscale could be considered a neutral score. It naturally follows that a score of 100 on the total CAS would be considered neutral. Therefore, it can be concluded that the total scores for both traditional-aged and non-

traditional-aged students in the study indicate a positive overall attitude for these females.

In the literature reviewed in Chapter Two, much attention was given to the Computer Attitude Scale's subscale entitled Anxiety. Although the computed t-scores of the overall Computer Attitude Scale and the subscales of Computer Confidence and Computer Liking showed no significant differences between the two groups tested, the computed t-score of Computer Anxiety did demonstrate a significant difference between groups. An examination of the mean scores in Table 2 showed that traditional-aged females had a higher mean score (33.07) than non-traditional-aged females (31.58). Although the spread between scores was not extensive, it indicated that more anxiety regarding computers existed among non-traditional-aged females than that of traditional-aged females. The mean score for non-traditional-aged females in this subscale was also lower than those for the other three subscales.

The computed t-score for the subscale Computer Liking was also significant at the 0.05 alpha level. In this instance, however, it was the traditional-aged females who had the lower mean score. It can be concluded that non-traditional-aged females who were taking an introductory word processing class, although somewhat anxious about computers, believed they would enjoy using them. This implied that non-traditional-aged females had chosen to study for an occupation in which they knew they would be expected to use microcomputers . Clearly, today's beginning word processing students

in Oregon's community colleges are aware of the demand for people with some computer knowledge (Grever & Zimmerman, 1988).

Implications and Recommendations

This study showed that no significant difference exists in overall Computer Attitude and that scores on the total Computer Attitude Scale as well as its subscales were more positive than neutral in the sample population of traditional-aged and non-traditional-aged females in introductory word processing classes. Given these indications, it would appear that, as a group, the students enrolled in introductory word processing classes in Oregon's community colleges may not have been in need of special desensitizing methods to improve their attitudes about working with microcomputers . However, traditional-aged females scored significantly lower on the subscales of Computer Liking. It appears that strategies might have been needed to be developed to assist traditional students in improving their liking for working with computers. It is also interesting to note that non-traditional-aged females scored significantly lower than traditional-aged females on the subscale Computer Anxiety. This implies that non-traditional-aged females have more anxiety than traditonal-aged females and that non-traditional-aged females would benefit from assistance in relieving anxiety. Therefore, the following recommendations are made:

1. It has been estimated that by 1990 one personal computer for every two employees in offices throughout the world will be a reality (Grever & Zimmerman, 1988). Therefore, the demand for computer-literate office employees will continue to grow, and community colleges in Oregon will be called upon to produce computer-trained office workers. As a result, it is recommended that students in computer related courses be monitored to be sure that computer attitudes will continue to be positive and negative aspects of students' computer attitude be detected and corrected whenever possible. Instructors may want to be particularly attentive to the matter of computer anxiety that could exist in their non-traditional-aged females. Instructors should also be aware that their traditional-aged female students may actually have a less positive overall computer attitude than their non-traditional female students.
2. It is recommended that a correlation study be made between negative computer attitudes and word processing performance.
3. This research explored attitudes with respect to using computer word processing. Similar scientific testing is needed to measure attitudes about computer applications of spreadsheet, database management, desktop publishing, and graphic programs. With ongoing changes in computer technology, further scientific study is needed to detect problems of computer attitudes when students are confronted with new business software and hardware.

4. Specific strategies to reduce negative attitudes need to be collected or developed and their outcome scientifically tested. Students are being introduced to telecommunications, networking, electronic mail, creation of and manipulation of computer databases, and a host of other new electronics. Proven strategies will greatly assist the attitudes of students thrust into learning new computer technology.
5. As mentioned in the literature review, age was found by researchers to be a factor in the amount of computer anxiety being experienced. Therefore, it is recommended that the age difference of non-traditional-aged students be divided into five year intervals to determine if students in specified age categories experience more anxiety about computers than do students in other age categories.
6. No attempt was made to scientifically study the relationships of computer attitudes with recent employment and length of employment. It is recommended that future research be directed toward this variable.
7. This study did not address the issue of female attitudes related to the amount of computer experiences. Although some research has been done, more information is needed to assist instructors in introductory computer classes.

This study has reported on computer attitudes in female community college students as they begin to learn computer word processing. It recommends that instructors be alert to negative attitudes about computers in

their students as those students are exposed to new office technology. It further recommends that those instructors finding successful strategies in relieving negative attitudes share their methods with other teachers. Scientific research to measure student attitudes about technology other than word processing is needed. A correlation study between computer attitudes and word processing performance is recommended. Further recommendations are made for scientific study related to age differences, the amount of time previously employed, and the affect of previous computer experience on computer attitudes. This research would assist successful instruction in software applications for use in today's business office.

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APPENDICES

APPENDIX A

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

Brenda H. Loyd and Clarice P. Gressard
University of Virginia

The purpose of this survey is to gather information concerning people's attitudes toward learning about and working with computers. It should take about five minutes to complete this survey. All responses are kept confidential. Please return the survey to your instructor when you are finished.

Please check the blank which applies to you.

1. Age: ( ) 21 or less ( ) 41-50
( ) 22-30 ( ) 50+
( ) 31-40

2. Have you been employed outside the home within the last:
( ) 6 months ( ) 2 years ( ) 4 years
( ) 1 year ( ) 3 years ( ) 4+ years

3. If so, has your work been in:
( ) Office occupations
( ) Sales
( ) Manufacturing
( ) Service
( ) Other (please specify)_____

4. Sex: ( ) Male ( ) Female

5. Briefly indicate your reason for taking this class:
( ) Personal interest
( ) Work-related
( ) Work-required
( ) Other (please specify)_____

6. Experience with learning about or working with computers:
( ) none ( ) 1 month to 6 months
( ) 1 week or less ( ) 6 months to 1 year
( ) 1 week to 1 month ( ) 1 year or more

Briefly state the type of computer experience:_____

_____

COMPUTER ATTITUDE SCALE

Below are a series of statements. There are no correct answers to these statements. They are designed to permit you to indicate the extent to which you agree or disagree with the ideas expressed. Place a check mark in the parentheses under the label which is closest to your agreement or disagreement with the statements.

	Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
1. Computers do not scare me at all.	( )	( )	( )	( )
2. I'm no good with computers.	( )	( )	( )	( )
3. I would like working with computers.	( )	( )	( )	( )
4. I will use computers many ways in my life.	( )	( )	( )	( )
5. Working with a computer would make me very nervous.	( )	( )	( )	( )
6. Generally I would feel OK about trying a new problem on the computer.	( )	( )	( )	( )
7. The challenge of solving problems with computers does not appeal to me.	( )	( )	( )	( )
8. Learning about computers is a waste of time.	( )	( )	( )	( )
9. I do not feel threatened when others talk about computers.	( )	( )	( )	( )
10. I don't think I would do advanced computer work.	( )	( )	( )	( )
11. I think working with computers would be enjoyable and stimulating.	( )	( )	( )	( )
12. Learning about computers is worthwhile.	( )	( )	( )	( )
13. I feel aggressive and hostile toward computers.	( )	( )	( )	( )
14. I am sure I could do work with computers.	( )	( )	( )	( )
15. Figuring out computer problems does not appeal to me.	( )	( )	( )	( )
16. I'll need a firm mastery of computers for my future work.	( )	( )	( )	( )

		Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
17.	It wouldn't bother me at all to take computer courses.	( )	( )	( )	( )
18.	I'm not the type to do well with computers.	( )	( )	( )	( )
19.	When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.	( )	( )	( )	( )
20.	I expect to have little use for computers in my daily life.	( )	( )	( )	( )
21.	Computers make me uncomfortable.	( )	( )	( )	( )
22.	I am sure I could learn a computer language.	( )	( )	( )	( )
23.	I don't understand how some people can spend so much time working with computers and seem to enjoy it.	( )	( )	( )	( )
24.	I can't think of any way that I will use computers in my career.	( )	( )	( )	( )
25.	I would feel at ease in a computer class.	( )	( )	( )	( )
26.	I think using a computer would be very hard for me.	( )	( )	( )	( )
27.	Once I start to work with a computer, I would find it hard to stop.	( )	( )	( )	( )
28.	Knowing how to work with computers will increase my job possibilities.	( )	( )	( )	( )
29.	I get a sinking feeling when I think about trying to use a computer.	( )	( )	( )	( )
30.	I could get good grades in computer courses.	( )	( )	( )	( )
31.	I will do as little work with computers as possible.	( )	( )	( )	( )
32.	Anything that a computer can be used for, I can do just as well some other way.	( )	( )	( )	( )
33.	I would feel comfortable working with a computer.	( )	( )	( )	( )

		Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
34.	I do not think I can handle a computer course.	( )	( )	( )	( )
35.	If a problem is left unsolved in a computer class, I would continue to think about it afterward.	( )	( )	( )	( )
36.	It is important to me to do well in computer classes.	( )	( )	( )	( )
37.	Computers make me feel uneasy and confused.	( )	( )	( )	( )
38.	I have a lot of self-confidence when it comes to working with computers.	( )	( )	( )	( )
39.	I do not enjoy talking with others about computers.	( )	( )	( )	( )
40.	Working with computers will not be important to me in my life's work.	( )	( )	( )	( )

APPENDIX B

Permission to Survey Letter

September 1, 1987

(Name)
(Department)
(Community College)
(Address)
(City), OR (Zip Code)

Dear (Salutation):

In cooperation with Dr. Margaret M. Stamps, Chairman of the Business Education Program at Oregon State University, I am doing a research study. I will be studying computer attitudes in female students in beginning word processing classes in Oregon's Community Colleges. We are interested in knowing more precisely: students' anxieties or self-confidence in their ability to learn word processing, how much they like computers and how useful they believe computers will be in their lives.

A survey taking only five minutes will be administered at the very beginning of their first class to ALL students, both male and female. In order to have a valid study, the survey must be administered the first class day of your Fall Term beginning business computer class which leads to word processing in every community college in the State of Oregon. Therefore, I am seeking the cooperation of the appropriate instructor(s) to help me carry this out.

Would your department be willing to cooperate in this study? If so, could you indicate the following on the enclosed postcard:

1. The name(s) of the appropriate instructor(s).

2. The estimated number of students in business classes aimed at introducing students to word processing.

Surveys will be mailed in a returnable box to facilitate your handling. Return postage will be reimbursed if you so request. Your return of the enclosed postcard as soon as possibly feasible would be greatly appreciated.

Sincerely yours,

Judith A. Fletcher

Enc. - 1

APPENDIX C

Survey Postcard

[NAME] COMMUNITY COLLEGE

We will ___ will not ___ participate in your study.

The instructor(s) involved will be:

_____

_____

We estimate that we will need ____ copies of the survey.

APPENDIX D
Instruction Letter

251 Bryant Street South
Vale, OR 97918
(DATE)

(Name)
(Community College)
(Street)
(City) OR (Zip Code)

Dear (Salutation):

We are very pleased that you have agreed to participate in this study of computer attitudes of beginning word processing students. Enclosed are the copies of the survey that you estimated you would need for your beginning word processing classes. The length of time needed to complete the instrument is five minutes.

"The Survey of Attitudes Toward Learning About and Working With Computers" needs to be administered at the very beginning of class on the fist day of [Fall or Winter] Term. If possible, we wish it's administration to precede any activity which might in any way alter the attitudes toward computers that students bring with them into the course. Also, ideally the students will be seated in the same room as the computers to be used for instruction.

ALL students, male and female, are to be asked to participate. They are to be advised that similar classes in the other community colleges in the state are receiving the identical survey at approximately the same time. Please inform them that the reason for the survey is to assess the attitudes of this entire statewide group of community college students toward computers, and that the results of the survey will assist the instructors in planning their approach to instruction.

We expect to be able to document some most interesting findings about our students' attitudes as they approach word processing instruction. Findings of the study will be available upon request.

The carton in which you have received the surveys also contains a return-addressed mailing label. The box is designed to be reused to return the surveys. Once again, our deepest thanks for your assistance in this project.

Sincerely,

Judith Fletcher
Enc. - (Number)

APPENDIX E

Schools Participating in the Survey

	SCHOOLS PARTICIPATING	TERMS PARTICIPATED	
		FALL	WINTER
1.	Blue Mountain Community College	x	
2.	Central Oregon Community College	x	
3.	Chemeketa Community College	x	x
4.	Clackamas Community College		x
5.	Clatsop Community College	x	
6.	Linn-Benton Community College	x	x
7.	Lane Community College	x	
8.	Mount Hood Community College		x
9.	Portland Community College	x	
10.	Rogue Community College		x
11.	Southwestern Oregon Community College	x	x
12.	Treasure Valley Community College	x	x
13.	Umpqua Community College	x	x

APPENDIX F

Computer Attitude Scale Items

A breakdown of the items of the Computer Attitude Scale by subscales and direction (positive or negative wording) is presented below.

Subscale	Positive	Negative
Computer Anxiety	1, 9, 17, 25, 33	5, 13, 21, 29, 37
Computer Confidence	6, 14, 22, 30, 38	2, 10, 18, 26, 34
Computer Liking	3, 11, 19, 27, 35	7, 15, 23, 31, 39
Computer Usefulness	4, 12, 16, 28, 36	8, 20, 24, 32, 40

Taken from a letter dated July 7, 1986, from Brenda H. Loyd and Clarice Gressard, University of Virginia.