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A correlational study of teachers' attitudes towards the computer and the use of computer-assisted instruction in the classroom

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A CORRELATIONAL STUDY OF TEACHERS' ATTITUDES TOWARDS THE COMPUTER AND THE USE OF COMPUTER-ASSISTED INSTRUCTION IN THE CLASSROOM

by
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ABSTRACT

L. K. LORE

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Graduate Advisor: Randall Robinson, Ed.D.
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The teachers completed a Computer Attitude Survey (CAS), and a Computer Assisted Survey (CAIS). The CAS measured the attitude of the teacher in four areas; their anxiety towards computers, confidence in their ability; liking of computers, and their perceptions of the usefulness of computers. Each subclass and the overall score was classified as High (positive attitude towards computers), Medium (neutral attitude towards computers), and Low (negative attitude towards computers). The scores were correlated between each of the subclasses using the Pearson r.

The CAIS consisted of 8 items which presented statements of CAI usage in the classroom of the teacher. Specific responses on the CAIS were correlated to the scores the CAS using chi square tests.

Highly significant positive correlations were found among the subscale scores. Chi square tests found statistically positive relationships between the subscale scores of anxiety, liking, and perceived usefulness towards the computer and the utilization of CAI in classroom instruction.

MINI-ABSTRACT

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This study was designed to examine the relationship between the attitude of the classroom teacher towards computers and the utilization of Computer Assisted Instruction (CAI) in the classroom. The teachers were located in four separate schools in urban and rural district of southern New Jersey. Evidence was found that there is a positive relationship between the attitude of the teacher towards computers and the utilization of CAI.

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CHAPTER 1

Scope of the Study

Introduction

"Teachers' attitudes toward computers are important to the success in implementing computer related programs in school curricula" (Gressard & Loyd, 1986, p. 302). Each day computers are playing a more prominent role in the classroom. The teachers' perception of the computer effectiveness will have a direct impact on the use of computers and technology in the classroom (Ancarrow, 1986).

"Over the past 10 years, American schools have spent a large portion of their discretionary funds on purchasing computers and software for their teachers and students" (Becker, 1994, p. 305). At the present trend approximately 4.3 million PC's will be installed in our schools by the year 2000 (Itzkan, 1994-95).

The development of instruction-related computer activities in United States schools has proceeded in a very decentralized fashion. Computers were first acquired primarily through the actions of individual teachers and parents rather than by districts (Becker, 1993). Even so, computers are not the standard method students use for learning and completing classroom activities. In fact, on the average computers are reported to be used less than one fourth of the time in a school year(Becker, 1991). "Computers in most subject matter classes serve primarily as opportunities for enrichment or for occasional individual remediation, rather than as a major way that students learn to think and

accomplish learning and understanding" (Becker, 1991, p.7).

The classrooms will have to be restructured to meet the technological goals of nation in the 21st century. Both the teacher and student roles will have to change (David, 1991). Integrating technology into the curriculum often requires that the teacher adopt different strategies and take on different roles (Carey, 1993). The teachers role will have to change from a lecturer to more of a coach and the students will have to become less passive and more independent. "Students gain a greater sense of ownership in the instructional process when given more responsibility for their learning" (Dwyer, Ringstaff & Sandholtz, 1991, p. 11). Only when teachers' beliefs and attitudes about computer instruction are changed will the students benefit from a technology rich classroom (Dwyer et al.)

In many systems the competence of the teacher is still judged primarily by their ability to manage the classroom. Appropriate management of the classroom reflects quiet and attentive students that listen to the lessons being delivered by the teacher. When teachers use technological tools in a facilitative classroom environment, they will not be delivering their lessons to quiet and attentive students. Instead, the teachers' facilitative role will involve helping students to select research topics, guide their search for information, and providing feedback on their accomplishments. The students will work in cooperative learning groups which will require the teacher to teach the social skills necessary to successfully operate within a group (Carey, 1993).

The teacher training programs must help the beginning teacher develop the skills and the attitudes that support the facilitative model. In addition, teacher education programs must support the placement of student teachers with cooperating teachers who are competent with the" teacher as facilitator" model, and, ideally, users of technology (Carey, 1993).

Since the integration of technology is not yet widespread in classrooms throughout North America, the time is right for studies that reach far beyond the demographic studies of computer use that only report the average number of computers per classroom, school, district, and state (Carey, 1993), hence, the need for this study.

Statement of the Problem

Do teachers' attitudes toward computers affect their use of computer assisted instruction in the classroom? The purpose of this study was to investigate the relationship of elementary school teachers' attitudes toward computers, and the use of computer assisted instruction in the classroom. If the teachers do not value the computer as an instructional device, computers presently in schools will not be utilized appropriately. The students will not have access to the most current information available, and the student will not learn the skills required to secure jobs in our technology based society of the future.

Statement of the Hypothesis

There is a significant positive relationship between the utilization of Computer-Assisted Instruction (CAI) in the teachers' classroom instructions and the attitude of that classroom teacher towards computers, as measured by the Computer Attitude Scale.

Limitations of the Study

The use of CAI in the classroom may be influenced by factors other than the attitude of the teacher towards computer and, the time constraints of the study do not allow the researcher to conduct a multi-level investigation.

The selection of schools for this study was not based on random sampling. It consisted more on cluster sampling, hence, it may not be a representative sample of elementary school teachers nationwide.

The sample size consisted of only four elementary schools and therefore, may not be generalized to the population. The results may hold only for the sample of the study. It may not be the same results that would of been obtained if a larger, and more diverse population had been used.

The sampling included one school which had elementary teachers from grades K - 4. Therefore, three out of the four schools surveyed included grade 5, which may result in sampling bias. The sampling of the teachers was based on convenience sampling because, "they were there at the school". Therefore, the results cannot be generalized to all elementary teachers in grades K - 5. In addition, any teacher who taught "specials" were not included in this survey. A "specials" teacher is defined as one that teaches a variety of grades in one specialized field of study.

This study does not examine the expectations and attitudes of teachers toward the "Teacher As Facilitator" role in the classroom. It is possible that teachers are reluctant to use CAI in the classroom because the teachers are unwilling to

manage a computing environment in which student groups work on different problems or curricular units. Some teachers may feel idle and anxious in the role of facilitator. The tendency will be to bring students back to large group instruction. This study does not measure this issue.

This study does not measure the influence of principals and superintendents in the school district on teachers and the use of CAI in the classroom. There are many things to learn about using computers effectively and creatively for schools to succeed that require an active involvement at the district level. The level of leadership and staff development in computers and CAI at the district level may affect teachers' attitude and usage of computers in the classroom.

Definition of Terms

Elementary School Teacher : A teacher in a classroom in grades K-5.

CD-ROM : Compact Disc-Read-Only Memory. It provides a way of providing large volumes of data on a disc. Their capacity is about 550 MB of information per disk.

Computer Assisted Instruction : An instructional multimedia lesson which combines audio, video, text and graphics.

Computer Literacy : The knowledge and skills required to operate a computer.

Teacher as Facilitator Paradigm : In this paradigm, the teacher's responsibility is to ease or guide the student through a learning task or experience. The teacher is a resource for learning rather than a source of information.

CHAPTER 2

Review of Related Research

Introduction

In the seventies, a small number of teachers usually acting on their own initiative, introduced students to various kinds of programing on small 16k computers. In those early days having students understand the computer itself was often the only rationale for its use (Fisher & Howell, 1994). Teachers continue to introduce their students to various kinds of computer skills. Just as in the seventies, the student utilization of technology in the classroom depends on the teachers attitude towards computers (OTA, 1988).

Technology in Schools: Past - Present - Future

There was a tremendous surge of computers and other educational technologies in the schools during the 1980's. The United States Congress Office of Technology Assessment (OTA, 1988) reported that the percentage of American schools having one or more computers intended for instruction grew from 18% in 1981 to 95% in 1987. As of 1989, only 13 states require schools to integrate the computer in the curriculum (Bruder, 1989). The schools which have computers are expanding their capabilities by purchasing peripheral instruments such as modems, CD-ROMS, and videodisc players(Bruder, 1989).

The number of computers in U.S. public schools translates to approximately 1

computer for every 20 students. In practice, there is wide disparity of computer access by the student and the teacher. In a elementary school there may be one computer in a classroom, clusters of computers in a classroom, full computer laboratories, and classrooms with no computers (OTA, 1988).

Bob Edwards, reported on National Public Radio that the process of integrating computer technology into American Schools has not been smooth. He stated that some teachers worry about where they fit into a computerized classroom. He also indicated that school administrators suffer from sticker shock when they see the prices of new machines (Ferrante, 1995).

"When computers were first introduced to schools, they acted essentially as electronic paper, replicating the drill and practice that was already familiar" (Itzkan, 1994-95, p. 63). We now have a variety of computer software, including simulations, programming languages, spreadsheets, database programs, graphing programs, writing tools, and problem-solving programs (Becker, 1991). The introduction of the integrated learning system, ILS, to the schools has provided a variation to the drill and practice programs. These programs will teach the student in specific areas that require improvement. The computer will strengthen and monitor the students progress in the area of study (Hofmeister & Rudowski, 1991).

Even though schools have been using computers to teach for more than 15 years, the decision is often controversial to put technology into schools. The decision may be influenced by local politics, skeptical school boards and parents, and sometimes community cultures and values (Ferrante, 1995).

A recent study looked at the decision making about computer acquisition and use in American schools. The survey consisted of six groups of survey questions and were distributed to 1105 schools. Discovered from these surveys was that a great deal of teacher autonomy exists in deciding how to use computers for instruction in the classroom. The districts play a much smaller role than schools in providing direction to teachers regarding computer instruction in the classroom (Becker, 1993).

However, increasing teacher autonomy limits the ability to develop a coherent program for using computer resources. This study shows that knowledgeable district administrators and school-based computer coordinators must be called upon to lead and make decisions regarding school computer-use efforts. From one perspective, optimal use of technology is not likely to occur unless teachers have as great a control as possible over the kinds of technological resources they can use and the circumstances and methods of their use (Becker, 1993).

The schools of the 21st century must ensure that teachers and students have access to the equipment and the most recent technological developments. There must be a computer on every teachers' desk, and a computer in the home of every teacher. There must be a telephone and modem in every classroom. Every teacher must have direct classroom support related to the uses of educational technology. There must be easy access to and strong support for the continued professional development of teachers. Technology must be integrated into the curriculum rather than being a supplement. By the year 2000, all students should have access to all types of technologies that promote learning development (Braun, Moursund, & Zinn, 1990).

Attitudes of Teachers Toward Computers

The attitudes of teachers toward working with computers are important indicators of their future use in instructional settings (Bohlin & Hunt, 1993; Gressard & Loyd, 1986.)

When asked about the role of computers in classroom learning, educators commonly respond that , " the computer is a tool" (Fisher & Howell, p. 120). For most educators , technology is a tool to accomplish teaching and learning. This use of technology provides new or at least alternative means to old instructional ends (Fisher & Howell, 1994).

Exemplary teachers in the Bank Street Study allowed computers to have a much greater impact on how and what they taught, than the typical computer using teachers (Becker, 1994). In the Bank street study, the exemplary teachers had students using a variety of computer software, including simulations, programming languages, spreadsheets, database programs, graphing programs, logic and problem-solving programs, writing tools, and communications software. The exemplary teachers integrated the use of CAI in their curricular goals (Becker, 1994). Making the classroom computer a priority is not typical of most teachers. Many teachers claim that the biggest impediment towards using the computer is the lack of time required to figure out how to use computers well (Becker, 1991).

However, many teachers are apprehensive about using computers and are uncomfortable with the idea of bringing computers into their classrooms. Some

of this feeling of being uncomfortable could be attributed to their individual teaching style. Integrating technology into the curriculum often requires that the teacher adopt different strategies and take on different roles. The change is often from a teacher-centered, teacher-controlled classroom to a classroom in which the teacher is more a facilitator than a director of learning (Carey, 1993).

The teacher that values control and quietness in the classroom will be reluctant to forego the "teacher- centered approach" to an "interactive and collaborate, student centered approach" to learning (Becker, 1991; Celsi, Cousineau, & Stuebing, 1991).

Per Alex Chadwick, new technologies can change the way we learn, and where we learn, and what we learn. He continued to state that public schools often remain unchanged. Many teachers say nobody asks what they think of technology or shows them how to use it (Ferrante, 1995).

Not all teachers are enthusiastic about the computer. Some teachers report that the computer caused little or no change in their teaching style or content. These reactions often come in situations where teachers are frustrated by insufficient hardware or software, or when they have not received training or had opportunities to develop confidence in using computer tools (OTA, 1988).

Some teachers feel a computer is a distraction in the classroom. Additionally, some teachers fear that their students may lose important underlying skills, such as penmanship or computation, when adopting new technologies that replace these skills (OTA, 1988).

Teachers must be prepared to modify their role in the classroom. Computers do provide students with access to vast amounts of information and powerful new ways to explore it. Teachers become not so much authorities as guides. Some teachers might be threatened by becoming more of a guide rather than the discerning authoritarian figure in the classroom. In addition, some students will inevitably know more about computers than their teachers. Some teachers may find that fact ominous (Berchner, 1993).

Appropriate and accurate computer utilization in the classroom has become more important in the educational process of the student. The attitudes of teachers do play an important role in the successful implementation of CAI components in the curriculum (Gressard & Loyd, 1986.)

New teachers must be trained to use the instructional resources available to them, which includes showing them how to take advantage of the capabilities of educational technology, while also making them aware of its limitations (Berchner, 1993).

The Attitude of Teachers Towards Computer Assisted Instruction

Approximately one half of the nation's teachers have used computers in their curriculum. Only a small minority are even aware of the other interactive technologies. Reasons for their limited use of computer technology in the classroom are the lack of equipment, lack of knowledge and apprehensive attitudes. There are more than 10,000 educational software programs available on the market (OTA, 1988). Yet, computer software programs constitute only a

minuscule portion of computer use in teaching standard school subjects (Becker, 1991).

Computer Assisted Instruction (CAI) is the oldest instructional application of computers and the most researched. The early CAI programs were provided through large mainframe, time-sharing computer systems which were operated and controlled from a central location. Critics of CAI argue that drill and practice tasks could be done just as easily without computers. Another complaint is that CAI promotes passivity on the part of the user (OTA,1988).

Access is a critical component in the assessment of microcomputer usage. One cannot expect high levels of CAI usage in the classroom , if computers are not available during convenient times (Costa & Stieglitz, 1988). Another component necessary for the teacher to use CAI in the classroom is the availability of appropriate and adequate quantities of educational software. Regardless of the teachers interest in the use of CAI, if the computer is unavailable or there is not an adequate supply of educational software, CAI will not be utilized in the classroom (Costa & Stieglitz, 1988).

Individualizing lessons, matching software to curriculum, scheduling student computer time, monitoring use, providing assistance all add demands to the teachers time. While the computer can minimize some administrative chores and ease classroom discipline problems, the net effect is increased demand on teacher's time and creativity (OTA, 1988).

Almost all teachers who have taught with computers agree that computers make teaching more difficult . It takes a great deal of planning to incorporate CAI into a lesson (OTA, 1988).

Teachers in a school district who perceive themselves as being competent users of the computer, use the computer often and in effective ways in their classroom instruction. Teachers in school districts who perceive themselves as less competent computer users, show limited use of CAI in their classroom (Sweeney & Vockell, 1994).

As of 1989 there were 23 states, plus Washington, D.C. that stipulate the computer courses which are required in order for applicants to receive their teaching credential (Becker, 1989).

Many current teachers have not experienced using the computer as part of their own personal educational development. In addition, many of the teachers did not receive computer training as part of their teacher preparation program (OTA, 1988). "Unless the teacher can effectively use educational technology, its potential for facilitating and enhancing the teaching and learning process will never be realized" (Bohlin & Hunt, 1993, p. 487). It has been the experience of the Cincinnati Country Day School that the most valuable learning takes place when the teacher and student manage the computer projects together (Hofmeister & Rudowski, 1991).

The most impressive applications of computer based technologies are in the field of special education. Word processors allowed students who could not

hold a pencil to be able to write. Speech synthesizers provide some deaf students with a means to communicate orally for the first time (OTA, 1988). Thus, for the children at the Clarke School for the Deaf, computers have opened new doors for learning (OTA, 1988).

The 10 year study conducted by Apple Classrooms of Tomorrow (ACOT) discovered that teachers are the key to creating learning environments with technology (Dwyer, 1995). There are many examples of ACOT students being engaged in meaningful learning activities. For example, fourth graders designed and produced instructional books to help other students more easily learn how to use computer technology based tools (Dwyer, 1995).

The ACOT study observed the approach of the teacher to the use of classroom technology. The study found that there are five stages through which the teacher evolved during their use of technology in the classroom. The five stages are: entry, adoption, adaptation, appropriation, and invention. The chart below describes each stage (Dwyer, 1995).

Evolution of Technology

Stage	Examples of what teachers do
Entry	Learn the basics of using the new computer technology.
Adoption	Use new technology to support traditional instruction.
Adaptation	Integrate new technology into the classroom - word processor, spreadsheet and graphics tools
Appropriation	Incorporating CAI as needed and as one of many technology tools.
Invention	Discover new uses for technology tools for teaching

Numerous studies indicated several possible factors involved in determining the utilization of CAI in the classroom. Based on the literature reviewed, a significant positive relationship exists between the utilization of CAI in the classroom and the attitude of that classroom teacher towards computers.

CHAPTER 3

Method

Introduction

This study examined the relationship between the utilization of Computer-Assisted Instruction (CAI) in the classroom instructions of the teacher and the attitude of that classroom teacher towards computers. The subjects were elementary classroom teachers in urban and rural southern New Jersey school districts. The subjects were instructed to complete a Computer Attitude Survey (CAS), and a Computer Assisted Instruction Survey (CAIS). The Computer Attitude Survey scored the teachers' attitude towards computers in four areas; anxiety, confidence, liking, and usefulness. A high score represented a positive attitude towards computers and a low score represented a negative attitude toward computers. The scores were correlated to the teachers' responses on the Computer Assisted Instruction Survey.

Population/Sample/Subjects

The population for this study included teachers in grades K - 5 from three public schools and one private school. The schools were located in urban and rural districts of southern New Jersey. Specifically, the public schools were located in the Millville school district and the Pittsgrove school district. The private school was located in the Harrison Township school district. Each of the schools contain computers and multimedia software.

The sample included a minimum of 10 teachers from each of these schools. Approximately, 95% of the teachers participating in the study were female. All of the subjects were full time teachers working within intact classrooms. None of the subjects were special needs teachers.

Instruments

The two instruments selected for this correlational study respond to interval and nominal data. Both instruments are survey documents. They seek to discover a relationship between attitudes towards computers and the utilization of CAI in the classroom. The following are descriptions of the Computer Attitude Scale (CAS) and the Computer Assisted Instruction Survey (CAIS).

Computer Attitude Scale (CAS): The CAS was created to measure positive and negative attitudes toward computers (Gressard & Loyd, 1986). The CAS is a likert-type instrument consisting of 40 items which present statements of attitudes toward computers and the use of computers. In response to the statements, subjects indicate which one of the four responses from strongly agree to strongly disagree most closely typify their ideas (see appendix A). The 40 items are divided into four 10 item subscales: computer anxiety; computer confidence; computer liking; and perceived usefulness of computers. A higher score corresponds to a more positive attitude towards computers (Kluever et al.(1994); Koohang (1989); Harrison & Rainer(1992); and Gressard & Loyd (1986). Also, the survey asks for specific information about the teachers' age, college level completed, major area of study, gender and computer experience.

Loyd and Gressard (1984, 1985) and Gressard and Loyd (1986) reported good internal reliability and factor validity on their Computer Attitude Scale. The results of the Loyd (1985) study showed the coefficient alpha reliabilities were .90, .89, .89, and .82 respectively for the Computer Anxiety, Computer Confidence, Computer Liking, and Computer Usefulness subscales. For the total score, an overall coefficient alpha of.95 was produced. The results indicated that the CAS can be used to reliably assess teachers' attitudes toward computers. However, the test group of teachers needs to remain similar. The CAS was selected for use in this study because of its previous use with a similar group of teachers.

A mean score of 3.0 or higher in any of the subscale categories is a "High Score" and corresponds to a positive attitude towards computers. A mean score between 2.0 - 3.0 in any of the subscale categories is considered a "Medium Score" (neither high nor low in their attitude towards computers). A mean score between 1.0 - 2.0 is considered a "Low Score" and corresponds to a negative attitude towards computer. A higher score on any of the subscales or total score indicated a more positive attitude toward using computers.

Computer Assisted Instruction Survey (CAIS): The researcher designed a Compute Assisted Instruction Survey for each teacher to complete(see appendix B). It consisted of 8 items which presented statements of CAI usage in the teacher's classroom. The response set is in the form of frequency counts occurring in two or more mutually exclusive categories. The instrument included a nominal scale for questions, such as, " Is there a school curriculum guide for CAI? (yes or no)".

Also, interval data questions are included, such as, " How often do their students use the computer in their classroom?" (never = 1, less than once a week = 2, once a week = 3, more than once a week = 4). Face validity was provided by a panel of experts in the area of technology and statistical measurement.

Research Design

The design applied to this study is the basic correlational design. There were scores obtained for each teacher for their overall attitude towards computers, as well as for the independent subscales. The Pearson r was used to measure the correlation of the independent subscale categories. A chi square was used to test the significant relationship of the teachers attitude towards computers and the utilization of CAI in the classroom.

Procedure

The study was designed to take place during the second half of the 1995-96 school year. The researcher spent the first four weeks (Stage I) of the study acclimating to the school's environment, and the development of the CAIS instrument. The validity of the CAIS instrument was completed during this phase.

During weeks five and six (Stage II), the researcher met with the principals of each of the schools and explained the survey instruments and the purpose of the survey. The researcher selected one person at each of the schools to distribute and collect the surveys during the implementation period. The researcher prepared the cover letter (see appendix C) and the survey documents for distribution.

Week seven of the study (Stage III) was the distribution of the survey instruments to the teachers. Each teacher had four days to complete the survey. After such time, the researcher collected the surveys from the schools. All the schools returned a 100% of the surveys completed. The researcher did not have to conduct any follow-up efforts.

During weeks fifteen through sixteen, the researcher scored all the surveys, placed the results in a table and calculated the Pearson r formula to measure the correlation of the independent subscale categories on each subject. The researcher used chi square to compare frequencies occurring in different categories with respect to the High, Medium or Low attitudes of the subjects towards the computer. A chi square test of significance determined if the observed frequencies were significantly different than the expected frequencies.

CHAPTER 4

Analysis of the Findings

Introduction

The purpose of this study was to examine the relationship between the attitude of the classroom teacher towards computers and the utilization of CAI in the classroom instructions. The subjects were classroom teachers in grades K-5 as shown in the chart below.

Number of teachers per grade level

Kindergarten	First	Second	Third	Fourth	Fifth
3	11	12	11	12	6

The teachers were from three public schools and one private school in urban and rural districts of southern New Jersey.

The teachers completed a Computer Attitude Survey (CAS), and a Computer Assisted Instruction Survey (CAIS). Specific responses to the research questions on the CAS measured the attitude of the teacher in four areas; their anxiety towards computers, their confidence in their ability, their liking of computers, and their perceptions of the usefulness of computers. An overall high score represented a positive attitude towards computers and a low score represented a negative attitude toward computers. In addition to an overall score, each area was tabulated and rated high, medium or low. The scores were correlated to key responses on the CAIS.

Statistical Procedure

The relationship being investigated in this study was between and among the three attitudinal groups, High, Medium and Low and their relationship with the nominal data displayed in a chi square diagram.

The variables correlated were expressed as interval data therefore, the appropriate technique to use was the Pearson r formula. For purposes of assessing the relationship of attitudes as measured by the CAS, item responses were coded so that a higher score indicated a lower degree of anxiety and a higher degree of liking, confidence, and usefulness. The level of significance at which the researcher worked was at $p < .05$ with a degrees of freedom = N-2.

Chi square was used to measure any significant differences between the ratings of High, Medium and Low in the subclass categories and the observed frequencies of teachers using CAI in the classroom. This study examined any significant relationships among the age of the teacher and that teacher's subclass scores. Also, the study examined the computer experience of the teacher and their subclass scores. The level of significance was $p < .05$

Chi square was used to measure any significant differences between the total attitudinal CAS score of High or Low and the observed frequencies of teachers using CAI in the classroom; the age of the teacher and the computer experience of the teacher. The level of significance was $p < .05$.

In order for the researcher to describe the data in the most accurate way, descriptive statistics were computed separately for each subclass of CAIS and for each school. The researcher measured the central tendency by calculating the mean from responses on the survey. The standard deviation was calculated to determine the index of variability. Separately, the researcher reported on frequencies of responses to key questions in the surveys.

Descriptive Statistics

The CAS is a 40 item instrument in which four subscale scores were tabulated. The 4 subscales; anxiety, confidence, liking, and usefulness resulted in a total score up to 160 points per survey. Each subscale consist of 10 questions with a possible total score of 40 points. As reported in table 1, mean scores for the schools on the CAS were 125.9, 124.6, 117.3, 122.0 respectively. The total mean score for all the schools was 121.80.

table 1.

Descriptive Statistics for the Computer Attitude Scale.

Statistics	School 1	School 2	School 3	School 4	Total Subjects
N	10	11	15	19	55
Mean	125.9	124.6	117.3	122	121.8
Median	130	119	114	122	122
SD	23.5	14.21	20.02	20.9	19.5
Minimum	84	105	80	80	80
Maximum	156	147	154	155	156
Range	72	42	74	75	76

The scores of the teachers do form a normal curve. Because the variables are normally distributed, the researcher conducted Pearson r and chi square statistics.

The descriptive statistics for the four subscale scores are shown in table 2.

table 2.

Descriptive Statistics for Subscale Scores on the CAS (N=55)

Subscale	Mean	Median	SD	Minimum	Maximum	Range
Anxiety	29.41	30	6.47	15	40	25
Confidence	28.72	28	5.58	18	40	22
Liking	30.3	32	5.61	18	40	22
Usefulness	33.1	33	4.87	14	40	26

As compared to a neutral score range of 20 - 29 for each subscale, these means indicate the teachers scored positively in their view of liking computers and finding the computer useful in the classroom.

Tabulation of High, Medium and Low Scores

The tabulation of the scores in any of the subscale categories corresponded to either a "High Score" (a mean score of 3.0 or higher), a "Medium Score" (a mean score between 2.0 - 3.0) or a "Low Score" (a mean score between 1.0 - 2.0). A higher score indicated a lower degree of anxiety and a higher degree of liking, confidence, and usefulness. On any of the subscales or total score, a higher score corresponds to a more positive attitude towards computers. See table 3. for the distribution of scores.

table 3.

Tabulation of the Number of Teachers in each Subscale per High, Medium and Low

Subscale	High	Medium	Low	Total
Anxiety	30	20	5	55
Confidence	27	24	4	55
Liking	33	17	5	55
Usefulness	47	7	1	55
Total	137	68	15	220

A tabulation of the total scores resulted in high and medium attitudes toward computers. Interestingly, the teachers who scored low in the subclasses of anxiety, confidence or liking, scored extremely high in the subclass of usefulness. The high score in the subclass of usefulness brought the overall score up from the low to the medium category. Therefore, there are not any overall negative attitudes towards computers in this population. Table 4 illustrates the tabulation of the total scores.

table 4.

Tabulation of the Total Score on the CAS

Category	Teachers
High	30
Medium	25
Total	55

Pearson r Measurement

A Pearson r at $p < .05$ level was the most appropriate coefficient for determining the relationship among the four subclasses. Table 5 illustrates the Pearson r measure of correlation and identifies the level of significance between the variables being correlated.

table 5.

Pearson r at significance $p < .05$

Subclasses	P_r	Level of significance
Anxiety/Confidence	0.808	$p < .001$
Anxiety/Liking	0.691	$p < .001$
Anxiety/Usefulness	0.482	$p < .001$
Confidence/Liking	0.747	$p < .001$
Confidence/Usefulness	0.727	$p < .001$
Liking/Usefulness	0.56	$p < .001$

Highly significant positive correlations were found among the subscale scores. The strongest correlation was between the anxiety of the teacher towards computers and their confidence level in their ability to use the computer. Although highly significant, the weakest of the four subclasses was the relationship between the attitude of the teacher and their perception of the usefulness of the computer. Therefore, the CAS was a reliable instrument for determining the attitudes of teachers towards computers in education.

Chi Square Tabulations For the Attitude of Teachers Toward Computers Utilized in the Classroom

The overall attitude of the teacher towards computers used in education is comprised of the four subclass categories, anxiety, confidence, liking and usefulness of the computer. The following calculations refer to this overall rating of the attitude of teachers toward computers.

In order to determine the relationship between the observed frequencies on the CAIS and the attitudinal score, High and Medium on the CAS, several chi square contingency tables were established. A chi square test of significance was used in order to determine whether the groups were positively related.

The contingency tables 6 and 7 depict the relationship of the total CAS score and the utilization of CAI in the classroom. Contingency table 8 expresses the relationship between age and the attitude of the teacher towards the computer. Table 9 illustrates the relationship of computer experience and the attitude of the teacher towards the computer.

table 6.

Number of Times the Students Use the Computer in the Classroom and the Teachers' Attitude Towards Computers

Attitudinal Category	Never	Less than once a week	Once a week	More than once a week
High	8	5	6	11
Medium	8	7	4	6

The chi square test was 1.764 with df=3, not statistically significant.

Each of the schools surveyed had a computer lab in their school. Unfortunately, not all teachers had computers in their classroom. The question in the survey assumed the teacher did have access to a computer in their classroom. The following chart illustrates the percentage of teachers which had computer(s) in their classroom.

Percentage of Computers in the Classroom

None	One	Two	Three
35.00%	49.00%	11.00%	5.00%

Regardless of the attitude of the teacher, 35% of the teachers did not have access to a computer and CAI in their classroom. Of the 35% of the teachers with no computers in their classroom, 42% of the teachers scored high in their attitudes towards computers. Per table 6, 37% of the teachers which scored high and have computers in their classroom do have their students using the computers more than once a week. Almost twice as many teachers that scored high have their students utilizing the computer in the classroom versus the teachers that score medium. Therefore, there is a practical positive relationship

between the teachers that scored high in attitude and the use of the computer in the classroom.

table 7.

Teachers that Use CAI to Teach the Curriculum and their Attitude Towards Computers

Attitudinal Category	Yes	No
High	10	20
Medium	4	21

The chi square test was 2.159 with df=1, not statistically significant.

The fact that 35% of the population did not have computers in their classroom could affect the results of this comparison.

table 8.

Age of the Teacher and their Attitude Towards Computers

Attitudinal Category	Under age 26	26 - 30	31 - 39	40 - 49	50 - 55	56 +
High	4	3	9	9	4	1
Medium	0	3	3	12	5	2

The chi square test was 7.48 with df=5, not statistically significant.

As reported in table 8, there was not a statistically significant positive relationship between the age of the teacher and the attitude of the teacher towards the computer. However, 73% of the teachers under the age of 40 years scored high on their attitude towards computers versus 43% of the teachers over the age of 40 years old.

There were 57% of the teachers over age 40 that scored medium on their attitude towards computers versus 27% that are under age 40. Therefore, there was evidence that a practical positive relationship exists between the age of the teacher and the attitude of the teacher towards the computer.

table 9.

Computer Experience of the Teacher and the Attitude of the Teacher Towards Computers

Attitudinal Category	None	Less than 1 yr.	1 - 3 yrs.	3 yrs. or more
High	0	5	8	17
Medium	4	5	12	14

The chi square test was 4.734 with df = 3, not statistically significant

Table 9 displays the relationship of computer experience of the teacher and their attitude towards computers. Although, there was not a significant positive relationship between the amount of computer experience of the teacher and their attitude towards computers, 56% of the teachers who had a score of "high" had 3 or more years of computer experience.

Chi Square Test on the Subclasses Anxiety, Confidence, Liking and Usefulness Toward the Computer

The research was examined for the relationships of each of the subclass categories and the relationship of high, medium, low scores and the utilization of CAI in the classroom. There were some statistically significant relationships found during this analysis. Tables 10 - 13 recognized only the anxiety of the teacher towards computers and their utilization of CAI in the classroom. Tables 14 - 18 illustrated the relationship of confidence with the teacher using

and their utilization of CAI in the classroom. Tables 19 - 22 demonstrated the relationship of teachers who like to use the computer and their use of CAI in the classroom. Lastly, tables 23 - 26 showed the relationship of perceived usefulness of the computer in the classroom and the utilization of CAI in classroom instruction.

In all subclasses a chi square was used to measure the age of the teacher and their corresponding subclass category. Also, each subclass was measured against the amount of computer experience of the teacher and their scores in the corresponding subclass category

Each subclass category was comprised of 10 items with a range of scores of 1-4 per item. A mean score of 3.0 or higher is a "High Score" and corresponds to a positive attitude towards computers. A high anxiety score means the teacher has less anxiety towards the use of computers. A mean score of 2.0 - 3.0 was considered a "Medium Score" and represents neither a high nor low in their attitude towards computers. A mean score between 1.0 - 2.0 was considered a " Low Score" and corresponds to a negative attitude towards computers.

Anxiety Subclass Tables

Table 10 represents the number of times the students use a computer in the classroom and the anxiety level of the teacher towards using computers. There was not a statistically significant positive relationship between the anxiety score of the teacher and the number of the times their students used the computer in the classroom. However, the teachers with less anxiety towards using the computer had their students use the computer more than twice as much as the

teacher with a medium anxiety score.

table 10.

Number of Times the Students Use the Computer in the Classroom and the Teachers' Attitude Towards Computer

Subclass = Anxiety	Never	Less than once a week	Once a week	More than once a week
High	8	5	6	11
Medium	8	5	2	5
Low	0	2	2	1

The chi square test was 6.389 with df=6, not statistically significant

Table 11 shows a highly significant positive relationship at the level $p < .001$ between the relationship of the teachers use of CAI to teach the curriculum and their anxiety level towards using computers.

table 11.

Teachers that Use CAI to Teach the Curriculum and their Anxiety Towards Computers

Subclass = Anxiety	Yes	No
High	9	21
Medium	5	15
Low	0	5

The chi square test was 13.335 at df = 2,
$p < .001$, Highly significant relationship

Furthermore, there was a highly significant positive relationship between the years of prior computer experience and the anxiety level of the teacher towards using computers, as shown in table 12. The more computer experience the teacher had resulted in a lower degree of anxiety towards using the computer.

table 12.

Computer Experience of the Teacher and the Anxiety of the Teacher Towards Computers

Subclass = Anxiety	None	Less than 1 year	1 - 3 years	3 years or more
High	0	5	8	17
Medium	3	5	11	1
Low	1	0	1	3

The chi square test was 18.525 with df=6, $p < .01$, highly significant relationship

Table 13 examined the relationship between the age of the teacher and the anxiety level of the teacher towards computers. It was found that there was not any statistical relationship. However, the percentage of teachers, under age 40, with high, medium and low anxiety scores were 73%, 18%, and 9% respectively. The percentage of teachers, over age 40, with high medium and low attitude scores were 42%, 48%, and 10%, respectively. Clearly, there is a positive relationship between the teachers who were under the age of 40 and had a lower degree of anxiety towards using computers.

table 13
Age of the Teacher and their Anxiety Towards Computers

Subclass = Anxiety	Under age 26	26 - 30	31-39	40-49	50 - 55	56 and over
High	4	3	9	9	4	1
Medium	0	2	2	9	5	2
Low	0	1	1	3	0	0

The chi square test was 10.527 with df = 10, not statistically significant.

Confidence Subclass Tables

A chi square test was calculated to examine five different relationships in regards to the teachers confidence level with using the computer. There was a statistically significant relationship found between the age of the teacher and their confidence with using computers; between the years of experience using the computer and their confidence level; and between their self rating of competency in using the computer and their score in the confidence subclass category (see tables 14 - 16).

table 14.

Age of the Teacher and their Confidence Towards Using Computers

Subclass = Confidence	Under age 26	26 - 30	31 - 39	40 - 49	50 - 55	56+
High	3	4	7	8	4	1
Medium	1	2	5	10	5	1
Low	0	0	0	3	0	1

The chi square test was 12.833 with df = 6, significant $p < .05$

There was a positive relationship between the age of the teacher and their confidence towards using computers. In the group of teachers under 40 years of age, 64% scored high in their confidence levels versus only 37% of the teachers over 40 years of age that scored high in their confidence levels.

table 15.

Computer Experience of the Teacher and their Confidence Towards Using Computers

Subclass = Confidence	None	Less than 1 yr.	1 - 3 yrs.	3 yrs. or more
High	0	5	7	15
Medium	4	5	10	5
Low	0	0	3	1

The chi square test was 9.235 with df = 10, highly significant $p < .001$

There was a very strong positive relationship between the teachers that scored high in their confidence level using computers and the years of computer experience. There were 73% of the teachers that reported 3 years or more computer experience that scored high in their confidence levels using the computer.

table 16.

Self Rating of Computer Competency and their Confidence Subclass Score

Subclass = Confidence	Self rating = Computer Competent	Self rating = Not Competent
High	16	11
Medium	2	22
Low	0	4

The chi square test was 17.066 with df = 2, highly significant $p < .001$

There was an extremely strong relationship between the self rating of the competency of the teacher with using the computer on the CAIS and their score in the confidence subclass category on the CAS.

table 17.

Number of Times the Students Use the Computer in the Classroom and the Confidence of the Teacher Towards Using the Computer

Subclass = Confidence	Never	Less than once a week	Once a week	More than once a week
High	8	3	6	10
Medium	7	7	4	6
Low	1	2	0	1

The chi square was 5.139 with df = 6, not statistically significant

Again, the lack of computers in the classroom may affect the relationship of this comparison. It is interesting to note that in the category, " more than once a week", 59% of the teachers scored high in their confidence level. The teachers that were more confident with working with computers had their students use the computer more than once a week.

table 18.

Teachers that use CAI to Teach the Curriculum and their Confidence with Using the Computer

Subclass = Confidence	Yes	No
High	9	18
Medium	6	18
Low	0	4

The chi square test was 2.062 with df = 2, not statistically significant

There was not any statistically significant relationship found between the use of CAI to teach the required curriculum and the confidence level of the teacher with using computers.

Liking Subclass Tables

The only statistically positive relationship was between teachers who use computer assisted instruction to teach the required curriculum and the score under the subclass " like to use the computer" (see table 19).

Although not statistically positive, there were practical positive relationships between the scores under the subclass of liking computers and key questions in the CAIS (see tables 20 - 22).

table 19.

Teachers that use CAI to Teach the Curriculum and Like to Use the Computer

Subclass = Liking to use computers	Yes	No
High	13	20
Medium	2	15
Low	0	5

The chi square test was 6.381 with df = 2, highly significant at $p < .01$

The teachers that scored high in the subclass liking were significantly more likely to use CAI to teach the curriculum. The primary reason there were more numbers of teachers that responded "No" was due to the lack of computers in their classroom to utilize the CAI and the lack of CAI software. However, of the teachers that responded with the answer "Yes", 86% scored high on the subclass "like to use computers" scale.

table 20.

Computer Experience of the Teacher and Like to Use the Computer.

Subclass = Like to use the computer	None	Less than 1 year	1 - 3 years	3 years and more
High	1	6	12	14
Medium	2	4	6	5
Low	1	0	2	1

The chi square was 4.815 with df = 6, not statistically significant

Although, there was not a statistically positive relationship between the amount of computer experience of the teacher and the level of liking, there is a practical positive relationship. Nearly three times as many teachers who scored high in liking to use computers had more than 3 years of prior computer experience than the teachers who scored medium (see table 20).

Table 21 shows that 72% of the teachers under age 40 scored high in liking to use computers. Although, not statistically significant there is a practical positive relationship between the teachers under 40 years of age and a high score in the subclass "like to use the computer".

table 21

Age of the Teacher and Like to Use the Computer

Subclass = Like to use the computer	Under age 26	26 - 30	31 - 39	40 - 49	50-55	56 +
High	4	6	11	18	7	1
Medium	0	0	1	3	2	1
Low	0	0	0	0	0	1

The chi square test was 7.545 with df= 10, not statistically significant

table 22.

Number of Times the Students Use the Computer in the Classroom and Like to Use the Computer

Subclass = Like to use the computer	Never	Less than 1 week	Once a week	More than once a week
High	9	8	6	10
Medium	6	3	2	6
Low	1	1	2	1

The chi square test was 2.633 with df = 6, not statistically significant

Table 22 illustrates that teachers with a high score in the subclass " liking to use computers" had their students using the computer 69% more than the teachers that scored medium and low. However, there is no statistical significance between the number of times the students use the computer and the level which the teacher liked to use the computer. The fact that 35% of the teachers did not have computers in their classroom could have affected these results.

Usefulness Subclass Tables

There were two significant positive relationships when completing the chi square test with the subclass of perceived usefulness of the computer in the classroom and key questions from the CAIS. The statistically significant relationships appear in table 23 and 24. There were strong practical positive relationships illustrated in tables 25 and 26.

table 23.

Age of the Teacher and their Perceived Usefulness of the Computer

Subclass = Usefulness of the computer	Under age 26	26 - 30	31 - 39	40 - 49	50 - 55	56 +
High	4	6	11	18	7	1
Medium	0	0	1	3	2	1
Low	0	0	0	0	0	1

The chi square test was 21.784 with df = 10, significant at $p < .05$

Under this subclass, 95% of the teachers under 40 years of age scored high compared to 78% of the teachers over the age of 40. Therefore, the teachers under the age of 40 held a stronger perception of the usefulness of the computer in the classroom than those teachers over 40 years of age.

table 24.

Computer Experience of the Teacher and their Perceived Usefulness of the Computer

Subclass= Usefulness of the Computer	None	Less than 1 yr.	1 - 3 yrs.	3 yrs. or more
High	2	10	16	19
Medium	2	0	3	2
Low	0	0	1	0

The chi square test was 8.607 with df = 6, significant at $p < .05$

Table 25 illustrates that 90% of the teachers who had 3 years or more computer experience perceive the computer to be useful in the classroom. There was a strong relationship between the number of years of computer experience and the perceived usefulness of the computer.

table 25.

Number of Times the Students Use the Computer in the Classroom and Perceived Usefulness of the Computer

Subclass = Usefulness of the Computer	Never	Less than once a week	once a week	More than once a week
High	13	9	9	16
Medium	2	3	1	1
Low	1	0	0	0

The chi square was 4.903 with df = 6, not statistically significant

Although the relationship was not statistically significant, the table illustrates that of the teachers that allowed their students to use the computer more than once a week, 94% of those teachers scored high in their perceived usefulness of the computer.

table 26.

Teachers that use CAI to Teach the Curriculum and their Perceived Usefulness of the Computer

Subclass = Usefulness of the Computer	Yes	No
High	15	32
Medium	0	7
Low	0	1

The chi square was 3.511 with df = 2, not statistically significant

The reason that this comparison resulted in no significant relationship is because there was a large number of teachers that scored high in their perceived usefulness of the computer and did not use CAI software to teach the required curriculum. The possible rationale for this may be the lack of computers and software in their classroom. However, the research does indicated that only those teachers that perceived the usefulness of the computer in the classroom utilized CAI to teach the required curriculum. Therefore, there is a practical relationship between those teachers that perceive the computer to be useful and the use of CAI in the classroom.

Analysis Related to the Hypothesis

The hypothesis tested in this study stated that there was a significant positive relationship between the utilization of Computer Assisted Instruction (CAI) in the teachers' classroom instruction and the attitude of that classroom teacher toward computers, as measured by the Computer Attitude Scale.

A chi square test with a level of significance at $p < .05$ was used to test the hypothesis. There was not any significant statistical positive relationship between the teacher's overall attitude towards computers and their use of CAI in their classroom instruction. However, there was a practical positive relationship between the teachers that scored high in their attitude towards computers and the use of the computers in the classroom by the students.

At the subclass level of anxiety towards the computer and liking to use the computer, there were highly significant positive relationships, $p < .001$ and $p < .01$, respectfully with the utilization of CAI in the classroom. A higher anxiety score means the teacher had a lower degree of anxiety towards using the computer. Also, there was a practical positive relationship at the subscale level of perceived usefulness of the computer and utilization of CAI in the classroom. Therefore the hypothesis for this study is supported.

CHAPTER 5

Discussion, Recommendations and Conclusion

Summary of the Problem

Classrooms are changing rapidly. Classrooms are becoming multimedia environments where the students and teachers use the media that best supports the goals of learning. The computer is the principle kind of media which is being installed in the classrooms and computer labs to accomplish the goals of learning. However, making the classroom computer a priority and using Computer-Assisted Instruction (CAI)is not typical of most teachers.

Computer assisted technologies include CD-ROMs, videodiscs, interactive multimedia, and hypermedia. These technologies must be integrated into the curriculum rather than being a supplement . These technologies will change the way learning takes place in the classroom. There will be more of an interactive and collaborate student centered approach to learning rather than the teacher centered approach. Teachers will need to be knowledgeable about the various interactive software packages and the computer equipment. The idea of integrating CAI into the required curriculum will soon become a standard practice.

A review of the literature indicates that the utilization of CAI in the classroom may be affected by many variables. Important variables include the necessity of teachers and students having easy access to the computer and the appropriate educational software. In addition, teachers require the financial commitment of

the district to invest time and money to fully train teachers in the operation of computers.

Teachers may be uncomfortable using computers in their classroom instructions. If teachers do not value the computer as an instructional device, the computers that are presently in schools will not be utilized appropriately. Do the attitudes of teachers toward computers affect their use of Computer Assisted Instruction in the classroom? Whether there was a relationship between the attitudes and perception of classroom school teachers toward using the computer and utilization of CAI in the classroom was the purpose of this study.

Summary of the Hypothesis

A significant positive relationship was set for this study between the utilization of Computer-Assisted Instruction in the teachers' classroom instructions and the attitude of that classroom teacher towards computers. The Computer Attitude Scale was used to measure the attitude of the teacher towards computers with significant levels set at $p < .05$.

Summary of Procedure

The population for this study included teachers in grades K - 5 from three public schools and one private school. The schools were located in urban and rural districts of southern New Jersey. Each of the schools contained computers and multimedia software. The sample included a minimum of 10 teachers from each of these schools.

The two instruments selected for this study were survey documents. The first survey was titled, Computer Attitude Scale (CAS), and was comprised of interval data which measured the positive and negative attitudes of the teachers toward computers. The second survey was titled, Computer Assisted Instruction Survey (CAIS), and contained nominal and interval data. The CAIS consisted of eight items which presented statements of Computer-Assisted Instruction usage in the classroom of the teacher. Each teacher in the sample received and completed the survey documents.

A Pearson r formula measured the correlation of the independent subscale categories on the CAS survey. The mean score of each subject on the CAS was classified as High (positive attitude towards computers), Median (neutral attitude towards computers), and Low (negative attitude towards computers). The level of significance was at $p < .05$

A chi square test was used to measure any significant relationship of the teachers attitude towards computers and the utilization of CAI in the classroom as described in the CAIS survey. The level of significance was $p < .05$.

Summary of the Findings

There was not any significant statistical positive relationship between the overall attitude of the teacher towards computers and their use of CAI in their classroom instruction. At the subclass level, there were highly significant positive relationships between the teachers that had a higher anxiety score (which means they had less anxiety towards using the computer) and the utilization of CAI in their classroom instruction. There was a highly statistical

positive relationship between the high scores in the subclass liking to use the computer and the utilization of CAI in their classroom instruction. Also, there was a practical positive relationship at the subscale level of perceived usefulness of the computer and utilization of CAI in the classroom. Therefore, the hypothesis for this study is supported.

Discussion

There was 100% participation from the teachers selected in all four elementary schools. The CAS instrument responded in this survey as in had in the literature review. Highly significant positive correlations were found among the subscale scores.

The teachers overall mean score on the CAS showed a Medium attitude towards the computer. However, the mean scores of the subscales liking to use the computer, perceived usefulness of the computers, and anxiety level towards the computer resulted in a High positive attitude towards computers. A high mean score in anxiety corresponds to a lower level of anxiety towards working with computers. The teachers expressed a lower level of confidence with using the computer and that contributed to the overall attitudinal score of Medium.

Each of the schools surveyed had a computer lab in their school. One of the computer labs was installed at the time of the survey. The computer labs at each school differed in the amount of students they could accommodate per setting. The lack of a fully operating computer lab would affect the number of

times the students use the computer. In addition, 35% of the teachers surveyed did not have a computer in their classroom. The questions in the CAIS survey assumed the teacher did have access to a computer and CAI in their classroom. The utilization of CAI in the classroom instruction by the teacher may have been negatively affected because of the lack of access to a computer and the CAI software in their classroom. The CAIS did not address the lack of appropriate CAI software in their school. This was a variable that could not be controlled.

The study did find that those teachers with a lower anxiety level, who liked to use the computer and perceived the computer to be an effective educational tool, utilized CAI in the classroom more often than those teachers who had a mean score of Medium or Low in each of these subclass areas. Also, there was a practical positive relationship between the teachers that scored high in their attitude towards computers and the use of the computers in the classroom by the students. Per the survey, more than twice as many teachers who used CAI in their classroom instruction scored a rating of High in their overall attitude towards computers. However, the teachers lack of computers and the availability of CAI had an impact of the CAIS instrument and limited the strength of the responses on this survey.

Recommendations

This study found strong relationships between the utilization of CAI in classroom instruction and the CAS subscales anxiety, perceived usefulness of the computer and liking to use the computer. The teachers overall attitude towards computer does have an impact on the amount of time their students use the

computer and the utilization of CAI in the classroom instruction. This study should be repeated with the following modifications:

* a larger and diverse sample should be tested
* the sample should include schools that have integrated technology throughout their school
* the sample should include teachers who have daily access to computers and Computer Assisted Instruction software in their classroom
* Computer Assisted Instruction Survey should be refined to elicit responses specifically designed to measure the amount of CAI in the classroom instruction

Conclusion

Integration of technology will be widespread in classrooms throughout the United States by the year 2000. How much the student benefits from a technology rich classroom will depend on the role of the teacher in helping students utilized all the information available. The depth and scope of the utilization of technology in the classroom will begin with the attitude and belief of that classroom teacher towards the computer.

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APPENDIX A

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

The purpose of this survey is to gather information concerning your attitude toward learning about and working with computers. It should take about ten minutes to complete this survey. All responses are kept confidential. Please return the survey to _____when you are finished.

GENERAL INFORMATION

1. Age: ( ) 25 or less ( ) 26-30 ( ) 31-39 ( ) 40 - 49
   ( ) 50 - 55 ( ) 56 and Over

2. College Degree Completed: ( ) Bachelors ( ) Masters ( ) Doctorate
   Major Area Of Study:_____

3. Sex: ( ) Female ( ) Male

4. Circle The Grade Level To Which You Are Currently Assigned :
   K 1 2 3 4 5

5. Experience With Learning About Or Working With Computers:
   ( ) Less than 1 year ( ) 1 - 3 years ( ) 3 years or more
   ( ) None

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

COMPUTER ATTITUDE SCALE

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

	Strongly Agree	Slightly Agree	Strongly Disagree	Slightly Disagree
1. Computers do not scare me at all.	( )	( )	( )	( )
2. I'm not good with computers.	( )	( )	( )	( )
3. I would like working with computers.	( )	( )	( )	( )
4. I will use computers many ways in my life.	( )	( )	( )	( )
5. Working with a computer would make me very nervous.	( )	( )	( )	( )
6. Generally I would feel OK about trying a new problem on the computer .	( )	( )	( )	( )
7. The challenge of solving problems with computers does not appeal to me.	( )	( )	( )	( )
8. Learning about computers is a waste of time.	( )	( )	( )	( )

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

	Strongly Agree	Slightly Agree	Strongly Disagree	Slightly Disagree
9. I do not feel threatened when others talk about computers.	( )	( )	( )	( )
10. I don't think I would do advanced computer work.	( )	( )	( )	( )
11. I think working with computers would be enjoyable and stimulating.	( )	( )	( )	( )
12. Learning about computers is worthwhile.	( )	( )	( )	( )
13. I feel aggressive and hostile toward computers.	( )	( )	( )	( )
14. I am sure I could do work with computers.	( )	( )	( )	( )
15. Figuring out computer problems does not appeal to me.	( )	( )	( )	( )
16. I'll need a firm mastery of computers for my future work.	( )	( )	( )	( )
17. It wouldn't bother me at all to take computer courses.	( )	( )	( )	( )
18. I'm not the type to do well with computers.	( )	( )	( )	( )

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

	Strongly Agree	Slightly Agree	Stronglyl Disagree	Slightly Disagree
19. When there is a problem with a computer program that I can't immediately solve, I would stick with it until I have the answer.	( )	( )	( )	( )
20. I expect to have little use for computers in my daily life.	( )	( )	( )	( )
21. Computers make me feel uncomfortable.	( )	( )	( )	( )
22. I am sure that I could learn a computer language.	( )	( )	( )	( )
23. I don't understand how some people can spend so much time working with computers and seem to enjoy it.	( )	( )	( )	( )
24. I can't think of any way that I will use computers in my career.	( )	( )	( )	( )
25. I would feel at ease in a computer class.	( )	( )	( )	( )
26. I think using a computer would be very hard for me.	( )	( )	( )	( )

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

	Strongly Agree	Slightly Agree	Strongly Disagree	Slightly Disagree
27. Once I start to work with the computer, I would find it hard to stop.	( )	( )	( )	( )
28. Knowing how to work with computers will increase my job possibilities.	( )	( )	( )	( )
29. I get a sinking feeling when I think of trying to use a computer.	( )	( )	( )	( )
30. I could get good grades in computer courses.	( )	( )	( )	( )
31. I will do as little work with computers as possible.	( )	( )	( )	( )
32. Anything that a computer can be used for I can do just as well some other way.	( )	( )	( )	( )
33. I would feel comfortable working with a computer.	( )	( )	( )	( )
34. I do not think I could handle computer courses.	( )	( )	( )	( )

SURVEY OF ATTITUDES TOWARD LEARNING ABOUT AND WORKING WITH COMPUTERS

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

APPENDIX B

Computer Assisted Instruction Survey

From a teachers perspective, please answer the following questions:

1. Do you have a computer(s) in your classroom full time? ____Yes ____No

   If Yes, how many computers do you have in your classroom?_____

   If Yes, how often do your students use the computer?

   _____ Never

   _____ Less than once week

   _____ Once a week

   _____ More than once a week

2. Do you have a computer lab in your school? _____Yes _____No

   If yes, how often do your students have access to the computer?

   _____ Once a week

   _____ Once a month

   _____ Only a specific number of weeks (# of weeks._____)

3. How do you use the computer? (Check all that apply)

   _____ To teach the required curriculum

   _____ To extend the regular curriculum

   _____ To teach problem solving and critical thinking skills

   _____ To develop educational materials

   _____ To support my teaching

   _____ I do not use the computer

4. How often would you like to use the computer?

   _____ Daily

   _____ Once a week

   _____ Once a month

   _____ Never

Computer Assisted Instruction Survey

5. What do you feel is the biggest constraint to your use of the computer?

_____ Anxiety

_____ Time

_____ Lack of knowledge

_____ I cannot fit the computer into my classroom curriculum

_____ Lack of grade appropriate software

_____ Other (Please Specify_____)

6. Do you have a curriculum guide for computer assisted instruction?

_____ Yes _____No

7. How would you rate your competency with the computer and software?

_____ None

_____ Less than competent

_____ Competent

8. What is your biggest frustration while using the software? (Check all that apply)

_____ Equipment that doesn't work

_____ Software you don't understand

_____ Time constraints

_____ Not enough computers

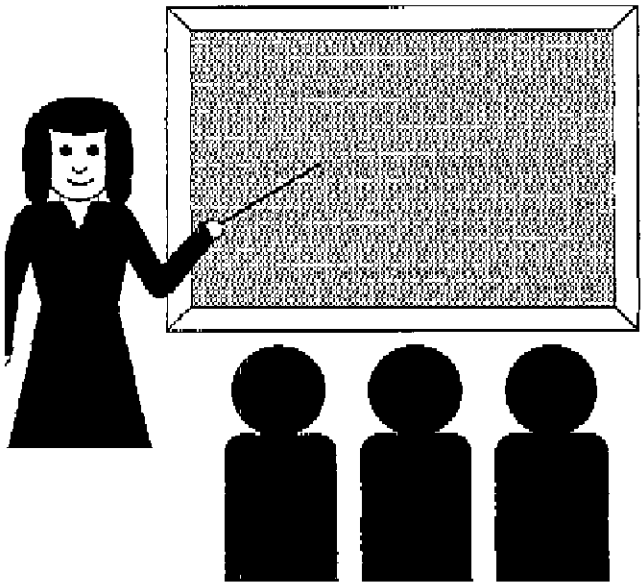
_____ Large amounts of down time for equipment repair

_____ Lack of help when needed

_____ Other (Please Specify_____)

Please feel free to add your thoughts and comments.

APPENDIX C



Date: February 26, 1996

Dear Teacher,

I am a Rowan College intern teacher assigned to Olivet School in Mrs. Mosley's fourth grade. As part of the Master of Science in Teaching program, I am required to submit a study. My research study explores the relationship of attitudes towards computers and the use of computer-assisted instruction in the classroom.

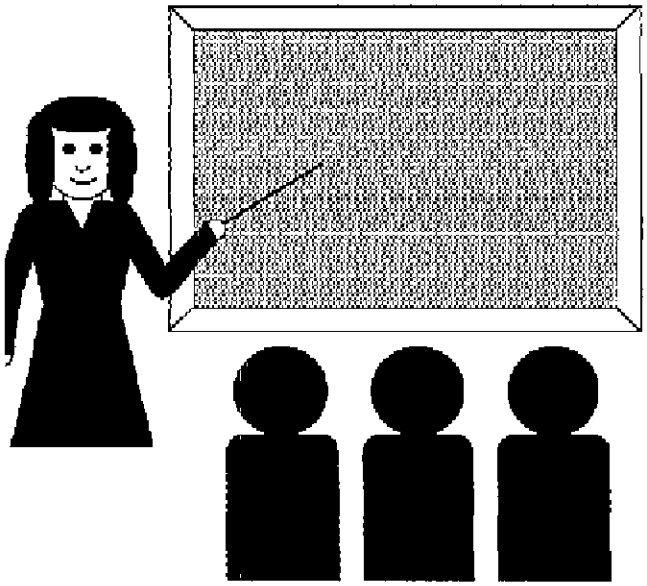
Teacher Dolores has approved the distribution of this survey. I would greatly appreciate if you would take 10 minutes to complete the enclosed survey. The survey is to be completed, anonymously.

Due to the time restrictions, please complete the survey and return it to Teacher Dolores mailbox by February 29, 1996. I will make the result of the study available to anyone who wishes to have a copy.

Please accept the enclosed sunflower greeting card as a token of my appreciation for your prompt attention and cooperation to this request.

Sincerely,

Lynn K. Lore



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Mr. Calareso has approved the distribution of this survey. I would greatly appreciate if you would take 10 minutes to complete the enclosed survey. The survey is to be completed, anonymously.

Due to the time restrictions, please complete the survey and return it to Mr.. Calareso mailbox by February 29, 1996. I will make the result of the study available to anyone who wishes to have a copy.

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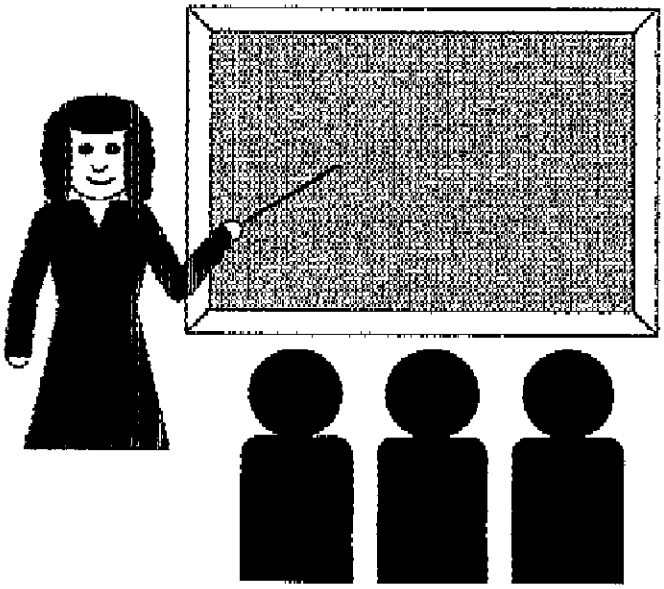
Lynn K. Lore



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Dr. Turco has approved the distribution of this survey. I would greatly appreciate if you would take 10 minutes to complete the enclosed survey. The survey is to be completed, anonymously.

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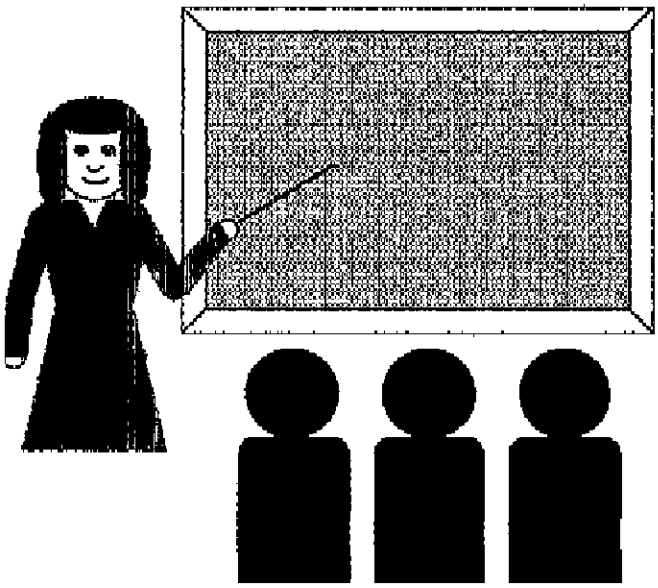

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Mrs. Lookabaugh has approved the distribution of this survey. I would greatly appreciate if you would take 10 minutes to complete the enclosed survey. The survey is to be completed, anonymously.

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Sincerely,

Lynn K. Lore

VITA

Name:	L.K. Lore
Date and Place of Birth:	10 December 1954 St. Cloud, Minnesota
Elementary School:	Madison School St. Cloud, Minnesota
High School:	Apollo High School St. Cloud, Minnesota
Undergraduate:	San Diego State University San Diego, California B.S.: Business Administration (Management) 1981
Graduate:	Rowan College of New Jersey Glassboro, New Jersey MST: Elementary Education 1996