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An investigation of teachers' backgrounds, usage, and attitudes towards computers in education

DeLFrate, Judith, Ph.D.
The Ohio State University, 1987
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UMI
AN INVESTIGATION OF TEACHERS' BACKGROUNDS,
USAGE, AND ATTITUDES TOWARDS COMPUTERS IN EDUCATION

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

By

Judith DelFrate, B.S., M.A.

* * * * *

The Ohio State University
1987

Approved by
Dr. Otto Santos, Jr.
Co-Advisor
College of Education

Dissertation Committee:

Dr. Otto Santos, Jr.
Dr. Anthony Olinzock
Dr. Aaron J. Miller

Dr. Anthony Olinzock
Co-Advisor
College of Education
DEDICATED TO MY PARENTS
ACKNOWLEDGMENTS

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VITA

May 24, 1957. Born - Pittsburgh, Pennsylvania

1975. Diploma - Ridge High School, Basking Ridge, New Jersey

1979. B.B.A. University of Massachusetts, Amherst Massachusetts

1981. B.S. Ohio State University Columbus, Ohio


1984. M.A. Ohio State University Columbus, Ohio

1984-present. Teacher, Data Processing, Eastland Career Center, Groveport, Ohio

FIELDS OF STUDY

Major Field: Business and Vocational Education
Minor Field: Computer Education


Studies in Computer Education: Professors Anthony A. Olinzock and Otto Santos, Jr.

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CHAPTER I
INTRODUCTION

"One million computers are in place around the nation in the nation's schools" (Bergman, 1986, p.12). With the decreasing cost of hardware and the increasing availability of software, more and more schools have been able to afford computers.

In his 1983 study, Bell identified the major educational uses of the computer. In rank order, the major uses of the computer in educational settings included using the computer as:

1. A tutorial tool,
2. A drill and practice tool,
3. A recordkeeping tool,
4. A remedial instruction tool, and
5. A motivational tool.

Educators also used computers along with application software to teach spreadsheets, word processing, and accounting in their classrooms (Clark, 1985). Other educational uses included programming and simulations.

As the cost of purchasing computers decreases, more and more computers have become available for
instructional purposes. This gradual increase in computer availability has had a major impact on education. A positive attitude towards computer usage in the educational setting helped students in obtaining a better education (Yuen, 1984). Kulick and others at the University of Michigan found that students who supplemented their education with computers learn more, do better on tests and obtain better grades (Kulick, Bangert, and Williams, 1983). In addition, computer usage in the classroom aided in developing students' esteem. Yuen (1984) found that computers have been proven effective when used as a tool for teaching.

Hallworth and Brebner (1980) found that the effectiveness of a computer in the classroom relates to the teacher's understanding of the computer, his/her attitude towards and acceptance of computers and the availability of curricula using computerized instructional programs. The attitudes of teachers towards computers have influenced their commitment and subsequent success of their program (Yuen, 1984).

This researcher found conflicting views regarding the attitudes of teachers toward computers. Gershman, Janis, and Sakamoto (1981) reported that teachers felt computers were responsible for motivation and helped
student achievement. Yuen (1984) reported that the vocational teachers he surveyed had a positive attitude towards computers. Bliss, Chandra, and Cox (1986) identified the following advantages of using computers in an educational setting:

1. A useful, quick and dynamic visual display for difficult concepts encountered in the classroom.
2. A good statistical tool for use in the classroom.
3. A means for reinforcing learning through the visual medium in the classroom.
4. A promoter of individual learning in the classroom.

Sherzer's (1979) findings indicated that teachers felt that they didn't have enough time in class to use computers and that they didn't feel competent enough. Signer (1982) reported that teachers were reluctant to use the computer due to their lack of training and their own insecurities towards computers. In a report to the 1983 General Assembly of North Carolina, researchers indicated that many teachers today have little facility with computers and feel an ambivalence about computers in the classroom and otherwise.
Yuen (1984) found that teachers' attitudes towards computer usage are affected by the teachers' background. Those teachers who had training in computer usage demonstrated positive attitudes in the classroom.

SIGNIFICANCE

The researcher investigated teachers' attitudes towards computers and the relationship between attitude and computer usage in the classroom. The researcher also examined the relationship between teachers' knowledge of computers and their attitudes towards computers. The results from this study could help to provide direction for curriculum development. Major curriculum revision has been necessary to reflect the expanding use of computers and the public's needs for education and retraining on computers.

This study provided findings that will add to the research already completed. New findings have resulted from the use of a different population and different geographic area. Finally, this research study was designed to examine inconsistencies reported by researchers who have conducted similar research.
STATEMENT OF THE PROBLEM

The problem of this study was to examine the computer literacy backgrounds of secondary teachers and to determine whether there were significant relationships between teachers' computer literacy backgrounds and their use of computers in the classroom. This study also examined the relationship between teachers' attitudes as related to the use of computers in education.

The following research questions were formulated to address the statement of the problem:

1. What are the attitudes of secondary educators towards the use of microcomputers in the classroom?

2. Is there a relationship between the computer literacy backgrounds of secondary teachers and the presence or absence of computer usage in the classroom?

3. Is there a relationship between the understanding of computers by secondary teachers and their attitudes towards computer usage in the classroom?

4. Is there a relationship between whether or not teachers use computers in their
classrooms and if they have had any training on the computer?

5. What is the relationship between teachers' experiences with computers and the usage of computers in the classroom?

6. Which type of teachers (high school teacher, middle school teacher or vocational school teacher) have a tendency to use computers more in their instructional programs?

7. What is the relationship between teachers' ages and computer usage in the classroom?

8. What is the relationship between the gender of teachers' and computer usage in the classroom?

LIMITATIONS

The findings of this study have been limited by the following items:

1. This study only addressed the variables identified in the questionnaire (see Appendix A). The study did not attempt to determine the attitude of any individual teacher towards computers.

2. The population of the study consisted of secondary teachers and middle school teachers.
in the Columbus City school district who completed the survey. A random sample was generated from the population, therefore results can be generalized to the whole population.

3. The results are limited to the honesty of the respondents.

4. The results are limited to the time the study took place.

5. The results are limited to the reliability and validity of the questionnaire.

6. The study was limited to the extent that participants completed the questionnaires on different days and times of the week.

7. The study was limited to the extent that the teachers' responses to the questions were based on the teachers' perceptions of how they saw themselves. Each teacher had different perceptions. An outsider may have evaluated the teachers differently than they evaluated themselves.
DEFINITION OF TERMS

Terms that were unique to this study, that were technical in nature or that are subject to several different interpretations are defined below:

1. Computer - A device in which data and the instructions for processing it are represented as electronic codes or impulses. The largest type of computer which has the greatest storage is the mainframe computer. A minicomputer is smaller than a mainframe and less powerful. A microcomputer is the smallest computer in size. The use of the word computers in this study referred to microcomputers, minicomputers and mainframes (Clark and Lambrecht, 1985, p. 317).

2. Computer Literacy - "Knowledge a person needs to have about computers in order to function well in his/her job or personal life. This includes a knowledge of programming, social impact, history, applications, and programs and equipment available" (Hunter, 1984, p. 45).

3. Attitudes - "Manner, disposition, feeling, position toward a person or thing" (Random House, 1984).

4. Business Education - "That aspect of the total education program that provides the knowledges,
skills, understandings, and attitudes needed to perform in the business world as a producer and/or consumer of goods and services that business offers." This included courses taught at the secondary level such as accounting, general business, shorthand, typewriting/keyboarding and business law (Nanassy, Malsbury, Tonne, 1977, p. 4).

5. Computer assisted instruction - A way of adapting learning materials to the individual needs of the student. CAI can be integrated into the classroom for remediation, enrichment, practice, or reinforcement of difficult concepts (D'Souza, Smith, 1986, p. 43).

6. Applications software - Allowed the user to use the computer as a tool. The most common types are spreadsheets, database manager, and word processing packages.

7. Background/Training - This included the demographic characteristics of teachers including the courses, in-service workshops, and other training that they have had in the area of computer science.
8. Computer Usage - How an educator used a computer in the classroom. This could be for teaching, record management, or other uses.


10. DataBase Manager - Software that allowed the user to file, store, and retrieve information (Guthrie, 1986, p. 58).

11. Electronic Spreadsheets - Software that manipulated information and helped to predict the future (Guthrie, 1986, p. 58).


13. Hardware - The computer itself plus any additional peripheral devices like a printer.


15. Systems Software - Programs written to aid in the operation of a computer system (Shelly and Cashman, 1980, p. 19).

16. Applications Software - Computer programs written for a computer system that solve a particular type of business or mathematical problem (Shelly and Cashman, 1980, p. 24).
17. Understanding of Computers - In this study, the term understanding of computers referred to the second section of the survey instrument. This included questions one through eighteen.
CHAPTER II

REVIEW OF RELATED LITERATURE

INTRODUCTION

In order to develop a theoretical basis for this study of teachers' understanding of and use of computers in the secondary school setting, the researcher investigated areas which other researchers have suggested important or related to one's understanding and use of computers. This chapter is divided into the following sections:

1. Computers in Education
   CAI
   CMI
   Types of Schools
2. Computer Literacy of Teachers
   Background of teachers
   Training
   Experience
3. Teachers' Attitudes Toward Computers in the Classroom
4. Demographics Related to Teacher Attitude and Use of Computers
5. Summary
Burns (1981) reported that computers have been used as instructional tools as early as the 1950's where they were used to train employees. Today, computers are seen in schools throughout the United States. In 1980, researchers estimated that 94 percent of the school districts would be using computers by 1985, 87 percent of these computers would be used for instructional purposes (Chambers and Bork, 1980, p. 50).

Research done in New York State by the Center for Learning Technologies indicated that 85 percent of their schools use computers for instructional purposes. This study also revealed that most of the schools used the computer for drill and practice, problem solving, simulations, and tutorials.

In her 1986 study, Lambrecht indicated that computers were used predominantly for programming and drill and practice by teachers in Minnesota. These were the most common uses for computers. However, they were also found to be used for word processing, database instruction, and other lab opportunities.

In 1983, researchers from the National Education Association found that computers were being used in
many of the same ways that other researchers have indicated. In addition, these researchers found that computers are used 70.7 percent in math classes, 34.7 percent in reading, 32 percent in computer literacy classes, and 12 percent in business education classes.

In his 1985 study, Lucas identified the major areas of computer use in schools. In rank order, the major uses of computers in schools included using the computer in:

1. Math classes
2. Computer science classes
3. Vocational education and Science classes
4. Bookkeeping/Accounting classes, and
5. English classes.

As stated by Lucas, 68 percent of the time, the computer was used for programming purposes. The computer is used most frequently for instruction in a regular classroom, in computer labs, or for enrichment in the form of games and puzzles.

Computers can be used in any classroom to aid in instruction. The computer does not necessarily have to be used in the classes typically suited for computer use.
In his 1985 study, Hurwitz found that the computer can be used in a class such as Physical Education. Hurwitz used the computer to keep records and prepare written material. Hurwitz used a spreadsheet to do grading and plan rotations. Database programs helped him choose teams and take attendance. He also used the computer to help students when they had to make-up missed work.

Computers are also used in music departments. College music departments advised students to take coursework in computing and programmed instruction at the graduate level (Taylor and Parish, 1978). The use of computers in music departments has not been as common as in other academic areas, but computers are beginning to make an impact in music education.

There are many reasons why computers are being used more in education today. In his 1983 study, Bell found three major reasons why computers have become so popular. The three reasons for increased desire for computers in education are as follows:

1. A decrease in the cost of hardware for schools
2. An increased exploration of new technologies by teachers in schools, and
3. A development of ways to link computers to videodisks and interactive cable in schools.
CAI

Computer assisted instruction (CAI) is the process where computers are used for instruction in a classroom. Chambers and Bork (1980) reported that CAI will be used more by school districts than any other type of application. CAI can improve students' learning, retention, achievement, and attitude under the right conditions (Bell, 1983, p. 64). CAI allowed students to practice, develop better study habits, and motivates (Bell, 1983). Computer assisted instruction can be in the form of drill and practice or as a tutorial. Hallworth and Brebner (1980, p. 28) stated that "the vital factor in the success of CAI is the teacher."

CAI allows the student to obtain individual attention. Atkinson (1967) stated that one hour per day with a computer can provide a student with more interaction than a day in a regular classroom. A curriculum supplemented by CAI can lead to improved student achievement (Burns and Bozeman, 1981).

CAI can also provide benefits for the teacher. It relieved the teacher of some of his/her basic duties of remediation, drill and practice, or basic information (Holmes, 1982).
In addition to CAI, computers are also used for computer managed instruction (CMI). Splittgerber (1979) defined CMI as an instructional management system that utilizes the computer to direct the entire instructional process. Some of CMI's uses included attendance, grade tabulation, testing, or to diagnose learning problems.

Types of Schools

Computers are used in all stages of education, from the elementary grades to college. In elementary and secondary education, the microcomputer has become a major educational tool. However, Rogers (1985) found that microcomputer use was greatest at the secondary level.

In schools surveyed in 1984 by researchers in New York, it was found that 24 percent of the computers were used in public schools and 29 percent were used in non-public schools. Bell (1983) indicated that two-thirds of the high schools and one-third of the elementary schools have at least one microcomputer. Bell further indicated that by 1987, nearly all high schools in the United States will have microcomputers. Computers are also used in vocational schools as indicated by Yuen's study (Yuen, 1984).
Backrounds of Teachers

Neibauer (1985) indicated that the backgrounds of computer literacy teachers changes in each school. He reported that in one school, the math teacher, who had an inexpensive personal computer at home was the unofficial computer science teacher. Neibauer further stated that in many instances, teachers were given personal computers for their classrooms. Yet, the teachers know nothing about their use and rarely used them in the classroom (Neibauer, 1985).

Sutphin (1987, p. 54) stated that "educators in the 1980's were operating on a limited knowledge and experience base with respect to computer use for educational purposes." Computer literacy teachers in schools can range from highly skilled data processing professionals to elementary teachers who write programs on their home computers (Neibauer, 1985).

Grossnickle, Laird, Cutter, and Tefft (1982) found that computer education occurred in at least four of their academic departments. These departments included: Business, Math, Science, and Industrial Arts.

In her 1982 study, Stevens found that K - 12 teachers demonstrated a lack of skills required to teach
computer literacy. These teachers however, were willing to participate in training to acquire these skills.

Training

The training of the teachers who teach computer literacy varied from state to state. Some teachers have taken courses at the collegiate level, others have attended in-service workshops and some computer literacy teachers are self-taught.

In the states of Louisiana and Texas, computer literacy teachers are required to obtain computer science certification. New Hampshire and New York do not require teachers to obtain computer certification or training. In Rhode Island, computer literacy is often taught by the math teacher of the school. Computer literacy in Tennessee is taught by whomever the school chooses ("States With Computer Literacy Requirements", 1985).

Lucas (1985) indicated that teachers received training on computers in one of three ways. These included: college courses, self-teaching, or from vendors.

Pipho (1985) found that in some schools there was only one teacher trained to teach computer
literacy. Other concerns arose when it became evident that the students knew more about computers than their teachers did. Pipho further pointed out that in order to solve this problem, states that teach computer literacy must require teachers to become certified. Teacher training was the key to the implementation of computers in the schools (Pipho, 1985).

Experience

In their 1982 study, Grossnickle, Laird, Cutter, and Tefft found that teachers they surveyed gained experience using the computer through instruction and demonstrations. This was the primary experience they had with computers, but others used computers for gaming or record keeping.

Ruhter (1985, p. 24) stated that there were four ways teachers' gained experience on computers in his school. These included the following:

1. By teaching programming skills
2. By providing CAI skills
3. By making word processing skills possible, and
4. By facilitating office and clerical work.

Locker (1986) wrote that teachers' experience with computers was centered around programming. However,
experience was also obtained by using word processors, databases, spreadsheets, and graphics software (Locker, 1986).

TEACHERS' ATTITUDES TOWARD COMPUTERS IN THE CLASSROOM

"Microcomputer use has been looked upon with great enthusiasm but also with apprehension by teachers and administrators challenged with implementing technology in the curricula" (Sutphin, 1987, p. 54). Attitudes towards computers are important when considering implementation of computers into a school system. A teacher's attitude towards computers directly affected the students' attitudes in the classroom (Beck, 1979).

Teachers have differing attitudes towards computers. Some teachers saw them as a positive influence in the classroom while others felt computers are a threat to job security. Beck (1979) found that a teacher's reluctance to use a computer comes from a fear of losing security, authority, or from a lack of computer skills and information. Lichtman (1979) found that educators seemed less enthusiastic about the computer's role in society than did the general public.

The National Education Association conducted a survey of teachers' attitudes towards and knowledge
of computers (1983). Results from this survey indicated that one-fifth of the teachers received some computer training but still were not well informed about computer knowledge. Robardely (1971) found a positive relationship between a teacher's level of knowledge about computers and his/her attitude towards computers.

Results from a survey done by the New York State Education Department indicated that the computer introduces a lot of anxiety and uncertainty into teachers who use it. Grossnickle, Laird, Cutter, and Teft (1982) indicated in their study that there were still many teachers who are denied access to computers in their classroom. These teachers stated that they lacked training on computers and this is one reason they did not feel comfortable using them in their classrooms.

In their 1982 study, Lawton and Gerschner found that some teachers suffered from "computerphobia". This concept occurred when the computer became more of a problem than a help to a teacher. This created a situation where teachers were afraid to use computers in their classrooms. Calkins (1982) found in his study that teachers were somewhere between apathetic and hostile in their attitudes towards computers.
In more recent literature, it appeared that teachers' attitudes towards computers are improving. Norris and Lumsden (1984) found in their study in Denton, Texas, that educators appeared to be highly positive in their attitudes towards computers.

Ingersoll, Smith and Elliott (1984) wrote that teacher attitudes were positive. These teachers looked forward to using new technologies in their classrooms. Yuen (1984) found vocational teachers in Pennsylvania to have a low level of knowledge about computers but to have positive attitudes towards them.

Stevens (1982) wrote that there was a marked difference in attitudes between teachers in his study and those in an earlier study. Stevens found that teachers were more positive towards computers than they were before. In their 1986 study, Vermette, Orr, and Hall found that teachers expressed positive attitudes towards computers.

DEMOGRAPHICS RELATED TO TEACHER ATTITUDE AND USE OF COMPUTERS

In a 1983 National Education report, the central section of the United States contained the largest group
of computers users in education. These users were middle class and generally located in suburban areas of towns.

Yuen (1984) found that attitude towards computers was affected by age. The younger the user, the better the attitude towards computers a teacher had. His study also indicated that the more education a teacher had, the better his/her attitude towards computers.

Vermette, Orr, and Hall (1986) found that there was not a difference between the gender of a teacher and his/her attitude towards computers. However, their studies indicated that there was stereotyping evident.

SUMMARY

Computers are being used as instructional tools in education today. They are used for drill and practice, simulations, and as tutorials. Two major uses of computers include computer assisted instruction (CAI) and computer managed instruction (CMI).

Research indicated that those teachers who teach computer literacy have varying backgrounds. Teachers can be highly qualified in data processing or simply be owners of computers with little experience. Math, Science, and Business teachers were responsible for teaching computer literacy in most cases.
Teacher training, as indicated by prior research, was inconsistent for teaching computer literacy. Some states require special certification, while others appointed a teacher. This teacher could easily be one with no special training. Research suggested that teacher training was the key to the implementation of computers into the school.

Teachers gained experience on computers by using them in their classroom for instruction. Some obtained experience by using computers for word processing, database instruction, spreadsheets, or graphics. Others used them for gaming.

As computers are placed into the classroom, the attitudes of teachers in charge of those classrooms became very important. The review of literature indicated that although teachers started out feeling very unenthusiastic towards computers, in recent years their attitudes have become more positive towards computer use in the classroom.

Research indicated that the central portion of the United States was the biggest user of computers in education. Computers were used most in suburban locations. Other research indicated that the more education a teacher had, the better the attitude a
teacher had toward computers. Furthermore, the younger a teacher was, the more positive his/her attitude was towards computers.
CHAPTER III
METHODS AND PROCEDURES

INTRODUCTION

The purpose of this study was to determine what teachers' attitudes were towards classroom use of computers and to investigate teachers' knowledge of computers as related to their education and background. In addition, the researcher examined the relationship between teachers' knowledge of computers and their attitudes towards computers. This chapter is divided into the following sections:

1. Population
2. Description of Sample
3. Research Instrument
4. Data Collection
5. Data Analysis

POPULATION

The population of this study included the secondary and middle school teachers in the Columbus Public School District during March and April of 1987. There were a total of 2,134 teachers in the population. A random sample of 1,067 teachers was selected to complete the
questionnaire. The Columbus Public School District consisted of sixteen high schools serving grades 9 -12, one school with grades 6 -12, and four vocational schools. The middle schools contain grades 6 - 8.

In this study, a comprehensive high school was one that offered a wide variety of classes. This type of school was college preparatory in nature, but did include non-college preparatory curricula. Vocational schools prepared students for entry-level jobs in a variety of vocations.

DESCRIPTION OF THE SAMPLE

Sixty-one percent of the sample were female, thirty-eight percent were male. Not all members of the sample answered this question, therefore the summed percentage of the males and females does not equal 100 percent. The majority of the teachers were between the ages of 40 to 49 (37.5%) followed closely by those who were 30 to 39 (35.9%). Twenty-six percent of the teachers had 20 or more years of teaching experience, 25 percent have taught 15 to 19 years, and 24.3 percent have been teaching 10-14 years. The majority of the teachers have earned more than a Bachelors degree (See Table 1).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>247</td>
<td>38.2</td>
</tr>
<tr>
<td>Female</td>
<td>398</td>
<td>* 61.6</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 29</td>
<td>60</td>
<td>9.3</td>
</tr>
<tr>
<td>30 - 39</td>
<td>232</td>
<td>35.9</td>
</tr>
<tr>
<td>40 - 49</td>
<td>242</td>
<td>37.8</td>
</tr>
<tr>
<td>50 - 59</td>
<td>86</td>
<td>13.3</td>
</tr>
<tr>
<td>Over 59</td>
<td>20</td>
<td>* 3.1</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>493</td>
<td>76.3</td>
</tr>
<tr>
<td>No</td>
<td>149</td>
<td>* 23.1</td>
</tr>
<tr>
<td><strong>Years of Teaching</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 4</td>
<td>64</td>
<td>9.9</td>
</tr>
<tr>
<td>5 - 9</td>
<td>91</td>
<td>14.1</td>
</tr>
<tr>
<td>10 - 14</td>
<td>157</td>
<td>24.3</td>
</tr>
<tr>
<td>15 - 19</td>
<td>162</td>
<td>25.1</td>
</tr>
<tr>
<td>20 or more</td>
<td>171</td>
<td>* 26.5</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60 college credits</td>
<td>6</td>
<td>.9</td>
</tr>
<tr>
<td>Over 60 college credits</td>
<td>15</td>
<td>2.3</td>
</tr>
<tr>
<td>Bachelors</td>
<td>99</td>
<td>15.3</td>
</tr>
<tr>
<td>Some Graduate work</td>
<td>204</td>
<td>31.6</td>
</tr>
<tr>
<td>Masters</td>
<td>164</td>
<td>25.4</td>
</tr>
<tr>
<td>Beyond Masters</td>
<td>151</td>
<td>23.4</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>1.1</td>
</tr>
</tbody>
</table>

* Some of the respondents did not answer these questions, therefore the percentages do not add up to 100 percent.
RESEARCH INSTRUMENT

The questionnaire that was used in this study was one developed by Chi-Yin Yuen (see Appendix A). The questionnaire consisted of three major parts. Part A contained information concerning the participants' background such as sex, age, educational level, service area, years of experience, experience in working with computers, training in using computers, and the availability of computers. Part B measured a teacher's understanding of computers using a Likert type scale. Part C contains 27 Likert type attitude items designed to measure a teacher's attitude towards using computers in the classroom. Each item in Parts B and C allowed for five responses ranging from "strongly agree" to "strongly disagree." The questions are rated on a scale from five to one. "Strongly agree" had a rating of five, "Agree", a rating of four, "Undecided", a rating of three, "Disagree", a rating of two, and "Strongly disagree" had a rating of one. There were negative attitude items in Part C. These were coded using a reversed score from one to five. This included questions 1, 3, 4, 9, 11, 12, 17, 19, 23, 24, 25, 26, and 27.
Items in this questionnaire are based on a review of literature done by Yuen. After completing the review of literature, Yuen made some minor modifications and additional items were added as necessary.

Reliability

The reliability for this instrument was tested by Yuen by the use of the Likert Attitude Scale Analysis. This analysis indicated that the coefficient alpha index of reliability was 0.938 and 0.963 for Part B and C respectively.

Yuen used the Spearman-Brown Formula to obtain the estimated number of items needed to achieve certain reliability. For a reliability of .90, 13 and 15 of the same quality of items is required for the understanding section and the attitude section respectively.

The questionnaire was refined by using the item-total correlation coefficient of each item. Yuen found that according to Lemke and Wiersma (1976) items with a high positive item-total correlation coefficient tend to increase test reliability. Yuen retained those items with high item total correlation coefficients and rejected those with low or negative item-total correlation.
Validity

A panel of experts was used to establish content validity of the questionnaire for the proposed study. Three experts in computers included one secondary teacher, one university professor, and one state department representative (see Appendix B). The panel suggested minor changes for the questionnaire. These suggestions resulted in the addition of two questions.

DATA COLLECTION

Permission was obtained by Chi-Yin Yuen on January 12, 1987 to use his instrument for the study (see Appendix C). The Columbus City School District gave permission to do the study on February 23, 1987. The researcher worked with the Director of the Department of Technology. Contact was made with the school principals to set up times and dates to do the study in their respective schools. The researcher went to the schools on a day and time that was agreed upon by both the school and the researcher.

The researcher attempted to identify a contact person at each school. If one was available, the contact person received instructions on how to distribute the questionnaire (see Appendix D). The researcher picked
up the questionnaire within one week of distribution to the contact person. If a contact person was not used, the researcher distributed the questionnaire and collected it the same day. Data collection was completed in approximately four weeks starting on March 16 and ending on April 7.

The participants were assured that the data collected from this survey would be kept strictly confidential. All information obtained was reported in statistical and summary form to guarantee anonymity. The questionnaire was also approved by the Behavioral and Social Sciences Human Subject Review Committee of The Ohio State University.

DATA ANALYSIS

Usable Surveys

Of the 1,067 teachers in the sample, 682 (64%) of the surveys were returned. There were 646 usable surveys. Twenty-one of the surveys that were returned were not used because they were incomplete. Fifteen were eliminated from the study because they were returned blank.
Non-Respondents

Kerlinger (1973, p. 414) indicated that with less than an 80% response rate, it is necessary to find out some of the characteristics of the non-respondents. The researcher contacted 19 (5%) of the non-respondents and asked them key questions from the survey instrument. The key questions that were asked included the following: 8A, 9A, 2B, 16B, 17B, 2C, 5C, 7C, 11C, and 13C. T-tests were used to determine if there was a significant difference between the non-respondents and the sample. The T-tests showed that there was not a significant difference between the two groups.

Analysis

The data collected was analyzed using various correlational and descriptive statistics. The analysis included frequency distributions, means, standard deviations, percentages, correlation coefficients, and chi-square. The SAS Package at the Ohio State University was used for the statistical analyses. The test used for each research question is described in detail in chapter four. The alpha level for each statistical analysis was set at .05.
CHAPTER IV
ANALYSIS OF DATA

INTRODUCTION

This study examined the computer literacy backgrounds of secondary teachers and determined whether there were significant relationships between the teachers' computer literacy background and whether or not they used computers in their classroom. The study also examined teachers' attitudes towards computers to see if there was a relationship between attitudes and computer usage in the classroom.

To investigate the eight research questions in this study, the researcher surveyed teachers in the Columbus Public School District (See Table 1). Each question and those items on the questionnaire relating to the question are presented in this chapter followed by the findings and interpretations.

Research Question (1): What are the attitudes of secondary educators towards the use of micro-computers in the classroom?

The analyses used for research question one included frequency distributions, percentages, means and standard deviations. To investigate this question, the
researcher used responses to questions one through twenty-seven on part C of the survey instrument (See Appendix A). Data collected from the questionnaire included items concerning teacher's opinions about computers and computer usage in the classroom (See Tables 2 and 3).

This section contained both positive and negative attitude questions. Questions 1, 3, 4, 9, 11, 12, 17, 19, 23, 24, 25, 26, and 27 were negative attitude questions (See Table 2). Because these items were negative, they will be discussed separately from the positive attitude items which include questions 2, 5, 6, 7, 8, 10, 13, 14, 15, 16, 18, 20, 21, and 22 (See Table 3).

The researcher used the scale shown in Table 4 to (located on page 39) analyze the attitude items on the survey instrument. This scale will be used throughout this chapter as a standard for evaluating mean scores of questions in Parts B and C of the survey instrument.
TABLE 2
NEGATIVE ATTITUDE RESPONSES

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Frequency of Responses</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10) Computers are too expensive to use as instructional tools.</td>
<td>243 202 66 29 4</td>
<td>4.17 99.7 .83</td>
</tr>
<tr>
<td>(30) I do not enjoy using a computer.</td>
<td>198 220 109 79 36</td>
<td>3.71 99.7 1.19</td>
</tr>
<tr>
<td>(40) Using computers in schools will isolate students from other students.</td>
<td>183 106 93 45 11</td>
<td>3.94 98.8 .93</td>
</tr>
<tr>
<td>(90) Computers used for instruction will cause more problems than they will solve.</td>
<td>197 279 117 37 13</td>
<td>3.95 99.5 .95</td>
</tr>
<tr>
<td>(110) Computers are too complicated for me to use in my classroom.</td>
<td>180 297 107 39 16</td>
<td>3.92 99.5 .96</td>
</tr>
<tr>
<td>(120) The use of computers requires a strong background in mathematics.</td>
<td>146 353 104 29 11</td>
<td>3.92 99.5 .85</td>
</tr>
<tr>
<td>(170) Using computers for instruction would make learning too mechanical.</td>
<td>124 317 127 59 12</td>
<td>3.75 98.9 .93</td>
</tr>
<tr>
<td>(190) Having a computer readily available my program poses a threat to job security.</td>
<td>261 305 53 10 7</td>
<td>4.23 99.7 .80</td>
</tr>
<tr>
<td>(230) Computers are of little value in education.</td>
<td>288 286 18 21 1</td>
<td>4.30 99.7 .76</td>
</tr>
<tr>
<td>(240) Computers in schools have an adverse effect on students.</td>
<td>230 291 83 29 10</td>
<td>4.09 99.5 .89</td>
</tr>
<tr>
<td>(250) My subject area is not appropriate for using the computer.</td>
<td>235 255 98 38 17</td>
<td>4.01 99.5 .99</td>
</tr>
<tr>
<td>(260) Students are already too computer dependent.</td>
<td>208 319 87 24 6</td>
<td>4.08 99.7 .83</td>
</tr>
<tr>
<td>(270) Computers are just another fad and will pass away just like most teaching machines of the past.</td>
<td>301 238 69 28 9</td>
<td>4.23 99.8 .91</td>
</tr>
<tr>
<td>Survey Question</td>
<td>Frequency of Responses</td>
<td>Responses</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>(2C) The use of computers can improve the quality of education in schools.</td>
<td>206 332 81 22 7</td>
<td>4.09</td>
</tr>
<tr>
<td>(5C) Schools should purchase computers for instructional use.</td>
<td>235 320 64 14 7</td>
<td>4.19</td>
</tr>
<tr>
<td>(6C) A computer will help students learn.</td>
<td>221 338 72 9 4</td>
<td>4.18</td>
</tr>
<tr>
<td>(7C) Teachers should be computer literate.</td>
<td>208 341 70 18 8</td>
<td>4.12</td>
</tr>
<tr>
<td>(8C) Implementation of computers for instruction should be encouraged.</td>
<td>194 338 88 20 5</td>
<td>4.08</td>
</tr>
<tr>
<td>(10C) The computer is a useful instructional tool.</td>
<td>215 356 60 8 6</td>
<td>3.99</td>
</tr>
<tr>
<td>(13C) Using a computer would add interest to my program.</td>
<td>138 355 108 32 11</td>
<td>3.89</td>
</tr>
<tr>
<td>(14C) The use of a computer in my program would improve my instructional</td>
<td>126 268 176 58 17</td>
<td>3.66</td>
</tr>
<tr>
<td>effectiveness.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(15C) I look forward to the time when computers are used in educational</td>
<td>135 300 136 54 16</td>
<td>3.76</td>
</tr>
<tr>
<td>programs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(16C) I am confident about the potential for using computers in my program.</td>
<td>138 285 132 68 21</td>
<td>3.70</td>
</tr>
<tr>
<td>(18C) Computers are a flexible medium for instruction.</td>
<td>100 386 113 37 4</td>
<td>3.94</td>
</tr>
<tr>
<td>(20C) Students should understand the impact of computers on society.</td>
<td>228 379 23 10 2</td>
<td>4.27</td>
</tr>
<tr>
<td>(21C) Computer instruction and use should occur in most subject areas.</td>
<td>129 324 135 46 10</td>
<td>3.80</td>
</tr>
<tr>
<td>(22C) The computer can be used as a tutor to simulate complex concepts.</td>
<td>150 354 107 19 8</td>
<td>3.97</td>
</tr>
</tbody>
</table>
The mean scores indicated that the participants agreed with all the positive attitude items in section C of the survey instrument (See Table 3).

The respondents disagreed with all of the negative attitude items found in section C of the survey instrument (See Table 2). The mean score of the entire attitude section was 4.00, indicating respondents agreed and had a positive attitude towards computers.

The mean attitude score for vocational school teachers was 4.23. High school teachers and middle school teachers had mean attitude scores of 4.00 and 3.96 respectively. This indicated that all three groups had positive attitudes. However, the vocational school teachers' attitudes were more positive than the attitudes of the high school or middle school teachers.
Both males and females from the sample had positive attitude scores. The male group had a score of 3.96 and the female group had a mean score of 4.03. This indicated that the females were slightly more positive in their attitudes towards computers than the males.

The researcher also examined the mean attitude scores of the five age groups of the sample. Respondents who were between the ages of 30 - 49 had a mean attitude score of 4.03. They had the most positive attitude towards computers. Those between the ages of 20 - 29 and 50 - 59 had mean attitude scores of 4.02 and 3.90 respectively. The least positive attitudes were those of the respondents who were over 59. Their mean attitude score was 3.80.

When the researcher examined the mean attitude scores of the different educational groups, those respondents who had under 60 college credits had the highest score of 4.07, indicating that they had the most positive attitudes toward computers. Teachers who had education beyond their masters degree had a mean score of 4.05 closely followed by those who have completed some graduate work. The teachers had a mean
attitude score of 4.04. Those respondents that have earned a Bachelor's degree had a mean attitude score of 4.02. The lowest attitude scores came from those teachers who had masters degrees (mean = 3.95) and those who have earned over 60 college credits (mean = 3.48). These groups had the least positive attitudes toward computers.

Research Question (2): Is there a relationship between the computer literacy backgrounds of secondary teachers and the presence or absence of computer usage in the classroom?

Statistical analysis procedures used for research question two included means, percentages, and Pearson Product Moment Correlation Coefficients. The standard that will be used throughout this chapter to interpret data and for reporting Pearson Product Moment Correlation Coefficient are based upon the criteria shown in Table 5.
TABLE 5

INTERPRETATION OF RELATIONSHIPS

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70 or higher</td>
<td>Very strong relationship</td>
</tr>
<tr>
<td>.50 to .69</td>
<td>Substantial relationship</td>
</tr>
<tr>
<td>.30 to .49</td>
<td>Moderate relationship</td>
</tr>
<tr>
<td>.10 to .29</td>
<td>Low relationship</td>
</tr>
<tr>
<td>.01 to .09</td>
<td>Negligible relationship</td>
</tr>
</tbody>
</table>

Source: Davis, Elementary Survey Analysis, 1971:49

To investigate research question two, the researcher used responses obtained from questions 14A and 2B on the survey instrument for teachers (See Appendix A). Data collected from the questionnaire included: (a) those teachers who felt they were computer literate; and (b) the teachers who have used computers in their classrooms.

**Computer Literacy**

Ninety-nine percent of the teachers responded to survey question (2B) - "I consider myself to be computer literate." The mean response was 2.79 and the standard deviation was 1.30 (See Table 6). Nearly 63 percent of the respondents were either undecided or did not consider themselves to be computer literate.
TABLE 6

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Frequency of Responses</th>
<th>Std</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2B) I consider myself to be computer literate.</td>
<td>62 176 98 178 128</td>
<td>2.79 99 1.30</td>
</tr>
</tbody>
</table>

**Computer Usage**

Ninety-nine percent of the teachers responded to question (14A) - "Have you used a computer in your instructional program?" There were 49.4 percent of the teachers that responded "yes" to this question and 49.1 percent that responded "no".

Survey question (2B) - "I consider myself to be computer literate." had a moderate significant, meaningful relationship with survey question (14A) - "Have you used a computer in your instructional program?" (p < .01) (See Appendix A and Table 7). This indicated that those teachers who responded "yes" to the question "Have you used computers in your instructional program?" are more likely to consider themselves to be computer literate than those teachers who responded "no" to the question.
TABLE 7
RELATIONSHIP BETWEEN COMPUTER LITERACY BACKGROUNDS
OF TEACHERS AND THE USAGE OF COMPUTERS
IN THEIR CLASSROOMS

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>632</td>
<td>.44</td>
<td>.01</td>
</tr>
</tbody>
</table>

Research Question (3): Is there a relationship between the understanding of computers by secondary teachers and their attitudes towards computer usage in the classroom?

Statistical analysis procedures used for research question three included means, percentages, and Pearson Product Moment Correlation Coefficients. The researcher used responses from all questions in Part B and Part C of the survey instrument. Data collected from the questionnaire included: (a) information concerning teachers understandings about computers; and (b) teachers attitudes towards computers (See Tables 2, 3, and 8).

Computer Understanding

Questions (5B) - "I have written a computer program.", (6B) - "I can develop an algorithm for solving a problem.", and (7B) - "I can read, understand, and modify existing computer programs." had mean scores of 2.37, 2.05, and 2.23 respectively. These scores
<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Frequency of Responses</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1B) I read about computers.</td>
<td>93 265 65 131 86</td>
<td>3.23</td>
<td>99.0</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2B) I consider myself to be &quot;computer literate.&quot;</td>
<td>62 176 98 178 128</td>
<td>2.79</td>
<td>99.3</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3B) I can operate a computer well enough to use a commercially produced computer program.</td>
<td>139 233 64 107 97</td>
<td>3.32</td>
<td>99.2</td>
<td>1.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4B) I know BASIC or some other computer language.</td>
<td>66 239 55 140 141</td>
<td>2.92</td>
<td>99.2</td>
<td>1.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5B) I have written a computer program.</td>
<td>62 148 26 136 267</td>
<td>2.37</td>
<td>98.9</td>
<td>1.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6B) I can develop an algorithm for solving a problem.</td>
<td>41 72 65 158 302</td>
<td>2.05</td>
<td>98.8</td>
<td>1.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7B) I can read, understand, and modify existing computer programs.</td>
<td>44 95 85 161 258</td>
<td>2.23</td>
<td>99.5</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8B) I know how computers are used.</td>
<td>89 336 87 71 59</td>
<td>3.50</td>
<td>99.4</td>
<td>1.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9B) I know how computers work.</td>
<td>66 297 101 105 75</td>
<td>3.27</td>
<td>99.6</td>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10B) I know how computers affect our society.</td>
<td>130 389 76 36 14</td>
<td>3.91</td>
<td>99.8</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11B) I understand the basic components of a computer.</td>
<td>71 285 90 120 66</td>
<td>3.28</td>
<td>97.8</td>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12B) I have experience in using computer packages for text preparation, test scoring, or packaged instructional programs.</td>
<td>62 205 58 161 153</td>
<td>2.78</td>
<td>99.2</td>
<td>1.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(13B) I consider myself informed about the use of computers in my field.</td>
<td>60 200 91 178 111</td>
<td>2.88</td>
<td>99.0</td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(14B) I know of at least one commercially produced computer program in my field.</td>
<td>120 311 47 85 79</td>
<td>3.48</td>
<td>99.3</td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(15B) I can evaluate and select an appropriate commercially produced computer program for my field.</td>
<td>94 217 97 124 112</td>
<td>3.08</td>
<td>99.7</td>
<td>1.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(16B) I can integrate computerized teaching materials into my program.</td>
<td>87 268 98 100 84</td>
<td>3.27</td>
<td>98.6</td>
<td>1.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(17B) I know sources of computer materials.</td>
<td>86 305 77 105 74</td>
<td>3.74</td>
<td>99.5</td>
<td>1.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(18B) I can assist in the selection and acquisition of computers.</td>
<td>68 139 105 180 149</td>
<td>2.68</td>
<td>99.2</td>
<td>1.32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
indicated that the teachers disagreed with these items (See Tables 8 and 4). Question (10B) - "I know how computers affect our society." had a mean score of 3.91 indicating that teachers agreed with this question. The remaining items in this section had mean scores showing that teachers were undecided about these questions (See Table 8).

The mean score for the entire section of Part B was 3.02. This indicated that teachers were unsure about their understanding of computers.

**Computer Attitudes**

Mean scores from questions in Part C of the survey instrument indicated that teachers agreed with the positive attitude items, numbers 2, 5, 6, 7, 8, 10, 13, 14, 15, 16, 18, 20, 21, and 22 (See Tables 3 and 4). According to the mean scores from the negative attitude items, numbers 1, 3, 4, 9, 11, 12, 17, 19, 23, 24, 25, 26, and 27, teachers disagreed with these questions (See Tables 2 and 4). The mean score for the entire section was 4.00 which indicated that teachers had a positive attitude towards computers.

Survey questions in Part B - "Your Understanding About Computers" had a moderate significant, meaningful
relationship with questions in Part C - "Your Opinions About Computers in Education." (p < .01) (See Appendix A and Table 9).

**TABLE 9**

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>646</td>
<td>.49</td>
<td>.01</td>
</tr>
</tbody>
</table>

These findings indicated that those teachers with more understanding of computers were more likely to have a better attitude toward computers. In comparing the items individually in Parts B and C, the researcher found no significant relationships.

Research Question (4): Is there a relationship between whether or not teachers use computers in their classrooms and if they have had any training on the computer?

Statistical analysis procedures for this question included means, percentages, and Pearson Product Moment Correlation Coefficients. The researcher used responses obtained from questions 14A and 9A on the survey instrument (See Appendix A). Data collected included: (a) those teachers who have used computers in their
classrooms; and (b) those teachers who have had a variety of methods of training on computers.

TABLE 10

<table>
<thead>
<tr>
<th>Type of training</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td>340</td>
<td>306</td>
</tr>
<tr>
<td>In-service</td>
<td>213</td>
<td>433</td>
</tr>
<tr>
<td>Another User</td>
<td>173</td>
<td>473</td>
</tr>
<tr>
<td>Self-taught</td>
<td>164</td>
<td>482</td>
</tr>
<tr>
<td>College Class</td>
<td>142</td>
<td>504</td>
</tr>
<tr>
<td>Meeting</td>
<td>110</td>
<td>536</td>
</tr>
<tr>
<td>Vendor</td>
<td>62</td>
<td>584</td>
</tr>
</tbody>
</table>

The majority of the teachers received training on computers through workshops (53%). Thirty-three percent received training by attending an in-service workshop. The other training methods were ranked in the following order: another user (27%), self-taught (25%), college class (22%), meeting (17%), and through a vendor (10%).

Computer Usage

Ninety-nine percent of the teachers responded to question (14A) - "Have you used a computer in your
instructional program?" Forty-nine percent of the teachers responded "yes" and 49.1 percent responded "no".

Survey question (9A) - "Which one of the statements is most comparable to the training you received for using computers?" had a moderate significant, meaningful relationship with question (14A) - "Have you used a computer in your instructional program?" (p < .01) (See Appendix A and Table 11). The findings indicated that those teachers who received training on computers were more likely to use them in their programs.

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>636</td>
<td>.41</td>
<td>.01</td>
</tr>
</tbody>
</table>

When each item of training was compared individually to responses from question (14A) - "Have you used a computer in your instructional program?" there was a low significant, meaningful relationship (See Table 12). Those teachers who had training were more likely to use computers.
This table showed that more people who used in-service workshops to receive training were using computers than any of the other type of training.

Research Question (5): What is the relationship between teachers' experiences with computers and the usage of computers in the classroom?

The statistical analyses used for research question five included means, frequency distributions, and Pearson Product Moment Correlation Coefficients. To investigate this question, the researcher used responses from questions 14A and 8A on the survey instrument (See Appendix A). Data collected included: (a) those
teachers who used computers in their classroom; and (b) those teachers who had experience working with computers.

**Experience**

Seventy-six percent of the teachers responded "yes" to question (8A) - "Have you had any experience working with computers?" Twenty-three percent responded "no". Ninety-nine percent of the teachers responded to this question.

**Computer Usage**

Ninety-nine percent of the teachers responded to question (14A) - "Have you used a computer in your instructional program?" There were 49.4 percent that responded "yes" to this question and 49.1 percent that responded "no".

Survey question (8A) - "Have you had any experience with computers?" had a moderate significant, meaningful relationship with question (14A) - "Have you used a computer in your instructional program?" (p < .01) (See Appendix A and Table 13). These findings indicated that those teachers who responded "yes" that they had
experience with computers were more likely to use them
in their classroom than those teachers who responded
"no".

| TABLE 13 |
| --- | --- | --- |
| RELATIONSHIP BETWEEN EXPERIENCE WITH COMPUTERS AND COMPUTER USAGE IN THE CLASSROOM |
| Number of Cases | Correlation Coefficient | Prob. Level |
| 633 | .40 | .01 |

Research Question (6): Which type of teachers (high school teacher, middle school teacher or vocational school teacher) have a tendency to use computers more in their instructional programs?

The statistical analysis for this question consisted of chi-square. To investigate this question, the researcher divided the questionnaires up by schools (high school, middle school, and vocational school) according to code numbers. The researcher also used question 14A from the survey instrument (See Appendix A).

Computer Usage

Ninety-nine percent of the teachers responded to question (14A) - "Have you used computers in your instructional program?" There were 49.4 percent that responded "yes" and 49.1 percent that responded "no".
The chi-square test showed that there was a small difference between the observed frequency and the expected frequency in the high schools and middle schools. There was a greater difference in the observed frequency and actual frequency in the vocational school. This indicated that teachers were more likely to respond "yes" to question (14A) - "Have you used a computer in your instructional program?" if they taught in a vocational school. These results were significant at the .05 level.

Research Question (7): What is the relationship between the teachers' ages and computer usage in the classroom?

The statistical analyses used for research question seven included frequency distributions and Pearson Product Moment Correlation Coefficient. To investigate this question, the researcher used questions from 14A and 2A on the survey instrument (See Appendix A). Data collected included: (a) those teachers who used computers in their classroom; and (b) the ages of the teachers.
Age

Ninety-nine percent of the teachers answered question (2A) - "Please indicate your age category." on the survey instrument. There were 9.2 percent of the teachers who responded that they were between 20-29, 35.9 percent were between 30-39, 37.4 percent between 40-49, 13.3 percent between 50-59, and 3.1 percent were over 59 years old.

Survey question (2A) - "Please indicate your age category." had a negligible significant relationship with question (14A) - "Have you used a computer in your instructional program?" (p < .05) (See Appendix A and Table 14). These findings indicated that there was no significant relationship between a teacher's age and whether or not they used computers in the classroom.

<table>
<thead>
<tr>
<th>TABLE 14</th>
<th>RELATIONSHIP BETWEEN AGE AND COMPUTER USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>Correlation Coefficient</td>
</tr>
<tr>
<td>630</td>
<td>.08</td>
</tr>
</tbody>
</table>
Research Question (8): What is the relationship between the gender of teachers and computer usage in the classroom?

The statistical analyses used for research question eight included frequency distributions, and Pearson Product Moment Correlation Coefficient. To investigate this question, the researcher used questions 14A and 1A on the survey instrument (See Appendix A). Data collected included: (a) those teachers who used computers in their classrooms; and (b) the gender of the teachers.

Gender

Ninety-nine percent of the teachers answered question (1A) - "Please indicate your sex." Sixty-two percent of the teachers were female and thirty-eight percent were male.

Survey question (1A) - "Please indicate your sex." had a negligible non-significant, relationship with survey question (14A) - "Have you used computers in your instructional program? (p < .15) (See Appendix A and Table 15). This finding indicated that there is not a significant, meaningful relationship between the usage of computers in a classroom and whether a teacher is male or female.
TABLE 15

RELATIONSHIP BETWEEN COMPUTER USAGE AND GENDER

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>635</td>
<td>.05</td>
<td>.15</td>
</tr>
</tbody>
</table>

ADDITIONAL FINDINGS

The researcher also investigated the relationship between teachers' attitudes toward computers and usage of the computer in the classroom. The statistical analysis used to investigate this relationship included the Pearson Product Moment Correlation Coefficient. The researcher used responses from Part C of the survey instrument and responses from question (14A) - "Have you used a computer in your instructional program?" (See Appendix A).

Survey questions from Part C of the survey instrument had a moderate significant, meaningful relationship with survey question (14A) - "Have you used a computer in your instructional program?" (p < .01) (See Appendix A and Table 16). This finding indicates that teachers who identify themselves as having a positive attitude toward computers are more
likely to respond "yes" to the question "Have you used a computer in your instructional program?"

**TABLE 16**

**RELATIONSHIP BETWEEN TEACHER ATTITUDE AND COMPUTER USAGE IN THE CLASSROOM**

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>636</td>
<td>.35</td>
<td>.01</td>
</tr>
</tbody>
</table>

The researcher also investigated the relationship between teachers' attitudes towards computers and the training they received on computers. Statistical analysis for this included the Pearson Product Moment Correlation Coefficient. The researcher used all the questions in Part C of the survey instrument and question (9A) - "Which one of these statements is most comparable to the training you have received for using computers?" (See Appendix A).

The survey questions in Part C of the survey instrument had a moderate significant, meaningful relationship with survey question (9A) - "Which one of these statements is most comparable to the training you have received for using computers?" (p < .01) (See Appendix A and Table 17). This finding indicates that
those teachers who had some form of training on computers were more likely to have a positive attitude toward computers.

### Table 17

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>646</td>
<td>.36</td>
<td>.01</td>
</tr>
</tbody>
</table>

When the researcher compared teacher attitude to each type of training, the results were a low significant, meaningful relationship. ($p < .01$) (See Table 18 and Appendix A).

### Table 18

<table>
<thead>
<tr>
<th>Training</th>
<th>Correlation Coefficient</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting</td>
<td>.26</td>
<td>.01</td>
</tr>
<tr>
<td>Vendor</td>
<td>.22</td>
<td>.01</td>
</tr>
<tr>
<td>Workshop</td>
<td>.20</td>
<td>.01</td>
</tr>
<tr>
<td>College</td>
<td>.18</td>
<td>.01</td>
</tr>
<tr>
<td>Other user</td>
<td>.18</td>
<td>.01</td>
</tr>
<tr>
<td>Self taught</td>
<td>.17</td>
<td>.01</td>
</tr>
<tr>
<td>In-service</td>
<td>.16</td>
<td>.01</td>
</tr>
</tbody>
</table>
This table indicates that those teachers who obtained training on computer through a meeting were more likely to have a positive attitude toward computers.
CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

INTRODUCTION

Chapter five is organized into four parts: research methodology, summary, conclusions, and recommendations for further research. The research methodology section describes the procedures used to identify the population; to collect data; and to analyze the data. The summary section gives findings based on the data collected. Recommendations and conclusions are made from the findings of each research question.

RESEARCH METHODOLOGY

The survey method of collecting data was used in this study. A questionnaire investigating the attitudes of teachers towards computers and their backgrounds with computers was used to collect this data.

The population consisted of middle school and high school teachers in the Columbus Public School District. A random sample of 1,067 teachers was chosen from the population of 2,134 and given surveys. A total of 682
surveys were returned (64%). There were 666 surveys that were usable. Others were eliminated because they were incomplete or blank.

The descriptive data has been presented in the form of frequency distributions, percentages, means, standard deviations, Pearson Product Moment Correlations and Chi-square.

SUMMARY

The purpose of this study was to determine what teachers' computer backgrounds were and if there was a relationship between their backgrounds and their attitudes towards computers. The study investigated eight research questions (Chapter 1, pages 5 and 6). The summary and conclusions that follow apply only to the population of 2,134 Columbus Public School teachers as described on pages 28 and 29 of this study within the stated limitations (Chapter 1, pages 6 and 7).

Research Question (1): What are the attitudes of secondary educators towards the use of microcomputers in the classroom?

Summary: This question was answered by tabulating response frequencies, means, and percentages for items in Part C of the survey instrument. There were both negative and positive attitude questions in this section.
The teachers agreed with all positive attitude items. The teachers in the sample disagreed with all negative attitude items. A mean score of 4.00 indicated that teachers had positive attitudes towards computers.

Vocational school teachers had the most positive attitude toward computers with a mean score of 4.23. Females also had the most positive mean attitude score of 4.03. Those respondents who were between the ages of 30 to 49 had the most positive attitude with a mean score of 4.03. Teachers who had under 60 hours of college credit had the most positive attitude toward computers with a mean score of 4.07.

Research Question (2): Is there a relationship between the computer literacy backgrounds of secondary teachers and the presence or absence of computer usage in the classroom?

Summary: The questions used to answer research question two provided data concerning teachers' computer literacy backgrounds and the teachers who have used computers in their classrooms. The Pearson Product Moment Correlation Coefficient indicated that there was a moderate significant, meaningful relationship between teachers' computer literacy backgrounds and whether or not they used computers in their classroom ($r = .44, p < .01$).
Research Question (3): Is there a relationship between the understanding of computers by secondary teachers and their attitudes towards computer usage in the classroom?

Summary: This question was answered using means, percentages, and Pearson Product Moment Correlation. Questions in Parts B and C of the survey instrument were used to obtain information of the teachers' understandings of computers and their attitudes towards computers. The Pearson Product Moment Correlation Coefficient showed a moderate significant, meaningful relationship between teachers' understandings about computers and their attitudes towards computers (r = .49, p < .01).

Research Question (4): Is there a relationship between whether or not teachers use computers in their classrooms and if they have had any training on the computer?

Summary: Statistical analysis procedures for this question included means, percentages, and Pearson Product Moment Correlation Coefficient. Data collected to answer this question included information regarding the use of computers in classrooms and the training received on computers. The Pearson Product Moment Correlation Coefficient indicated that there was a moderate significant, meaningful relationship between training received on computers and whether or not
computers were used in the classroom ($r = .41$, $p < .01$). When each training method was compared individually to the use of computers in the classroom, there was a low significant, meaningful relationship. However, more people who used in-service workshops to receive training were using computers than any of the other types of training.

Research Question (5): What is the relationship between teachers' experiences with computers and the usage of computers in the classroom?

Summary: Means, frequency distributions, and Pearson Product Moment Correlation Coefficient were used to statistically analyze the data used for research question five. Data used for this question included those teachers who used computers in their classroom and the teachers who had experience with computers. The Pearson Product Moment Correlation Coefficient showed a moderate significant, meaningful relationship between experience with a computer and use in the classroom ($r = .40$, $p < .01$).

Research question (6): Which type of school teachers (high school teacher, middle school teacher or vocational teacher) have a tendency to use computers more in their instructional program?

Summary: Chi-square analysis was used for research question six. Data that was used for this question
included those teachers who have used computers in their classroom and teachers employed in middle schools, high schools, and vocational schools. Chi-square analysis indicated that teachers were more likely to use computers if they taught in the vocational schools (p < .015). This was significant at the .05 level.

Research question (7): What is the relationship between teachers' ages and computer usage in the classroom?

Summary: Statistical analyses used for research question seven included frequency distributions and Pearson Product Moment Correlation Coefficient. Those teachers who used computers and the ages of the teachers were included in the data used for this question. The Pearson Product Moment Correlation Coefficient showed a negligible relationship between use of a computer in the classroom and age of the teacher (r = .08, p < .05). This finding was significant at the .05 level.

Research Question (8): What is the relationship between the gender of teachers and computer usage in the classroom?

Summary: Statistical analyses for this question included frequency distributions and the Pearson Product Moment Correlation Coefficient. The researcher used two questions from the survey instrument that provided
the following data: those teachers who have used computers in their classroom and the gender of the teachers. The Pearson Product Moment Correlation Coefficient showed a negligible relationship between gender and usage of computers in the classroom ($r = .05$, $p < .15$).

CONCLUSIONS

The teachers in the sample had positive attitudes towards computers. They felt computers could help them be better educators; should be used in almost all subject areas; and could make learning more interesting for students. These findings agree with research done by Yuen (1984), Norris and Lumsden (1984), Stevens (1982) and Vermette, Orr, and Hall (1986).

Females in this study had a more positive attitude toward computers than males. Vocational school teachers were also more positive in their attitude than high school or middle school teachers. Those teachers who were between the ages of 30 and 49 and had less than 60 hours of college credit were more positive in their attitudes towards computers than other teachers.

There was a significant, meaningful relationship between computer literacy and computer usage. Teachers
who were computer literate were more likely to use a computer in their classroom than those teachers who were not computer literate.

Teachers who had a better understanding of computers had a more positive attitude toward computers. This agrees with findings of Robardely (1971). The teachers in this study indicated that they were unsure of their understanding of computers. This study supports that they had a positive attitude. Yuen's 1984 study found that vocational teachers in Pennsylvania had a low understanding of computers but displayed positive attitudes.

Teachers who have received training on computers were more likely to use computers in their classrooms. Pipho (1985) found that training of teachers was the key to implementation of computers in the classroom. The majority of the teachers who received training on computers obtained it through computer workshops or in-service programs. The least likely used method of training was through the services of a vendor. More teachers who used in-service training were using computers than any other type of training.
Those teachers who had previous experience on computers were more likely to utilize a computer in their program. In this study, 25.5 percent of the teachers had no experience with computers. The remaining 74.5 percent had experience in the range of 1 – 99 months. Those teachers who taught in vocational schools were more likely to use computers. Neither age nor gender had any significant, meaningful relationship to computer usage in the classroom.

This study also found that those teachers who had a positive attitude toward computers were more likely to use them in their instructional programs. In addition, those teachers who had training on computers were more likely to have positive attitudes toward computers.

RECOMMENDATIONS

1. Is one type of training more effective than another? This study found that more teachers who used in-service training were using computers than any other type of training. However, this may have been the most convenient type of training for these teachers. This study does not show which type of training is the most effective. Therefore, the
researcher recommends that a study be done to determine which type of training is the most effective.

2. This study described the attitudes and understandings of teachers towards computers. This study found that teachers had positive attitudes towards computers. However, the study does not deal with how attitudes or understandings towards computers could be improved. The researcher recommends that a study be done to see what ways attitudes and understandings can be improved.

3. Over a period of time, do teachers' attitudes and understandings change in schools where computers and training are made available versus schools where they are not available? The researcher recommends that a longitudinal study be done to see if there are changes and what influences any changes that occur.

4. Attitude and understanding of subject matter influence what a teacher does in the classroom. This has been determined in prior research. A teacher with a poor attitude and understanding
toward computers may behave differently when teaching a computer class than a teacher with a positive attitude. The researcher recommends that a study be done to determine how attitude and understanding toward computers reflects what a teacher does in the classroom.

5. This study deals with the teacher's perception of "understanding of computers". One teacher who writes programs may feel he/she does not know that much about computers where another teacher who only knows how to use a word processing package may feel that he/she is very knowledgeable concerning computers. What determines how knowledgeable a teacher is or what a teacher's understanding of computers is? The researcher recommends that a study be done that would determine a teacher's actual understanding of computers.

6. This study indicated that the secondary and middle school teachers in the Columbus Public School District were unsure about their understandings about computers. Prior research indicated that there is a relationship between understanding and attitude. Therefore, the researcher recommends that more computer education be implemented in the
Columbus Public School District. This study found that meetings and vendor services had the highest relationship to teacher attitude. Therefore, the researcher recommends that training be provided by using meetings and vendor services.

7. The findings of this study may be similar to other middle or secondary schools in other areas. The researcher recommends that this study be replicated using different sociological settings such as rural settings.
REFERENCES AND BIBLIOGRAPHY


Lambrecht, J.J. Instructional Microcomputer Applications by Business Teachers in Minnesota. MN: Minnesota University, 1986.


Sherzer, B. Where are the Computers? The Computing Teacher, 1979, 7, 6-9.


This We Believe About Computer Literacy, Policies Commission for Business and Economic Education (PCBEE), 1984, 9.


APPENDIX A

THE SURVEY INSTRUMENT
March 16, 1987

Dear Teachers:

This survey is being conducted to learn more about the relationships that exist between teachers' backgrounds in computers and the attitudes and usage of computers in the classroom. The results obtained from this study will be kept strictly confidential and reported only in statistical and summary form. No attempt will be made to identify any individual teacher.

Please follow the directions below when filling out the questionnaire:

1. Complete the questionnaire according to the instructions given.
2. Place the completed questionnaire into the envelope provided.
3. Seal the envelope and give this back to the survey administrator.

Thank you for your help in this study.

Sincerely,

Judie DelPrato
Ph.D. Candidate

Dr. Anthony Ollmack
Associate Professor

The Ohio State University

Department of Educational Policy and Leadership
College of Education
325 Ramseyer Hall
29 West Woodruff Avenue
Columbus, Ohio 43210-1177
Phone 614-292-9015
COMPUTERS IN EDUCATION SURVEY

This is a study of the understandings and the attitudes that teachers have about the use of computers in education. It is intended that this information will be used to provide a clearer direction for administrators and educators who plan for the implementation of computers in education.

This questionnaire consists of three parts. Instructions for completing each section are provided at the beginning of the section. Please follow directions carefully and answer each part of the questionnaire completely. Please note that this is NOT a test and that all answers will be kept confidential. Your cooperation in completing this questionnaire is greatly appreciated.

PART A: Background Information

These are general descriptive questions that will help the investigator to classify the responses. They are for developing general categories and are NOT for the purpose of identification.

INSTRUCTIONS: Please fill in or check appropriate blanks.

1. Please indicate your sex.
   - [ ] a. Male
   - [ ] b. Female

2. Please indicate your age category.
   - [ ] a. 20-24
   - [ ] b. 25-29
   - [ ] c. 30-34
   - [ ] d. 35-39
   - [ ] e. 40-49
   - [ ] f. 50-59
   - [ ] g. 60-64
   - [ ] h. Over 65

3. In which of the following areas do you teach.
   - [ ] a. Social Studies
   - [ ] b. Language Arts
   - [ ] c. Science
   - [ ] d. Math
   - [ ] e. Home Economics
   - [ ] f. Business Occupations
   - [ ] g. Fine Arts
   - [ ] h. Physical Education
   - [ ] i. Other, please specify

4. Please indicate your number of years of teaching experience.
   - [ ] a. 0-3 years
   - [ ] b. 4-6 years
   - [ ] c. 7-9 years
   - [ ] d. 10-14 years
   - [ ] e. 15-19 years
   - [ ] f. 20 or more years

5. Please indicate your highest level of education attained.
   - [ ] a. Under 40 college credits
   - [ ] b. Over 40 college credits
   - [ ] c. Bachelor's
   - [ ] d. Master's
   - [ ] e. Beyond Master's
   - [ ] f. Some graduate work
   - [ ] g. Other, please specify

6. In what type of area is your school located?
   - [ ] a. Urban
   - [ ] b. Suburban
   - [ ] c. Rural

7. To your knowledge, has your school ever used remote terminals, connected to computers located elsewhere, to deliver computer-assisted instruction?
   - [ ] a. Yes
   - [ ] b. No
   - [ ] c. Don't know

8. Have you had any experience working with computers?
   - [ ] a. Yes
   - [ ] b. No
   - [ ] c. No
   - [ ] d. Have received in-service training
   - [ ] e. Have attended workshop(s) or seminar(s) (educational or vendor)
   - [ ] f. Have received pre- or in-service training
   - [ ] g. Have had a college course in using computers
   - [ ] h. Have attended a professional meeting on computers
   - [ ] i. Am mainly a self-taught learner
   - [ ] j. Have received individual instruction from a vendor
   - [ ] k. Have received individual instruction from another computer user
   - [ ] l. Other, please specify

9. Which one of these statements is most comparable to the training you have received for using computers? (Check all that apply)
   - [ ] a. Have received no training
   - [ ] b. Have attended workshop(s) or seminar(s) (educational or vendor)
   - [ ] c. Have attended workshop(s) or seminar(s) (educational or vendor)
   - [ ] d. Have had a college course in using computers
   - [ ] e. Have attended a professional meeting on computers
   - [ ] f. Am mainly a self-taught learner
   - [ ] g. Have received individual instruction from a vendor
   - [ ] h. Have received individual instruction from another computer user
   - [ ] i. Other, please specify

Please indicate your number of months of experience.
10. Do you own a computer?
   ___ a. Yes ___ b. No
   If yes, please specify the brand of computer

11. Does your school own any computers?
   ___ a. Yes ___ b. No
   If yes, please specify the model(s) of computer
   the number of computers
   the number of computers for administration
   the number of computers for instruction

12. Are computers available for your use in your program?
   ___ a. Yes ___ b. No

13. Are computers available for your students to use in your program?
   ___ a. Yes ___ b. No

14. Have you used a computer in your instructional program?
   ___ a. Yes ___ b. No

15. If you are not now using computers, would you be interested in using
    them in your program?
   ___ a. Yes ___ b. No

16. If you are not familiar with computers, how would you prefer to learn
    to use the computer? Please check one or more.
   ___ a. Self-taught
   ___ b. One-on-one instruction by another computer user
   ___ c. Programmed learning right at the computer
   ___ d. Workshop on computers
   ___ e. College credit courses in computers
   ___ f. One-on-one instruction by a paid consultant
   ___ g. Other, please specify

PART B: YOUR UNDERSTANDING ABOUT COMPUTERS

Listed below is a series of statements about computer knowledge. You
are asked to agree or disagree with each statement on an ordinal scale.
There are NO RIGHT or WRONG answers—only your personal opinions.

Instructions: Please indicate your personal opinion about each statement
by circling one of the five possible choices.

Strongly agree: ...........................................SA
Agree: .......................................................A
Uncertain or Undecided: .................................U
Disagree: ....................................................D
Strongly Disagree: .........................................SD

1. I read about computers. .................................SA A U D SD
2. I consider myself to be "computer literate." ........SA A U D SD
3. I can operate a computer well enough to use a
   commercially produced computer program. ........SA A U D SD
4. I know BASIC or some other computer language. ....SA A U D SD
5. I have written a computer program. ...................SA A U D SD
6. I can develop an algorithm for solving a problem. ...SA A U D SD
7. I can read, understand, and modify existing
   computer programs. ....................................SA A U D SD
8. I know how computers are used. .......................SA A U D SD
9. I know how computers work. 
10. I know how computers affect our society. 
11. I understand the basic components of a computer. 
12. I have experience in using computer packages for test preparation, test scoring, or packaged instructional programs. 
13. I consider myself informed about the use of computers in my field. 
14. I know of at least one commercially produced computer program in my field. 
15. I can evaluate and select an appropriate commercially produced computer program for my field. 
16. I can integrate computerized teaching materials into my program. 
17. I know sources of computer materials. 
18. I can assist in the selection and acquisition of computers. 

PART C: Your Opinions about Computers in Education

Listed below is a series of statements about the use of computers in education. You are asked to agree or disagree with each statement on an ordinal scale. There are NO RIGHT OR WRONG answers—only your personal opinions.

INSTRUCTIONS: Please indicate your personal opinion about each statement by circling one of the five possible choices.

Strongly Agree.................................SA
Agree................................................................A
Uncertain or Undecided........................U
Disagree..............................................D
Strongly Disagree...............................SD

1. Computers are too expensive to use as instructional tools. 
2. The use of computers can improve the quality of education in schools. 
3. I do not enjoy using a computer. 
4. Using computers in schools will isolate students from other students. 
5. Schools should purchase computers for instructional use. 
6. A computer will help students learn. 
7. Teachers should be computer literate. 
8. Implementation of computers for instruction should be encouraged. 
9. Computers used for instruction will cause more problems than they will solve. 
10. The computer is a useful instructional tool.
11. Computers are too complicated for me to use in my classroom.  
12. The use of computers requires a strong background in mathematics.  
13. Using computers would add interest to my program.  
14. The use of a computer in my program would improve my instructional effectiveness.  
15. I look forward to the time when computers are used in educational programs.  
16. I am confident about the potential for using computers in my program.  
17. Using computers for instruction would make learning too mechanical.  
18. Computers are a flexible medium for instruction.  
19. Having a computer readily available in my program poses a threat to job security.  
20. Students should understand the impact of computers on society.  
21. Computer instruction and use should occur in most subject areas.  
22. The computer can be used as a tutor to simulate complex concepts.  
23. Computers are of little value in education.  
24. Computers in schools have an adverse effect on students.  
25. My subject area is not appropriate for using the computer.  
26. Students are already too computer dependent.  
27. Computers are just another fad and will pass away just like most teaching machines of the past.
APPENDIX B

PANEL OF EXPERTS
Panel of Experts

Mr. Gary Anello
Data Processing Instructor
Eastland Career Center
4465 S. Hamilton Road
Groveport, OH 43125

Ms. Beverly Cross
State Supervisor, Business Education
Ohio Department of Education
65 S. Front Street
Columbus, OH 43215

Dr. Walter Sharp
Lecturer, Department of Education Policy and Leadership
Ohio State University
6430 Lexleigh Road
Reynoldsburg, OH 43068
APPENDIX C

LETTER OF PERMISSION FROM C.Y. YUEN
January 12, 1987

Judie DelFrates
2004 MacKenzie Drive
Columbus, OH 43220

Dear Judie:

Thank you for your letter of January 6 and for your interest in the research instrument used for my dissertation. I am pleased to give you permission to use the Microcomputers in Vocational Education Survey located on pages 105-109 of my 1984 dissertation.

If it is possible, I would like to have a copy of the results when you have completed your study. Good luck with your work.

Sincerely,

Steve Chi-Yin Yuan, Ph.D.
Assistant Professor

SCY/ns
APPENDIX D

CONTACT PERSON'S INSTRUCTIONS
CONTACT PERSON INSTRUCTIONS

Please follow the instructions below when administering the questionnaires:

1. Pass out the questionnaires to the teachers in the order given. (This will ensure that no two teachers sitting next to each other receive the same questionnaire).

2. Read the enclosed script to the teachers.

3. Allow the teachers to fill out the questionnaires.

4. Inform the teachers that they should return the questionnaires to you.

The principal of each building needs to sign the attached consent form. If someone other than the principal is administering the questionnaires, please see that the principal signs this form. This form must be returned to me along with the completed questionnaires.

If you provided me with a meeting date during our conversation, I will be in to pick up the questionnaires within a few days of that date. Please leave the questionnaires in the Main Office. Otherwise, I will be in contact with you to see when you will have them ready to pick up. Please do not hesitate to call me if you have any questions concerning this matter. Thank you for your help!

Judie DelFrate
836-5725 (work #)
459-6798 (home #)
SOLICITATION SCRIPT

(To be read by the survey administrator)

You have been selected to participate in a doctoral study at the Ohio State University regarding the use of computers in education. Your participation in this study is voluntary and you may withdraw from the study at any time without prejudice. Be assured that all data will be reported in statistical or summary form only.

Please follow the researcher's instructions provided to complete the questionnaire. Upon completion, place the questionnaire in the envelope provided, seal the envelope, and return the envelope to me.
CONSENT FORM

I, __________________________, principal of __________________________, give permission for Judie DelFrate, under the supervision of Anthony Olinzock, to conduct her survey in my building.

I understand that participation in this study is voluntary and that any teacher may withdraw from the study at any time without prejudice. I realize that data collected from this study will be reported in statistical or summary form only.

I acknowledge that I have read and understand this consent form.

____________________  Date

____________________
Signature