A STUDY OF THE RELATIONSHIP BETWEEN TEACHER COMPUTER COMFORT ATTITUDES, ACCESS TO A COMPUTER, AND INSERVICE PROGRAMS

MASTER'S PROJECT

Submitted to the School of Education

University of Dayton, in Partial Fulfillment

of the Requirements for the Degree

Master of Science in Education

by

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UNIVERSITY OF DAYTON

Dayton, OH

December, 1994

Approved by:

CONTENTS

ACKNOWLEDGEMENTS

Completing a Master's thesis is a difficult task, but it becomes even more difficult without the help of others when you are married, have a child, teach full time, and hold the chair of the elementary technology committee.

I owe a great deal thanks to the following people who help me along the way:

Dr. Ann Westbeld, my building principal and good friend, who allowed me to "leave early" when I needed to meet with my advisor.

Janet Fisher, the world's best typist and my wife, who always helped me with the many revisions and knew when "to push and to back off".

Dr. Tom Lasley, my advisor, for guiding me through the thesis writing process and paying for the postage when I forgot.

And Barbara Ryan for her friendship, encouragement, and shoulder to cry on when life got rough.

To Janet,
behind every successful man
there is a loving women,
you have always been that to me
and more.

To Samantha,
our next generation,
keep on dreaming and blooming
where you are planted.

To my parents
for listening and believing.

CHAPTER I

INTRODUCTION

The purpose of this study is to describe the effectiveness of computer inservice programs for a selected sample of teachers. More specifically, the researcher sought to determine the relationship between inservice programs and teacher access to and comfort with the computer as a teaching tool.

RATIONALE FOR STUDY

Research has shown inservice training, in computer use, is becoming more necessary because of the lack of preservice training in the undergraduate programs. Preservice is defined as the undergraduate course work required for an individual to become a teacher. This researcher is not implying that undergraduate programs are inadequate, but rather that they are not structured to allow for more than introductory courses in computer usage. In fact, at Arizona State University, as with many universities such as University of Dayton and Wright State University, the only educational computer course required is one in computer literacy (Bitter & Rossberg, 1988). As a result, school districts must provide the necessary computer training as an inservice in order for teachers to use this technology as a management tool or teaching device. Research also shows that inservice alone will not allow teachers to become competent enough to use their acquired knowledge in practical application

unless they have access to a computer (Bitter and Rossberg, 1988). Accessibility is defined as having a computer readily available for teacher use. This concept allows teachers to logically practice their learned skills and gain confidence in order to use the computer as a tool to further their students' educations. In fact, at the Greene County Career Center the contract between the teachers and the board reflects this idea. The contract states the board will provide the teachers with a computer at home in order for teachers to further their skills, at no charge to the teachers, as long as the teachers are employed by the Greene County Career Center. After 120 documented inservice hours, the computer provided by Greene County Career Center then belongs outright to the teacher.

In the researcher's school district, a great deal of work has been done to develop inservices and to evaluate those inservices in the area of computer technology. Inservice consists of training provided to teachers both formally and informally on techniques and skills that enhance teaching and learning. However, in the researcher's school district, little research has been done to show the relationship of those inservices and the "comfortability" of the computer user. Comfortability is defined as the confidence a user has with his/her computer skills to independently use the computer. The sample school district at this point has still not been able to provide each teacher with a computer for immediate accessibility.

Information on computer accessibility could provide valuable data to both the researcher and the school district. Such data would provide a better direction for planning and evaluating particular computer inservices. Changes in the use of the computer in the classroom will lead teachers away from the traditional computer uses (e.g., drill and practice, teacher management, and entertainment games) and enable teachers to implement the computer to increase higher order thinking skills (e.g., sequencing, problem solving, and simulation) of not only students but themselves as well (Vockell-van Deusen, 1989).

HYPOTHESES

As part of this investigation, the researcher will test four hypotheses.

1. There is no significant relationship between teacher participation in computer inservices and teacher attitudes toward computer usage.
2. There is no significant relationship between teacher access to a computer at work and teacher attitudes toward computer usage.
3. There is no significant relationship between teacher access to a computer at home and teacher attitudes toward computer usage.
4. There is no significant relationship between teacher gender and teacher attitudes toward computer usage.

ASSUMPTIONS

The researcher assumes computer skills are important and that enhanced inservice opportunities, as well as computer accessibility, influence teacher comfort with computers. Also, the more teachers know about computers, the more likely they are to fully explore how computers can be used within educational contexts. Further, they are also more inclined to feel comfortable with computer usage as part of that exploration process.

LIMITATIONS

The research findings of this study are limited by the scope of the sample. That is, the study investigated teacher attitudes in one school district in a Midwestern region. Generalizing beyond that site cannot be done. Further, the use of multiple t-tests to analyze the study data increases the likelihood of a Type I alpha error.

DEFINITIONS

Comfortability	The confidence a user has in his/her skills to independently use the computer.
Preservice	The undergraduate course work required for an individual to become a teacher.

Inservice	The training provided to teachers both formally and informally on techniques and skills that enhance teaching and learning.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Stewig (1983) noted: "We should not need the magic powers of Janus to warn us that a new computer age is overtaking us, bringing startling implications for the classroom" (p. 43). The computer age is here, but are educators ready? Training seems to hold one of the keys to whether teachers are comfortable with the technology or whether they let the opportunity pass as just another educational fad.

The purpose of this chapter is to provide background on computer usage and to review pertinent literature as it relates to computer education. The areas to be discussed are: effective inservice, the relationship of effective inservice and teacher comfortability, and the relationship of computer accessibility of the user and comfortability.

Inservice Education

Effective inservice may be categorized into three major areas: What is effective inservice? What is not effective inservice? And, what inservice instructors should consider when teaching said inservice?

Attributes of Effective Inservice

The most frequently taught preservice class is computer literacy (Ely, 1990). During a three-year period, only three students out of 2,000 enrolled in

a preservice education program at one leading university tested out of the required computer literacy course (Bitter, 1989). It is not a question of who is responsible for computer training; but rather, what is the best way to deal with training and to work with school districts to continue the education of teachers as they gain experience in computer usage (Bruder, 1989).

The primary motive for teaching about the products of technology is to provide practical experiences for the computer novice to feel comfortable with using new methods (Bitter & Yohe, 1989). The methods for making teachers comfortable with the products of modern technology are as varied as the universities that provide the training. However, the Office of Technology Assessment (OTA), through an analysis of various computer expert reports and surveys conducted with teachers who use technology, provided the following eight keys for training teachers both in inservice and preservice training sessions (U.S. Congress, 1988).

1. **Emphasize hands-on training**. Those providing training should analyze workshops and courses to determine how strong the hands-on component really is.
2. **Use credible instructors.** Teachers' inservice sessions should have close ties to the classroom. This will allow the participants to identify with the problems with integration of the curriculum and technology.

3. **Build close support**. Support for technology at the building level is very important. Each building must be staffed with full-time people in order to have questions and problems solved quickly. Too many buildings have full-time teachers trying to solve complex technology problems.

4. **Increase access time.** Training must be adequate for the program and curriculum. Some educational experts believe that a minimum of 100 hours is needed for a user to reach the computer literate level.

5. **Build a "tool" focus**. First help the teachers view the computers as a personal tool to enhance productivity. Teachers who become empowered with this knowledge can then use the computer to empower their students.

6. **Integrate technology**. The teachers must be helped to catch the vision and develop plans/approaches to integrate technology with the curriculum/content area.

7. **Go online**. Electronic networks, bulletin boards, and computer help lines with software vendors can help solve most problems. One of the biggest problems in teaching K-12 is the isolation of the classroom teacher.

8. **Don't leave home without one.** Evidence suggests that teachers who have computers at home have an easier time integrating computers with their teaching (U.S. Congress, 1988). In a survey conducted by National Center for Technology in Education at the Bank Street College, most teachers surveyed indicated they were self-taught by using a computer at home (West, 1990).

Findings such as those outlined above suggest that teacher inservice needs to improve greatly in order to enhance computer accessibility for teachers and to foster a comfort level towards computer usage.

Shortcomings of Computer Inservice

School districts, even those with effective inservice, have distinct problems with creating teacher comfortability with computers. Some of the problems, as suggested by Sturdivant (1989), include:

1. **Incentives are lacking for training.** Because the computer requires such a vast number of hours of training, teachers need to be reimbursed or credited for their time. However, many districts reward the training for technology with the same amount of money as less ambitious programs even though the technology training may require more hours.
2. **Teachers who take additional training are often unrecognized for their extra efforts.** This is a result of the lack of knowledge of a

"non-user" knowing the time required to become comfortable. As a result, the administration and/or teachers do not understand and recognize the time required in order to appreciate the extra efforts of those trained or undergoing training of the technology.

3. **Teachers are already overburdened with paperwork, which leaves little time for staff development.** Thus, it becomes the job of the inservice sessions to provide teachers with ways in which the computer can reduce teacher paperwork.

4. **Teachers have limited opportunities to see model applications.** One solution to seeing model applications may be using the cable television in school buildings to view video tapes of successful lessons. Commercial videos are also available for selected software programs.

5. **Teachers are isolated and have few opportunities for sharing.** Bulletin boards, help lines, and networks must be available so the teachers can gain access to information this is needed about new hardware and software.

6. **Access to software is limited.** Software needs to be in a central location of a school district or provided by a software vendor in order to be previewed, evaluated, and learned for the effective implementation into the curriculum.

7. **Teachers still don't have enough computer access.** Every school district must provide various creative means (summer hardware and software check-outs, week-end building access, loaner programs for week-ends, or night courses providing access) to ensure teacher access to computers.
8. **Teachers don't get enough coaching, advice, and assistance.** Teachers must feel that someone is interested in them and their problems.
9. **Feedback and direction are often missing.** Teachers enroll in courses and are treated with little regard to their skills various. If teachers are expected to individualize their computer instruction, they must see that their own inservice instruction models those skills for them.
10. **Teachers can't provide quality training sessions for their peers because they have so little time to prepare.** In Houston, Texas, the Department of Technology staff provided modules for the technology trainers to use to develop workshops for fellow teachers (Sturdivant, 1989). These modules include transparencies, audiovisual aids, handouts, and software.

As a result of such shortcomings, inservice must be a continuing event and progress at the user's rate (Sturdivant, 1989). As discussed earlier, any

novice programs or lessons must meet the needs of the individual and progress at the learning curve of the user. Some outdated learning theories suggested that complex skills were acquired in small pieces and carefully arranged in sequence of those small skills (Herman, Aschbacher, and Winters, 1992). Basic skills were taught first and mastered before higher level thinking skills and lessons were taught. However, evidence from contemporary cognitive theorist suggests that learning is not necessarily linear (Herman, Aschbacher, and Winters, 1992). Learning is an on-going process, where the learner is gathering information and processing that information continually. This process helps the learner construct his/her knowledge structure and schemes. Because learning is not always linear, learning can take place at uneven paces and following different paths (Herman, Aschbacher, and Winters, 1992).

Instructor Consideration for Inservice

The computer training dilemma of teachers is overwhelming, but to neglect to train towards confidence could be disastrous. Trainers are faced with the tremendous challenge of educating teachers on hardware and software that in many cases has not yet been developed. This is a difficult challenge, but we must use our pedagogical training and our vision of what technology is in order to expose our children to the realities of change (Sturdivant, 1989).

The inservice leaders need to consider how they teach, plan, and challenge the participants in a computer inservice session or sessions. The

inservice leader should be cognizant of Dewey's ideas in Democracy in Education that all learners share the same attributes as they move from novice to expert in any particular area (Dewey, 1916). Also, the inservice leader should not only examine Dewey's philosophies but Carter's, et. al., (1987) propositions regarding how experts (those teachers selected by principals and having five years of teaching experience), novices (first year teachers), and postulants (teachers in preservice training) differ in the performance of their tasks of learning and teaching.

1. **Experts, novices, and postulants differ in their inclination to accept as valid the information provided by the previous teacher**. As with other areas, the most notable difference was between experts and postulants. All subjects in the expert pool of Carter's samples indicated that they would disregard information from the previous teacher. Experts suggested that, more than any other group, they preferred to get their own, very personal feeling or information about the students and the classroom.

   The experts describe their preference in gathering information in many ways. One expert reported, "I wouldn't want to take someone else's word" (Carter et. al., 1987, p. 150). Further, another expert said, "I think it is good reference material [information left by the previous teacher], but I sure wouldn't put a

whole lot of stock in it" (Carter et. al., 1987, p. 150). Significantly, this kind of statement was attached to the experts sense of themselves as unique teachers and individuals. As a result, the experts talked about what "I" wanted to know, to explore, to start, or to try.

Postulants on the other hand, more readily accepted the validity of the information they received. In fact, postulants felt guided by previous teacher observation and information. Surprisingly, to Carter, the description of the postulants concerning the new students, contained few qualifiers of description.

Postulants said they would try to link together the various pieces of information left by previous teachers. Carter (1987) pointed out that one postulant even said, "connect, connect, connect, all across the board" (p. 151). In other words, postulants were taking bits of various information from previous teachers and connecting them together to formulate opinions and conclusions about their students and class.

Quite likely, the teachers or instructors responsible for the training of teachers during an inservice program are going to be a collection of either a select few or a single individual with computer expertise. Teachers conducting the inservice must guard against prejudged conclusions in order to deliver

individualized programs for the participants. Relying on data from other inservice instructors or self drawn conclusions, the teacher of inservice might ignore the needs of the slow learner in technology, fail to teach the "gifted" of a particular piece of software, and not encourage the reluctant user. Because the class time is usually short during an inservice program, the leader should collect the data based on the students' performance in that particular class and move to expand all students' comprehension of the computer concepts.

2. **Experts, novices, and postulants differ in terms of the kind and quality of solution strategies they proposed for classroom problems**. Experts, and to a somewhat lesser extent, novices, tended to speak conditionally (e.g., if this were the case, then I would...) about classroom problems and connected solutions. Postulants, on the other hand, identified their "problems" by describing students. For example, one postulant stated, "I'm probably going to make sure she's seated in the front row or something" (Carter et. al., 1987, p. 152). Further, in comparison to novices and experts, their solutions to problems were very simplistic and described in a nondescriptive manner.

   As a whole, postulants saw problems from those students who failed to complete homework, performed poorly on tests, had several absences and tardies, were class clowns, or exhibited

excessive talking. Even though these "problems" were similar to those labeled by the other two groups, the postulants made fewer and noticeably less rich statements about problems, and their connection to strategies to solve those problems.

As stated previously, time is short for computer inservice classes in comparison to what needs to be done to facilitate the skills and needs of the participants. As a result, instructors need to quickly identify the needs of the participants and find solutions and strategies based upon those needs. A computer inservice instructor can not find effective solutions or strategies to meet the needs of the participants by wasting time describing or labeling their conditions.

Inservice Comfortability Relationship

The purpose of this section is to review the literature on effective inservice and further discuss the principles discussed in the previous section regarding the learner.

In recent years, the comparison and analysis of the performance of expert teachers (learners) to the performance of novice have appeared in educational journals (Berliner et. al., 1988; Leinhardt, 1986; Leinhardt & Putnam, 1986; Leinhardt & Smith, 1985). This research is interesting; however, it is particularly valuable to see that the learning curve can be accelerated if the learning concepts are divided into specific areas. First, all teachers (as

learners) need to have some knowledge of the subject they are trying to teach. Second, the teacher must know the learner who is going to learn the subject. Third, each novice who is progressing towards expertise must have some type of organizational management skills. Fourth, the teacher must understand the beginning teacher (as a learner) in order to help that individual progress smoothly toward becoming an expert. Here, the key is progressing smoothly because all teachers (learners) progress at different rates and levels (Goldman & Brown, 1990).

With the above discussed topics in mind, Goldman and Brown (1990) developed a multimedia preservice mathematical program which could move novice teachers toward the expert level at a quicker rate. Then they established a rating instrument in ten different areas based on the goals of the course. Graduate students were then pretested, using the instrument, until they achieved a rating of 80% reliability. Students enrolled in the methods course in 1988 were the base line group and did not use the multimedia program. Students enrolled in 1989 formed the treatment group for the use of the multimedia program. Goldman and Brown found significant differences favoring the video group in the four teaching categories (basic skill development, development of higher order cognitive and problem solving skills, management practice, and development of a positive attitude towards math) and two student behavior categories (pupil involvement and on-task behavior).

Some caution should be taken because their sample was small (Goldman & Brown, 1990). The significance of the findings suggest, however, that if teachers (learners) are shown the proper techniques, within the context of effective inservice and/or preservice program, they will move more readily toward full usage and comfort with technology.

In previous years, numerous studies have been done regarding student performance related to computer assisted instructed (CAI). However, few studies have been completed to show the relation between computer teacher training and student performance. In a meta-analytical statistical study of 40 previous studies, Ryan (1991) examined the relation between academic achievement efforts and computer instruction. Ryan explained that the essence of meta-analysis is to convert varied outcomes to standardized scales that can be combined for investigation and analysis. In her meta-analysis study, achievement outcomes were based on several different outcomes and several different measures, including nationally standardized tests and evaluation instruments created specifically for her experiment. In order to allow comparability across the study, the results were converted into a standard effect size. Hedges and Ollom (1985) referred to effect sizes from different scales of measurement as a "scale-free index of effect magnitude" (p.6). Ryan (1991) stated:

> the results can be combined meaningfully in statistical analysis. In addition, effect sizes for academic achievement can be correlated with other variables, such as faculty preparation and support, implementation conditions, frequency and duration factors, type of instruction, study conditions and style of application, for example, to investigate the effects of such characteristics on academic achievement. (p. 163)

In Ryan's study, the effect size was calculated using Glass's (1981) formula. The effect sizes were calculated on every subgroup that was independent and met the minimum number of 20 students. Ryan (1991) observed:

> The effect size was interpreted as the proportion of the experimental scores that are greater than the average scores in the control group. Thus, effect size of .30 means that 62% of the experimental group scored higher than the average student in the treatment group. Further, an effect size of 1.0 means that 84% of the experimental group scored higher than the average student in the control group. (p. 168)

Ryan considered those involved in CAI as the treatment group and those not involved in CAI as the control group. Students in the CAI advanced four years learning growth in the same time as the control group advanced in three years.

Ryan also studied the results of computer inservice training, defined by Ryan as preservice and/or inservice, on the students' effect size scores. She divided the results into three groupings: students having teachers with less than 5 hours of computer inservice training, students having teachers with 5-10 hours inservice, and students having teachers with more than 10 hours inservice training. She discovered significant differences related to the number of teacher computer inservice hours of training and student performances within the treatment group. Students in teachers' classes with fewer than five hours experienced the least academic growth. And, students in classes with teachers having more than ten hours training experienced the largest gain or academic growth within Ryan's specified time frame. The number of hours a teacher serves in training for CAI, according to Ryan, has a significant relationship with student performance.

Bracey (1988) reported similar results to those of Ryan. A total of 38 teachers and administrators who had enrolled in semester long introductory courses on computers served as subjects for this experiment. Bracey discovered people with prior computer experience had lower levels of computer anxiety. Bracey also discovered that a decline in anxiety did not appear until after 30 computer contact hours.

Accessibility

In a longitudinal study, Keirns (1992) assessed teachers' attitudes upon the entrance and exit of three consecutive semester courses. The teachers were questioned regarding the integration of computers with the curricula. Keirns found that the teachers' concerns (e.g. word processing and the writing process, one computer per classroom, and simulations to teach higher order thinking skills) were being resolved by the courses. In fact, the survey revealed that all the teachers moved from the competent stage to the comfortable stage of use and integration. Further, she found that experience with computers, by itself, does little to affect the attitudes of teachers. However, the practical experience of learning computer skills coupled with access to a computer that is personally useful have a positive effect on teachers' computer skills (Keirns, 1992).

The purpose of this section is to review the literature on computer accessibility as it relates to teacher comfort with using computers. Bronsan (1989) observed that, "since a teacher's computer skills depend, at least partly, on computer accessibility and time on task, their skills may be limited by the proximity of computers" (p.10). Bronsan's study did not attempt to measure the impact of staff development programs, but rather described the computer skill strengths and weaknesses of Erie, Pennsylvania teachers.

Bronsan's (1989) findings were interesting, especially those related to teachers' skills. For example, from the sample surveyed, she found that 37% of the teachers possessed the general computer skills listed on the survey. However, the great variability suggested that teachers had a varied range of skills. She found that the greatest number of survey respondents (39%) possessed word processing skills. Further, she discovered the skill least possessed by teachers (only 11%) was the understanding and utilization of graphics. Specifically, she discovered that the majority of the teachers could turn on a computer, access a disk drive, and operate a keyboard. However, she also found that few teachers possessed the programming skills of algorithms, Pascal, and programming with interactive video. The troubling fact was that only 27% of the respondents indicated that they have medium to high levels of expertise in general computer use, and 38% of the respondents claimed to have no experience at all.

Bronsan (1989) also, determined where the accessible computers were located and how often the computer were used by the teachers. Most surveyed teachers claimed to have access to the computer. Bronsan determined that 38% of the teachers had access to computers in the classroom or shared computers among classrooms. On the other hand, 43% reported having access to the computers in the library; however, no mention was made as to how many computers were available or to the frequency of computer

availability. Also, 52% of the teacher responses indicated computer use at least once a week; 70% claimed use once a month; 77% declared use at least once a year; and 23% indicated computers were available but never used.

In order to investigate the research question of computer accessibility and computer skills, Bronsan compared the number of respondents in each category of computer accessibility with the means and dispersions of percentages of computer skills by computer accessibility. Bronsan's results on accessibility and computer skills were not surprising. Using Scheffe F-test to accomplish the comparison of skills with access, she found that teachers who have access to the computer at home and at school have far greater skill levels than those who do not have any access to a computer. Also, the greatest significant difference was found between those with no access and those with access at home and school. All respondents who indicated they had no access had skills less than those with access at home or school. Bronsan reported that if a choice had to be made between access at home or school, those with access to a computer at home had greater skill than those with access only at school. However, like all questions concerning computers, skills, and access, a combination seemed to make a more significant difference.

Summary

Teachers need help with computer technology. They need effective inservice on computer usage, development of computer skills, and subject specific software (Bronsan, 1989). They need in-house technical assistance to provide timely answers and solutions to problems. Computers need to be accessible and distributed equally. All of these factors contribute to teacher's usage and comfort attitudes. To what extent each factor contributes is to be determined by this study.

CHAPTER III

METHODOLOGY AND DATA ANALYSIS

The purpose of this study is to describe the effectiveness of computer inservice programs for a selected sample of teachers. More specifically, the researcher sought to determine the relationship between inservice programs and teacher access to and comfort with the computer as a teaching tool.

SUBJECTS

The subjects were 375 teachers of the Beavercreek Local School District. The survey was distributed in September 1994. Beavercreek is a middle to upper class socio-economic population. This school district is in the middle of implementing an extensive technology plan, which includes a heavy inservice component. The range of teacher experience is quite varied (see Figure 1). The educational demographics of the staff indicated 24.6% with master's degrees, 28.3% with a master's degree plus (e.g., coursework beyond a graduate degree), 1.1% doctorate degree, 15.2% bachelor's degrees, and 30.8% bachelor's degree plus. The Beavercreek teaching staff consists of 71.8% females and 28.2% males.

Of the 375 teachers, 190 responded to the survey. Of the respondents 76.8% were females and 23.2% were males; 80.5% have eight or more years

of teaching experience, and 19.5% have fewer than eight years; and, 56.3% are elementary teachers and 43.7% are secondary teachers.

At the time of this study, inservice on computers was conducted within the context of various short term workshops for credit and non-credit offerings both were provided at the district and building level. The instructor of those inservices must be recommended by the district technology committee and must demonstrate an expertise in a specific area of inservice (e.g., word processing, multi-media, or teacher utility programs). The development of the inservice programs have been centered around teacher needs and oriented towards creating teacher comfort with the hardware the teachers must use in their curriculum. Each inservice has been evaluated to ensure that the content matches the teachers' identified needs. The inservices have been conducted in a "hands-on" atmosphere to allow the learner to experiment first hand with the advantages and shortcomings of the software and hardware. Finally, teachers have unlimited access to software and hardware in "teacher only" labs, in some classrooms, and in the Instructional Media Center.

INSTRUMENT

The researcher developed an attitude survey by creating original questions and by editing questions found in existing surveys. The questions were organized into specific interest areas which included, attributes of inservice (e.g., hands-on training, creditable instructors), attributes of how the

computer should be used in the classroom and as a teacher productivity tool (e.g., word processing, grade programs), the amount of time spent in inservice, and the number of hours each surveyed teacher used the computer. (See Appendix A for a copy of the instrument.)

The survey was revised several times based upon the feedback of selected "experts". The survey questions were reviewed by one University of Dayton faculty member and a Beavercreek School Administrator to determine content validity. Revisions in the instrument were made based on the comments and suggestions made by the two reviewers. A field test, to review the survey's clarity, was conducted using five Beavercreek teachers . Revisions were made based upon the comments made by those participating in the field test.

DATA ANALYSIS

The researcher collected the data in the fall of 1994. The surveys were hand delivered to each teacher in the sample through the teacher's professional mailbox. The teachers completed the surveys and returned the instruments to the building principals. In turn, the researcher collected the surveys from each building principal.

After the surveys were returned, the researcher entered the results in an ASCII format. Basic descriptive statistics (e.g., means and standard deviations) were computed. Further, a t-test was used to determine the statistical

relationship between teacher comfort, teacher accessibility to computers, and computer inservice. The areas of particular interest were the teachers' attitudes of how inservice related to comfort; the teachers' perceptions of effective inservice; the teachers' assessment of the availability of computers and whether the availability of a computer makes a difference in teacher comfort usage; and finally, an assessment of whether "comfortable" teachers use the computer as a higher-order thinking tool as opposed to a drill and practice machine.

Collected data were used to develop the conclusions of the study. Also, the data were used to identify tentative predictions of further teacher attitudes and inservices in the area of computer usage. Finally, the data were used to make recommendations to the district regarding future computer inservice work (see Chapter 4).

RESULTS

The research hypotheses investigated as part of this study were:

1. There is no significant relationship between teacher participation in computer inservices and teacher attitudes toward computer usage.
2. There is no significant relationship between teacher access to a computer at work and teacher attitudes toward computer usage.
3. There is no significant relationship between teacher access to a computer at home and teacher attitudes toward computer usage.

4. There is no significant relationship between teacher gender and teacher attitudes toward computer usage.

The purpose of this section is to report the findings of the survey and the t-test results as they relate to the hypotheses.

Survey Findings and Discussions

The survey data are divided into: questions concerning the hypotheses, attributes of how computer technology should be used, attributes of effective inservice, and the frequency of computer use and inservice.

Demographics and Hypotheses Questions

The survey was constructed to determine educational demographics of the respondents, the gender of the respondents, the accessibility (of computers) at home and work, the hours of attendance by teachers at computer inservice sessions, and computer use in the classroom. The educational demographics have previously been reported in the sample section. The respondents (Figure 2) indicated that 23.2% (44) were male and 76.8% (146) were females. Further, 76.3% (145) respondents reported that they had access to a computer at home and 23.7% (45) indicated they did not have home access. Also, 82.1% (156) respondents said that they had access at work to computers and 17.9% (34) did not. Finally, 92.6% (176) of the teachers indicated that they had participated in computer inservice and 7.4% (14) had not attended a computer inservice.

The next battery of questions (Figure 3) were constructed to determine teachers' attitudes regarding the importance of computer usage as a teaching and administrative tool. The scale of importance was divided with very unimportant as a value of 1 and very important as a value of 5. The value of three on the rating scale indicated the respondents were undecided as to the importance of an item. The greatest number of teachers (34.7%) reported that using the computer as a higher-order thinking tool was important. while 3.7% said this item was very unimportant. The largest number of respondents (34.2%) indicated that they felt computer use to teach drill and practice activities was an important tool; only 5.3% said drill and practice was very unimportant. A large number of teachers (55.3%) responded that they felt it was very important that a word processor be used to enhance the writing process; only 1.6% felt that it was very unimportant. The greatest number of teachers (61.6%) indicated it was very important that the computer be used as a tool for grading, while 2.1% said it was very unimportant. Approximately 44% (44.2%) of the subjects reported that it was very important for computers to be used by the students during the day; a much smaller number (1.6%) reported it was very unimportant. Almost 40% of the teachers (39.5%) felt it was important that computer simulations be used to teach the curriculum, while 6.3% said it was very unimportant. A number of subjects (39.5%) reported it was important for the computer to be used as a tutorial to teach and to develop

ideas; 4.2% indicated it was very unimportant. A majority of respondents (53.2%) indicated it was very important for the computer to be used as an effective teaching tool, while a much smaller number (3.2%) said it was very unimportant. Finally of those surveyed teachers, 38.7% felt it was important that the computer be used to teach math skills. On the other hand, the least number (6.3%) said it was very important.

The next battery of questions (Figure 4) were constructed using OTA's (Office of Technology Assessment) (see Chapter 2) suggestions. Almost 75% of the teachers (74.2%) felt technology training should be primarily hands-on was very important; a smaller number (.5%) felt it was and unimportant. Over 63% (63.2%) of respondents assigned important value to technology teachers having close ties to the classroom; a much smaller number (.5%) assigned an unimportant value to technology access. When asked if each building should have a full-time support person in technology, the greatest number of respondents (59.5%) indicated a very important value; a smaller number (3.2%) described it as a very unimportant. Most of the teachers (57.5%) reported that computer were a important tool for teacher productivity; a smaller number (1.1%) indicated the computer was unimportant to teacher productivity. When asked if the computer was an important productivity tool for students, 49.5% reported that computers were important to student productivity; only 1.6% described the computer as unimportant. Approximately 35% of the teachers

(34.7%) reported a very important value for computer networks being needed to enhance teacher support, while 3.7% placed a very unimportant value on the computer networks. A number of teachers (51.6%) reported a very important value to computer access at home (in order to integrate curriculum); however, a much smaller number (1.6%) described it as unimportant to have computer access. When surveyed (58.9%), the largest number assigned a very important value to teachers having desk access to a computer; a smaller number of respondents (4.7%) assigned a value of very unimportant.

The final battery of questions (Figure 5) were constructed to determine the number of hours teachers had participated in inservice and used the computer. Almost 46% of the teachers (45.8%) participated in 0-5 hours of inservice; far fewer (12.6%) have participated in 30-45 hours of training. When asked for the number of hours teachers used the computer to instruct, 72.6% reported 0-5 hours of instruction time and 2.6% reported 20 plus hours. Almost 68% reported availability of computers at school, (0-5 hours of use); the smallest (2.6%) reported 20 plus hours of available computer time. The largest number of teachers (64.2%) having access to home computers in order to compile tests, write reports, and compute grades--they report 0-5 hours of use. A much smaller number (1.1%) reported 20 plus hours of computer use at home.

The results of this section were both interesting and surprising to this researcher. It is quite apparent the teachers of the Beavercreek Local School system are taking the computer age and how it relates to education quite seriously. The results of the survey indicated that a significant number (92.6%) of the 190 teacher respondents have participated in computer inservice. Further, 82.1% of the responding teachers have computer access at work, and 76.3% of the teachers have computer access at home. Evidently, teachers have somehow provided access for themselves. The assumption can quite easily be drawn if the teachers are participating in computer inservices and teachers have computer access at work and home, then teachers in this school system are preparing themselves for this technology teaching tool.

It is also apparent, from the data, Beavercreek teachers feel the computer is an important teaching tool. The teachers think the computer should be used as a reference tool, writing tool, and an integration device for the curriculum.

Beavercreek teachers agree with the OTA survey of teachers (see Chapter 2) as to what needs to be included in inservice programs. Interestingly, the teachers placed a great deal of importance on the need for a full time technology person to help the teachers through and with technology. This researcher feels additional study should be done to show if a full time technology support person does make a difference for teachers and students

with their use of computers. Also, an interesting investigation might be to determine the relationship of the cost for the full time technology person and the diminishing or non-diminishing anxiety of the teachers or staff the full time technology person serves.

On the other hand, the teachers and administrative staff must be given more computer inservice opportunities. If research is accurate that 30 or more hours of inservice (Bracey, 1988) must be attended in order to be literate with the computer, school personnel who use computers must participate in additional hours of computer inservice. This researcher bases this opinion on the fact who attended only 0-30 hours of computer inservice (25.2% of the respondents). Simple math shows 74.8% have not reached the literate stage of 30 or more hours research literature indicates.

Beavercreek teachers also need to consider further the amount of hours they are using the computer as a teaching tool. Of the 156 teacher who indicated they had access to a compute at school, only 138 or 72.6% of the sample indicated they used the computer 0-5 hours to instruct. This statistic is alarming. By no means does the research indicate that the computer should be used exclusively, but an expensive investment by the taxpayers could be used with more frequency. Further study needs to be done to determine if teachers are moving towards more or less classroom computer use.

Conversely, 94.2% of the teachers, both at home and at work, are using a computer as a utility tool to compile grades, tests, and reports. This indicates the teachers are at least comfortable enough with these types of programs to use the computer as a communication tool.

T-test Results Relating to Hypotheses Questions

The purpose of this section is to report and discuss the findings of the t-test performed on the means of the survey results.

Hypothesis Question 1--There is no significant relationship between teacher participation in computer inservices and teacher attitudes toward computer usage.

No significant relationships ($p. \leq .05$) were indicated for any of the variables studied as they related to teacher computer inservice (see figures 6 and 7).

The absence of significant findings ($p. \leq .05$) for the first hypothesis could be for several reasons. First, some problems may exist with the construction of the survey instrument. The researcher may not have defined the term "inservice" clearly enough. Some teachers, for example, indicated they had only attended demonstrations and not attended hands-on computer inservice sessions. Second, the addition of a category "zero hours" in the hours spent participating in inservice on the survey could have provided some interesting results. With the survey construction showing 0-5 hours as an answer, it was

impossible to identify teachers with limited inservice (e.g., 3-4 hours) hours from those with no inservice (e.g., 0 hours) hours. To determine if this would make a difference in the results, additional items would need to be added to the instrument.

Hypothesis Question 2--There is no significant relationship between teacher access to a computer at work and teacher attitudes toward computer usage.

Teachers who had school computer access placed more importance on using computers with students during the teaching day, using computers to develop basic math skills, and using computers as a drawing tool to enhance student eye/hand coordination (see Figure 8).

No significant relationships ($p. \leq .05$) were evidenced for any of the other variables studied as related to teacher computer access at school (see Figures 8 and 9).

The only areas of significance ($p. \leq .05$) were: the computer should be used by students during the teaching day, the computer should be used to develop basic math skills, and the computer should be used to enhance hand/eye coordination (see Figures 8 and 9). These areas are all student related, and they are all oriented to drill and practice type activities. Further study needs to be done to determine if teacher access to a computer has a significant relationship relative to the use of the computer as a higher-order thinking skill tool and/or a drill and practice instrument.

As with hypothesis one, no significant relationship (p. $\leq$ .05) exists between teachers' computer access at school and the importance teachers place on the attributes to improve technology. Obviously, Beavercreek teachers agree with OTA (see page 6-8) as to what is the necessary item to be included in technology. Also, the results of the t-test indicate that each building needs to have a full time support person in technology.

Hypothesis 3--There is no significant relationship between teacher access to a computer at home and teacher attitudes toward computer usage.

Teachers who had home computer access placed more importance on inservices being constructed to help teachers catch the vision to integrate curriculum with technology (see Figure 11).

No significant relationships were indicated for any of the other variables studied as related to teacher computer access at home (see Figures 10 and 11).

As with hypothesis two, Beavercreek teachers placed a great deal of importance on the OTA principles (see pages 6-8) concerning the important attributes to improve and develop effective inservice computer programs. Throughout this study, it has become apparent Beavercreek teachers realize what their learning needs are concerning computer inservice. Additional study needs to done concerning the relationship between the attributes of effective

technology training a indicated by the Office of Technology Assessment (OTA) and diminishing teacher anxiety toward using the computer as a teaching tool.

Hypothesis 4--There is no significant relationship between teacher gender and teacher attitudes toward computer usage.

Female Beavercreek teachers indicated more importance on several questions of the survey instrument (see Figures 12 and 13). They reported that the computer should be used by students during the teaching day (see Figure 12). They indicated that technology training should be constructed as hands-on. They thought technology teachers should have close ties to the classroom. Female teachers, also, felt each school building should have a full-time support person to help solve technology questions and problems. Further, they thought that computers were an important productivity tool for teachers and students. In addition, the female teachers were more inclined to perceive a need for computer networks to enhance teacher support and computer education. Finally, they felt technology training should be constructed to help teachers catch the vision of curriculum integration with the computer (see Figure 13).

No significant relationships ($p. \leq .05$) were evidenced for any of the other variables as related to gender (see Figures 12 and 13).

Even though the data indicated a significant relationship ($p. \leq .05$) between gender and 7 survey questions, 16 questions demonstrated no

significant relationship. Therefore, making a conclusion that a relationship exists with the hypothesis question 4 would be problematic and would require additional research. However, as with other hypotheses questions, the Beavercreek teachers (especially the female teachers) do place a great deal of importance on the Office of Technology Assessment's list (see page 6-8) of the necessary attributes of improving and developing technology training.

SUMMARY

The data show that Beavercreek teachers are participating, to a limited degree, in computer inservice, and that they have a good feeling as to the important attributes of inservice. Beavercreek teachers also agree in general with the OTA principles regarding the attributes of how to improve technology training. Access to a computer is important to improve comfort with the computer for Beavercreek teachers, and probably for all teachers. Further, the Beavercreek teachers feel the computer as an instructional tool needs to be student centered in order to maximize learning.

Figure 1

EXPERIENCE MATRIX

YEARS OF EXPERIENCE	NUMBER OF TEACHERS
Beginner	19
1	4
2	10
3	81
4	13
5	12
6	16
7	11
8	20
9	23
10	14
11-15	73
16-20	71
21-25	76
26-30	39
31+	13

This experience chart includes 375 teachers, 7 nurses, 25 administrators, 12 learning disability teachers, and 3 reading teachers.

Figure 2

RESULTS OF DEMOGRAPHICS AND HYPOTHESIS

Have you attended a computer inservice?	Yes	92.6% (176)	No	7.4% (14)
Do you have immediate access to a computer at work?	Yes	82.1% (156)	No	17.9% (34)
Do you have access to a compute at home?	Yes	76.3% (145)	No	23.7% (45)
Gender	Male	23.2% (44)	Female	76.8% (146)
Experience	0-7 years	19.5% (37)	8-more years	80.5% (153)
Grade Level	Elementary	56.3% (107)	Secondary	43.7% (83)

Figure 3

RESULTS OF USE OF THE COMPUTER IN THE CLASSROOM

	Unimportant				Important
1. The computer should be used to develop high-order thinking skills in students.	3.7% (7)	5.3% (10)	24.2% (46)	34.7% (66)	32.1% (61)
2. The computer should be used as a drill and practice teaching tool.	5.3% (10)	8.4% (16)	26.8% (51)	34.2% (65)	25.3% (48)
3. The computer should be used as a word processor to enhance the writing process.	1.6% (3)	2.6% (5)	8.4% (16)	32.1% (61)	55.3% (105)
4. The computer should be used as a teacher tool (word processing, grade program, etc.)	2.1% (4)	3.7% (7)	8.9% (17)	23.7% (45)	61.6% (117)
5. The computer should be used by students during the teaching day.	1.6% (3)	5.8% (11)	19.5% (37)	28.9% (55)	44.2% (84)
6. Computer simulations should be used to teach objectives throughout the curricula.	6.3% (12)	8.4% (16)	25.3% (48)	39.5% (75)	20.5% (39)
7. Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	4.2% (8)	7.9% (15)	28.4% (54)	39.5% (75)	20.0% (38)
8. Computer programs should be used to engage students while the teacher is with other students.	6.8% (13)	11.1% (21)	28.9% (55)	34.2% (65)	18.9% (36)
9. The computer, with appropriate software, is an effective teaching tool.	1.1% (2)	2.6% (5)	8.9% (17)	34.2% (65)	53.2% (101)
10. The computer, with appropriate software, is as valuable as text, overheads, and other media.	3.2% (6)	5.3% (10)	18.9% (36)	22.1% (42)	50.5% (96)
11. The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	1.6% (3)	5.8% (11)	18.9% (36)	26.8% (51)	46.8% (89)
12. The computer should be used to help, teach, and develop basic math skills.	6.3% (12)	7.9% (15)	25.3% (48)	33.7% (64)	26.8% (51)
13. The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	14.2% (27)	11.6% (22)	33.2% (63)	26.8% (51)	14.2% (27)

Figure 4

RESULTS OF ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		Unimportant				Important
1.	Technology training should be primarily hands-on.	.5% (1)	.5% (1)	5.58% (11)	18.9% (36)	74.2% (141)
2.	Technology teachers should have close ties to the classroom.	1.1% (2)	.5% (1)	7.4% (14)	27.9% (53)	63.2% (120)
3.	Each building should have a full time support person in technology.	3.2% (6)	4.2% (8)	12.6% (24)	20.5% (39)	59.5% (113)
4.	Access time to the computer must be increased for all teachers.	3.2% (6)	4.2% (8)	12.6% (24)	20.5% (39)	59.5% (113)
5.	Computers are an important productivity tool for teachers.	1.1% (2)	2.6% (5)	14.7% (28)	24.2% (46)	57.5% (109)
6.	Computers are an important productivity tool for students.	1.6% (3)	2.6% (5)	15.8% (30)	30.5% (58)	49.5% (94)
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	3.7% (7)	6.8% (13)	24.7% (47)	30.0% (57)	34.7% (66)
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	2.6% (5)	1.6% (3)	15.3% (29)	28.9% (55)	51.6% (98)
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	2.6% (5)	1.6% (3)	15.3% (29)	28.9% (55)	51.6% (98)
10.	Access to a computer is needed at each teacher's desk.	4.7% (9)	5.3% (10)	15.8% (30)	15.3% (29)	58.9% (112)

Figure 5

RESULTS OF HOURS SPENT WITH THE COMPUTER

Number of hours I have spent in computer inservice regardless of local and sponsorship.

0-15	45.8% (87)
15-30	26.3% (50)
30-45	12.6% (24)
45+	15.3% (29)

Number of hours per week I use the computer to instruct.

0-5	72.6% (138)
5-10	18.4% (35)
15-20	6.3% (12)
20+	2.6% (5)

Number of hours per week, at school, I use the computer to compile tests, write reports, compile grades, or any other use.

0-5	67.9% (129)
5-10	18.4% (35)
15-20	6.3% (12)
20+	2.6% (5)

Number of hours per week, at home, I use the computer to compile tests, write reports, compile grades, or any other use.

0-5	64.2% (122)
5-10	30.0% (57)
15-20	4.7% (9)
20+	1.1% (2)

Figure 6

RELATIONSHIP OF INSERVICE TO
USE OF THE COMPUTER IN THE CLASSROOM

		t	DF	P
1.	The computer should be used to develop high-order thinking skills in students.	-.2427	188	.8085
2.	The computer should be used as a drill and practice teaching tool.	.3035	188	.7919
3.	The computer should be used as a word processor to enhance the writing process.	-.2689	188	.7883
4.	The computer should be used as a teacher tool (word processing, grade program, etc.)	.7189	188	.4731
5.	The computer should be used by students during the teaching day.	-.7792	188	.4369
6.	Computer simulations should be used to teach objectives throughout the curricula.	.0823	188	.9345
7.	Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	.4985	188	.6187
8.	Computer programs should be used to engage students while the teacher is with other students.	.8956	188	.3716
9.	The computer, with appropriate software, is an effective teaching tool.	.0035	188	.9972
10.	The computer, with appropriate software, is as valuable as text, overheads, and other media.	-.3513	188	.7257
11.	The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	.1700	188	.8652
12.	The computer should be used to help, teach, and develop basic math skills.	-.1558	188	.8763
13.	The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	-1.7898	188	.0751

Figure 7

RELATIONSHIP OF INSERVICE TO
ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		t	DF	P
1.	Technology training should be primarily hands-on.	.9273	188	.3550
2.	Technology teachers should have close ties to the classroom.	1.1988	188	.2321
3.	Each building should have a full time support person in technology.	1.3433	188	.1808
4.	Access time to the computer must be increased for all teachers.	.9202	188	.3586
5.	Computers are an important productivity tool for teachers.	1.4840	188	.1395
6.	Computers are an important productivity tool for students.	.9997	188	.3188
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	.7484	188	.4551
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	1.6192	188	.1071
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	-.5594	188	.5766
10.	Access to a computer is needed at each teacher's desk.	.3755	188	.7077

Figure 8

RELATIONSHIP OF SCHOOL COMPUTER ACCESS TO USE OF THE COMPUTER IN THE CLASSROOM

		t	DF	P
1.	The computer should be used to develop high-order thinking skills in students.	1.3333	188	.1840
2.	The computer should be used as a drill and practice teaching tool.	.4048	188	.6861
3.	The computer should be used as a word processor to enhance the writing process.	1.8727	188	.0627
4.	The computer should be used as a teacher tool (word processing, grade program, etc.)	.0483	188	.9615
5.	The computer should be used by students during the teaching day.	3.4627	188	.0007 ***
6.	Computer simulations should be used to teach objectives throughout the curricula.	1.0729	188	.2847
7.	Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	.8261	188	.4098
8.	Computer programs should be used to engage students while the teacher is with other students.	1.8802	188	.0616
9.	The computer, with appropriate software, is an effective teaching tool.	.9450	188	.3459
10.	The computer, with appropriate software, is as valuable as text, overheads, and other media.	1.2089	188	.2282
11.	The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	.7356	188	.4629
12.	The computer should be used to help, teach, and develop basic math skills.	2.3024	188	.0224 ***
13.	The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	2.5326	188	.0121 ***

***indicates significance

Figure 9

RELATIONSHIP OF SCHOOL COMPUTER ACCESS TO ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		t	DF	P
1.	Technology training should be primarily hands-on.	1.2513	188	.2124
2.	Technology teachers should have close ties to the classroom.	.8957	188	.3716
3.	Each building should have a full time support person in technology.	.1515	188	.8795
4.	Access time to the computer must be increased for all teachers.	-1.2091	188	.2282
5.	Computers are an important productivity tool for teachers.	-1.1310	188	.2595
6.	Computers are an important productivity tool for students.	-.1942	188	.8462
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	1.5693	188	.1183
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	1.1100	188	.2684
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	.1724	188	.8633
10.	Access to a computer is needed at each teacher's desk.	-.7687	188	.4431

Figure 10

RELATIONSHIP OF HOME COMPUTER ACCESS TO USE OF THE COMPUTER IN THE CLASSROOM

		t	DF	P
1.	The computer should be used to develop high-order thinking skills in students.	1.4318	62.2	.1572
2.	The computer should be used as a drill and practice teaching tool.	.7585	61.4	.4510
3.	The computer should be used as a word processor to enhance the writing process.	.5063	188	.6132
4.	The computer should be used as a teacher tool (word processing, grade program, etc.)	.4547	188	.6499
5.	The computer should be used by students during the teaching day.	.1338	188	.8937
6.	Computer simulations should be used to teach objectives throughout the curricula.	1.5228	188	.1295
7.	Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	.7358	188	.4628
8.	Computer programs should be used to engage students while the teacher is with other students.	-.8613	188	.3902
9.	The computer, with appropriate software, is an effective teaching tool.	.7185	59.8	.4752
10.	The computer, with appropriate software, is as valuable as text, overheads, and other media.	.5725	60.6	.5691
11.	The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	1.0843	62.5	.2824
12.	The computer should be used to help, teach, and develop basic math skills.	-.1374	188	.8909
13.	The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	.1205	188	.9043

Figure 11

RELATIONSHIP OF HOME COMPUTER ACCESS TO ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		t	DF	P
1.	Technology training should be primarily hands-on.	1.4262	58	.1592
2.	Technology teachers should have close ties to the classroom.	1.7497	65.7	.0848
3.	Each building should have a full time support person in technology.	1.0045	61.3	.3191
4.	Access time to the computer must be increased for all teachers.	-.6795	188	.4977
5.	Computers are an important productivity tool for teachers.	.6433	188	.5208
6.	Computers are an important productivity tool for students.	.1216	188	.9034
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	.2140	188	.8308
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	1.9256	60.1	.0589 ***
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	.8909	60.2	.3765
10.	Access to a computer is needed at each teacher's desk.	1.5122	188	.1322

***indicates significance

Figure 12

RELATIONSHIP OF GENDER TO
USE OF THE COMPUTER IN THE CLASSROOM

		t	DF	P
1.	The computer should be used to develop high-order thinking skills in students.	-1.4822	188	.1400
2.	The computer should be used as a drill and practice teaching tool.	.6297	188	.5296
3.	The computer should be used as a word processor to enhance the writing process.	-.6355	188	.5259
4.	The computer should be used as a teacher tool (word processing, grade program, etc.)	-.7511	188	.4535
5.	The computer should be used by students during the teaching day.	-2.1975	188	.0292 ***
6.	Computer simulations should be used to teach objectives throughout the curricula.	-.6520	188	.5152
7.	Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	-.1322	188	.8949
8.	Computer programs should be used to engage students while the teacher is with other students.	.3290	188	.7425
9.	The computer, with appropriate software, is an effective teaching tool.	-.8469	58.9	.4005
10.	The computer, with appropriate software, is as valuable as text, overheads, and other media.	-1.1229	188	.2629
11.	The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	-.6951	188	.4878
12.	The computer should be used to help, teach, and develop basic math skills.	-.0617	188	.9509
13.	The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	1.0056	89.8	.3173

***indicates significance

Figure 13

RELATIONSHIP OF GENDER TO
ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		t	DF	P
1.	Technology training should be primarily hands-on.	-3.2962	52	.0018 ***
2.	Technology teachers should have close ties to the classroom.	-3.2501	52.3	.0020 ***
3.	Each building should have a full time support person in technology.	-2.9585	54.5	.0046 ***
4.	Access time to the computer must be increased for all teachers.	-.6229	188	.5341
5.	Computers are an important productivity tool for teachers.	-1.7410	188	.0833
6.	Computers are an important productivity tool for students.	-2.3467	188	.0200 ***
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	-2.1562	188	.0323 ***
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	-2.5836	188	.0105 ***
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	-1.6350	58.6	.1074
10.	Access to a computer is needed at each teacher's desk.	-.6050	188	.5459

***indicates significance

CHAPTER IV

CONCLUSIONS

The purpose of this study is to describe the effectiveness of computer inservice programs for a selected sample of teachers. More specifically, the researcher sought to determine the relationship between inservice programs and teacher access to and comfort with the computer as a teaching tool.

When Bronsan (1991) stated that teachers needed help, she was referring to her finding that teachers lacked the necessary computing skills necessary to effectively operate a computer. This researcher's study did not focus on computer skills, but rather on the relationship of inservice, computer access, and teacher comfort. Beavercreek teachers still need an increase in inservice hours to develop their computer skills. Current literature indicates a computer user must have 30 or more hours of training in order to become comfortable as a computer operator (Bracey, 1988). However, only 25.2% of the 190 respondents in this study indicated that they had the requisite 30 plus hours of training. That fact suggests that 74.8% of Beavercreek teachers need more training to approach the requisite hours of necessary training.

Beavercreek teachers are using the computer in their teaching. The teachers also view the computer as a teaching tool that should be child-centered; that should be used to teach and develop higher-order thinking skills in students; that should be used to teach and develop basic skills; and, that

should be used to teach and develop writing processes. Combining an increase in computer inservice hours (which would enhance teacher comfort levels) and the way the computer should be used instructionally could lead Beavercreek teachers to use the computer as an effective tool to teach, to enhance high-order thinking skills, and to develop basic skills of reading and math.

The computer is not the answer for student learning problems or the only method teachers should use to promote student learning. Rather, the computer is yet another teaching tool that could enhance learning and the learning process.

RECOMMENDATIONS

The researcher makes the following recommendations to the Beavercreek Local School District.

1. **Beavercreek School District needs to hire a full time technology resource person in each building**. Support for technology at the building level was perceived as important by 80% of the 190 respondents. Each building needs to be staffed with full-time people who have technology expertise in order to have regular classroom teachers questions and problems solved quickly.
2. **Beavercreek Schools need to provide a means for the teachers of the district to reach the 30 or more hours of inservice**. The extant

research literature indicates that 30 or more hours of technology must be successfully accomplished by a computer user in order for that individual to become literate and reach comfortability (Bracey, 1988). This researcher's survey indicated that only 25.2% of the respondents had reached that level in the Beavercreek Schools.

By developing and implementing these two recommendations, the Beavercreek School District could provide a vehicle to make the computer a comfortable teaching tool.

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Appendix A

SURVEY

PLEASE RESPOND TO THE FOLLOWING:

Have you attended a computer inservice?

Yes_____ No_____

Do you have immediate access to a computer at work?

Yes_____ No_____

Do you have access to a computer at home?

Yes_____ No_____

Indicate the following (check as appropriate)

I am: Male_____ Female_____

I have taught: 0-7 years_____ 8 or more years_____

I teach at this level: Elementary_____ Secondary_____

COMPUTER COMFORT AND ACCESSIBILITY

The following items are divided into the subtopics of how you use computers and how you could improve technology training. Please indicate the importance of each item by circling the number on the continuum as it relates to you personally.

TOPIC I: USE OF THE COMPUTER IN THE CLASSROOM

		Unimportant				Important
1.	The computer should be used to develop high-order thinking skills in students.	1	2	3	4	5
2.	The computer should be used as a drill and practice teaching tool.	1	2	3	4	5
3.	The computer should be used as a word processor to enhance the writing process.	1	2	3	4	5
4.	The computer should be used as a teacher tool (word processing, grade program, etc.)	1	2	3	4	5
5.	The computer should be used by students during the teaching day.	1	2	3	4	5
6.	Computer simulations should be used to teach objectives throughout the curricula.	1	2	3	4	5
7.	Computer tutorial programs should be used to teach and develop objectives throughout the curricula.	1	2	3	4	5
8.	Computer programs should be used to engage students while the teacher is with other students.	1	2	3	4	5
9.	The computer, with appropriate software, is an effective teaching tool.	1	2	3	4	5
10.	The computer, with appropriate software, is as valuable as text, overheads, and other media.	1	2	3	4	5
11.	The computer and software should be used as a reference tool such as dictionaries, encyclopedias, and atlases.	1	2	3	4	5
12.	The computer should be used to help, teach, and develop basic math skills.	1	2	3	4	5
13.	The computer should be used as a drawing tool to develop hand/eye coordination and art skills.	1	2	3	4	5

TOPIC II: ATTRIBUTES OF IMPROVING TECHNOLOGY TRAINING

		Unimportant				Important
1.	Technology training should be primarily hands-on.	1	2	3	4	5
2.	Technology teachers should have close ties to the classroom.	1	2	3	4	5
3.	Each building should have a full time support person in technology.	1	2	3	4	5
4.	Access time to the computer must be increased for all teachers.	1	2	3	4	5
5.	Computers are an important productivity tool for teachers.	1	2	3	4	5
6.	Computers are an important productivity tool for students.	1	2	3	4	5
7.	Computer networks (electronic bulletin boards, on line help) are needed to enhance teacher support and education.	1	2	3	4	5
8.	Inservice should help teachers catch the vision and develop approaches to integrate technology into their curriculum.	1	2	3	4	5
9.	Access to a computer at home for teachers helps them have an easier time integrating computers with their teaching.	1	2	3	4	5
10.	Access to a computer is needed at each teacher's desk.	1	2	3	4	5

TOPIC III: HOURS SPENT WITH THE COMPUTER

Number of hours I have spent in computer inservice regardless of local and sponsorship.

0-15 _____
15-30 _____
30-45 _____
45+ _____

Number of hours per week I use the computer to instruct.

0-5 _____
5-10 _____
15-20 _____
20+ _____

Number of hours per week, at school, I use the computer to compile tests, write reports, compile grades, or any other use.

0-5 _____
5-10 _____
15-20 _____
20+ _____

Number of hours per week, at home, I use the computer to compile tests, write reports, compile grades, or any other use.

0-5 _____
5-10 _____
15-20 _____
20+ _____