AN ANALYSIS OF ATTITUDES OF FOURTH-GRADE STUDENTS TOWARD THE CLASSROOM COMPUTER

MASTER'S THESIS

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CHAPTER I

Introduction

Overview

It is a well established fact that computers are important technological tools today and will be in the future. Computers today are widely used in all areas of business, professional endeavors, and occupational enterprises. In 1993, there were 51,106,000 workers using computers in places of employment, and 4,470,573 computers located in American schools (Bureau of Census, 1996). With the rapid increase in computer usage, the field of education has been greatly impacted. Computer technology is being taught and used throughout today's school systems.

Because computers are so important and will remain an essential tool, educators must spend quality classroom teaching time instructing students how to use the computer. Schools have the responsibility to develop computer literate students. Ertmer, Evenbeck, Cennamo, and Lehman (1994) describe a computer-literate person as someone who willingly and naturally uses the computer as a problem-solving tool. In order to allow students to develop this willingness and natural use, educators must expose children to computers at a young age. Educators must also allow elementary students to gain vital experience and computer knowledge before going on to high school. Educators must encourage young students to develop an attitude of wanting to learn to use the computer.

Since student attitudes directly affect learning (Levin and Gordon, 1989), Sharp (1996) stated that teachers face the challenge of motivating students and fostering in them a positive attitude to improve their chances for success in school. Bracey (1982) found that students who worked on the computer had a more positive attitude toward it than those who had not worked on it. Therefore, because attitudes affect learning, educators need to impact attitudes. Necessary

and Parish (1996) stated that increased experience with the computer is related to greater confidence, greater computer knowledge, and reduced anxiety. This positive attitude can lead to computer literacy and develop a higher degree of self-confidence in the student.

In an attempt to better prepare students for a computerized society, many school systems have introduced computer education courses of study into their curricula. Since the development of positive attitudes toward school subjects is an important part of the educational process, it seems likely that students' attitudes toward computers and toward learning about computers may be an important factor in the success or failure of the new computer curriculum (Levin & Gordon, 1989; Loyd & Gressard, 1984b). An instrument for measuring attitudes and identifying problems in these courses has been developed and used successfully. Loyd & Gressard (1984b) developed the Computer Attitude Survey (CAS) which measures computer liking, computer confidence, and computer anxiety in high school and college students, but did not include elementary students in their studies.

Problem Statement

Little has been done to assess attitudes of elementary school children toward the computer (Bear, Richards, & Lancaster, 1987). Studies have been done with students in college, high school, and middle-school, but very few have focused on the elementary student (Kinnear, 1995), yet, it is these children who are exposed to computers at a young and impressionable age. Since computers are a necessity for their future, young students must be encouraged to develop positive attitudes toward using them early in the educational process in order to increase their chances of computer success in the future. Therefore, it is the attitude of the elementary student which must be assessed.

Purpose of Study

The primary purpose of this study is to survey, analyze, and determine the attitudes of elementary students toward the classroom computer. It is known, through related literature, that previously used tools to assess attitudes of computer users have been used with older students. It is necessary to adapt such a tool to apply to elementary students. Therefore, the secondary purpose of this study is to adapt an existing tool to be suitable for elementary students. This adapted tool will be used to survey, analyze, and determine the attitudes of fourth-grade students toward using the classroom computer.

CHAPTER II

Review of Related Literature

Loyd and Gressard (1984b) believed that an instrument which could be used to measure students' attitudes toward the computer would be a valuable tool to evaluate computer curriculum. Three types of attitudes toward computers were considered important enough to affect student achievement: (1) anxiety toward computers; (2) computer confidence in one's ability to learn to use computers; and (3) computer liking, or enjoyment of computers and using computers. Loyd and Gressard (1984a) believed positive attitudes increase the chance for mastering any subject, while negative attitudes make achievement less likely. Students in high school language arts classes, college students in math classes, and college students living in dormitories were subjects in a research study to examine the three attitudes. The researchers studied factors of age, sex, and experience to determine their effect on computer attitudes. The instrument used was their previously developed Computer Attitude Scale (CAS). Subjects responded to ten statements, such as "Computers make me feel nervous" or "Computers do not scare me at all," in each of the subscales. The students responded by selecting one-of-four responses ranging from "Agree" to "Disagree." Results of the CAS showed that the students had fairly positive attitudes toward computers. The relationship between age and experience was found to be significant for computer confidence and computer liking. The students with little computer experience showed significantly more anxiety than others with at least some experience. Students with more experience were also more confident than the other subjects. Students with more experience had significantly higher scores than those with less experience. Computer experience was found to be the major factor affecting all three attitudes.

Loyd and Loyd (1985) continued research using the CAS. The instrument had been previously used with high school students, but not with teachers. They determined to gather information on the reliability of the subscales of the CAS, to gather information concerning the factorial validity of the subscales, and to ascertain the ability of the CAS to differentiate among groups with different experience levels. A fourth subscale was added to the CAS to gain information about computer usefulness. The subjects were teachers of grades kindergarten through high-school who were enrolled in beginning computer classes or classes after having taken one prerequisite. Correlations among the four subscales were computed, and a 40 x 40 correlation matrix was formed. Means and standard deviations were calculated. Results of their analysis suggested that Anxiety and Confidence were measuring the same traits. The other subscales also had high correlations, but were scored separately. The researchers believed that attitudes toward computers seem to be related to computer experience. They believed the CAS to be a reliable instrument to measure attitudes of adults.

Kluever, Lam, Hoffman, Green, and Swearingen (1994) analyzed teacher attitudes toward computers because of the belief that the use of computers is necessary for instruction in a technologically sophisticated society. The CAS developed and revised by Loyd and Loyd (1985) was implemented in this study because of its previous use with a similar group. Four subscales, computer liking, confidence, anxiety, and usefulness, were examined. Subjects of this study were 265 teachers who were participating in a project to design and implement a program to recruit and train teachers in state-of-the-art computer technology for use in classroom instruction. Classroom teachers and university faculty were trained to serve as instructors in the following years. During the next two years, teachers were recruited throughout the state to participate in the study. The teachers were instructed on reviewing computer software, modeling lessons in

which computers were integrated into different subject areas, using multimedia hardware, and implementing a technology program in school. The CAS was given to the participants as a pretest, and nine months later, as a posttest. A significant difference in pretest-posttest responses was found. The implications of this study of the CAS are that it is a reliable instrument for measuring attitudes of teachers about the educational applications of computers.

Necessary and Parish (1996) also suggested that a positive relationship exists between the amount of experience using a computer and a positive attitude toward that computer. Their study involved undergraduate students at a midwestern university. The CAS was implemented in this study. The test items were separated into the three subscales: confidence, anxiety, and liking. In addition to the three subscales, the students evaluated their overall computer knowledge on a five-point scale. They indicated the time span of computer experience. Results showed that anxiety decreased and computer liking increased as the students increased their time on the computer.

Busch (1995) used college students in a beginning computer class as subjects for his study on gender differences when measuring self-efficacy. He used Loyd and Gressard's CAS. The findings of Busch's study support others by indicating that earlier computer experience and encouragement from friends are the most important factors of positive computer attitudes. He also found that both males and females had equal efficacy when performing simple computer tasks. Males received more encouragement from friends than the females did. The females were found to have less self-efficacy with regard to complex computer tasks than the males. Also, the females had less experience with programming and computer games. The author suggested further research is needed to examine how the efficacy of females can be increased.

Colley, Gale, and Harris (1994) used Loyd and Gressard's (1984b) CAS as part of their study to examine the effect of gender on the attitudes of confidence, anxiety, and liking, and to

take into account differences in previous experiences. The subjects were 160 college students. The respondents were asked about their computer experience, including use of a computer at home. They were asked which family members also used the computer. Respondents were also asked to rate themselves using the Bem Sex Role Inventory, which consists of sixty personality characteristics. Colley et al. descibed the results of the study as similar to earlier studies since it was found that males are more likely to have computers at home than females. The males had a more positive attitude, which was attributed to the confidence acquired from previous experience with the computer. Results showed that males had lower computer anxiety, higher confidence, and greater liking for computers than females. Colley et al. explained that stereotyping of computing as a masculine domain accounted for the greater home use by males. Results of the study also suggested that the influence of family members as role models should be taken into account.

Bear, Richards, and Lancaster (1987) stated that attitude change is an important index of the effectiveness of computer-based instruction (CBI). But very few instruments to measure attitude have been developed. The authors referred to the CAS developed by Loyd and Gressard (1984b) as a promising instrument but one which needs to document its external validity. Bear et al. were concerned with developing an instrument which could be used with students in the elementary through high school years. Therefore, they developed the Bath County Computer Attitude Survey (BCCAS). It consisted of 26 three-choice Likert-type items to evaluate attitudes toward five areas: general computer use, computer-assisted instruction, programming, social issues, and computer history. The authors expected to find that experienced users would score more favorably than inexperienced users. They also expected that those who planned to learn more about computers and go into a computer related career would score higher on the attitude

scale. Finally, they expected attitudes toward computers to be positively correlated with attitudes toward other school subjects. The authors found that the scores were as predicted. They suggested if others using the BCCAS find similar results, then this instrument would be a valuable measure of computer attitudes.

Katz, Evans, and Francis (1995) used the BCCAS in a research study which was designed to build on the work of Bear et al. (1987). The BCCAS was used with 339 college students ir Israel. The instrument was translated into Hebrew and then back to English. The results supported the reliability and validity of the BCCAS. Katz et al. (1995) suggested that the instrument can be used to analyze computer attitudes across cultures and with subjects of various ages.

Francis and Evans (1995) also used the BCCAS to continue the work of Bear et al. (1987). The researchers combined the BCCAS, the CAS, and four other instruments to measure attitudes toward computers: the Attitude Toward Computers Measure, the Computer Survey Scale, the Computer Use Questionnaire, and the Attitude Toward Computer Scale. College students were the subjects of this study to validate the BCCAS. Results demonstrated the reliability and validity of the BCCAS as a tool with which to measure attitudes toward computers. Francis and Evans stated that the BCCAS is comparable to the CAS as a measurement tool.

An extensive study was conducted by Woodrow (1991) to compare reliability and construct validity of four different computer attitude scales. Such scales are used to evaluate and analyze attitudes toward using the computer. One of those four was Loyd and Gressard's CAS. It is a Likert-type instrument consisting of thirty statements about attitudes toward computers and use of computers. The survey is divided into three separate categories, each measuring an attitude: Anxiety, Liking, and Confidence. Results showed that this scale had the highest

reliability coefficients. The results compared favorably with those obtained by Loyd and Gressard.

Gardner, Discenza, and Dukes (1993) also compared four instruments which measure attitudes toward computers. One purpose of the study was to compare qualities of the instruments, with the focus on computer anxiety. A second purpose of the study was to develop a tool that could be completed quickly, yet be highly reliable and exhibit validity. The CAS was among the four instruments compared in the study. College students taking business, engineering, and liberal arts classes were given the combined questionnaire at the beginning of the school year. Gardner et al. (1993) stated that, although all four of the instruments were very similar, the CAS was the instrument being chosen most often for research on computer attitudes of anxiety, confidence, and liking.

Ertmer et al. (1994) conducted a study with college students to explore how perceptions of self-efficacy might be affected using hands-on experiences followed by individual feedback. Their study was designed to test two hypotheses: (1) that self-efficacy would increase for all students engaged in computer experiences in a non-threatening learning environment, and (2) that students who had more time on-task with e-mail and word processing would obtain higher levels of self-efficacy than those with less time on-task. The research process of pretest, posttest, and delayed test was utilized. The control group did not use the computer. However, the results showed that the students who had spent more time on-task with e-mail and word processing did not achieve higher self-efficacy scores than did the other group; self-efficacy increased equally for all students engaged in computer activities in a non-threatening learning environment. Therefore, the researchers' first hypothesis was supported but their second hypothesis was rejected. Their conclusion was that quality, not only quantity, of computer experiences is the critical factor.

Gilman and Brantley (1988) investigated whether increased time on computers affects learning and attitudes toward school. The authors used fourth graders in an Indiana school as subjects for a year-long study. Students in the control group had access to only one computer. Each student in the experimental group spent two hours daily on the computer. The students used software in the areas of language arts, math, social studies, and enrichment in the fine arts. The results of this study were unexpected. The experimental group's achievement test scores were no higher than those of the control group. Mean scores in composite achievement only slightly favored the experimental group. The experimental group had significantly higher scores only on the computer skills test. The authors explained that the unexpected results may have been due to the fact that the regular classroom teacher was absent for two months during the study, which may have caused inconsistent computer instruction. Gilman and Brantley (1988) also suggested continued research with computer assisted instruction (CAI) is necessary.

Using CAI is only one of many uses for the classroom computer. Lewis and Doorlag (1995) stated that computers should be used to enrich and extend the regular classroom instruction. Drill-and-practice programs are the most commonly used type of software, and because of their immediate feedback, these programs can be beneficial to the students. Assignments can be completed using the computer for word processing tasks. Simulation activities, which can provide situations impossible to duplicate in the classroom, can provide enrichment in a variety of curricula. According to these authors, programs to teach problem-solving skills are valuable tools to practice critical thinking and problem analysis. Tutorials are designed to present new content and then provide practice using that new skill. Database management programs can be used not only by the students, but also by their teacher. The authors stated that teachers are only beginning to explore how classroom computers can be

implemented, and that students can become successful computer users with the proper guidance and attitude.

Kinnear (1995) studied attitudes of fourth-to-seventh graders as they were being introduced to computers in their school. The study was performed over a twelve month period beginning three months before two computers and one printer arrived, and continuing for nine months after their arrival. Because of the transient nature of the school's population, only a small number of students completed both the pre- and post-questionnaire. Kinnear's results showed that boys felt more positively toward the computer than girls. The boys monopolized the computer while the girls chose to take part in more socializing activities. Therefore, the negative attitude of the girls was attributed to their infrequent sessions at the computer.

According to Smith (1987), teachers' attitudes are usually positive toward computers in schools, but negative toward their own personal use. Students in grades one through twelve, as well as their teachers, were subjects for two studies using an efficacy scale and a sex-typing scale. The results of the first study concluded that students had a higher sense of efficacy than the teachers did after having the computers available for two years. Levels of confidence in their own abilities and possibilities of a career in computers ranged from the highest at the elementary level to the lowest at the high-school level.

The second study (Smith, 1987) took place in several schools where computers were just beginning to be implemented. Some classrooms already had computers, while others did not. High school computer courses were electives, and not required as in the first study. Again, the results showed that elementary students had more confidence than the older students. The elementary students had slightly more confidence than the teachers. Female elementary teachers showed more confidence than the male teachers.

According to Evans-Andris (1995), little is known about the ways in which classroom teachers have adapted using computers as instructional tools. Since the success of implementing computers depends mainly on the teacher's attitude and habits, it is important to study ways in which teachers have adjusted to this new tool. Evans-Andris used in-depth interviews and observations to accumulate information, using teachers in nine different elementary schools as subjects. Teachers were asked to describe ways in which computers were implemented in their schools, in their classrooms, and what they thought the optimal computer use would be. She observed how teachers prepared for and scheduled student work in the computer lab. Computer activities ranged from drill-and-practice to using the computer as a learning tool integrated into subject matter. The author concluded that teachers developed their own individual computing styles. She found that only a small number of teachers distanced themselves from the computer and its use, while the majority of teachers provided their students limited computing opportunities. Some teachers incorporated computer activities into their own day as well as that of their students. She stated that about 60% of the teachers in this study neither embraced nor resisted computer implementation, but treated computer use as an undervalued activity. Only about 30% of the teachers accepted the technology, developed their own method of integrating the computer, and used it as a learning tool. About 10% of the teachers taught their students only technical aspects of the computer. The author also concluded that programs to implement the computer's use must establish its relevancy to the curriculum. Teachers should be encouraged to plan and reinforce computer activities as they would their other lessons. Teachers should plan computer activities designed to expand and enhance the regular subject matter.

When reviewing the literature about encouraging the development of positive attitudes toward the computer, computer literacy, and implementing computers in the classroom, the reader

can find a variety of research. Certainly the literature shows that attitude surveys, such as CAS, can be used successfully to determine whether or not school computer programs promote positive computer attitudes.

CHAPTER III

Procedure

Sample

One-hundred-seventeen fourth-grade students took part in this study. The students were heterogeneously arranged in self-contained classrooms. Students of all ability levels were included in the sampling group.

The school district consists of one elementary, one middle, and one high school. Students from the elementary school took part in this study. This school has approximately 600 students enrolled in kindergarten through fourth grade. The school is located in a small, rural community in southwestern Ohio with approximately 4,500 residents. The majority of the employed residents work in local, small industries or travel to nearby cities for employment. The average economic status of residents is low to middle income.

The elementary school had been in the process of obtaining computers for each classroom, which had not yet been, but were expected to be, networked within the school and be online with the Internet. At the time this research was conducted, one computer was available for student use in each classroom, as well as 25 in the computer lab. The lab was used by each classroom for a period of 40 minutes a week. During previous summer vacations, the computer lab technician led several two-week sessions of computer classes, available to third and fourth grade students.

Instrument

The questionnaire was constructed using information gathered by reviewing related literature. Content validity was established by adapting the statements from Loyd and Gressard's CAS. Since the CAS was developed to be used with older students and adults, the format and content were changed and adapted to meet the needs of fourth-grade students. Some statements

were reworded to simplify the vocabulary to improve the comprehension. Other statements were reworded from the negative to the positive to make it easier for fourth graders to grasp the meaning. Statements concerning grades, computer courses, and computer language were omitted since these do not apply to the elementary student. A complete list of adaptations is provided in Appendix B.

Survey questions sought information regarding attitudes of **Anxiety**, **Confidence**, and **Liking**. Information about experience, computer availability, gender, and time spent on the computer were included. Students' perceptions of the attitude of their classroom teacher toward the computer was also solicited in order to determine how the students felt about their computer learning environment.

The instrument used was a Likert-type questionnaire with four possible responses: "Strongly Agree," " Agree," " Disagree," and "Strongly Disagree." The "Undecided" response was omitted, forcing choices to be made. To establish content validity, the questionnaire was evaluated by the school computer lab technician. Based on the literature, validity had also been established in previous studies (Loyd and Gressard, 1984b; Kluever et al., 1994; Necessary and Parish, 1996; Busch, 1995; Colley at al., 1994). The instrument was then field tested by 24 third-grade students, after which several statements were rewritten to clarify their meaning.

Data Collection

The questionnaire was administered to all fourth-grade students during one week of the second semester of the 1996-1997 school year. The entire questionnaire took approximately 25 minutes to administer. The researcher administered the questionnaire to each class of fourth graders to provide consistent directions and explanations. The researcher explained that the purpose of the survey was to investigate attitudes of fourth graders toward their own computer

use, as well as their perception of their classroom teacher's use of the computer. The fourth graders were told that their opinions were valuable since they had just completed their first experience using a computer in the classroom for one semester. One-hundred-seventeen fourth graders responded to the survey.

Method of Analysis

Frequencies of each response to each statement in the categories of **Confidence, Anxiety,** and **Liking** were figured. Frequencies to determine the student's perception of the classroom teacher's computer use, and computer experience were also calculated. Frequency of response was determined for the entire sample as well as by gender. Means and standard deviations were also calculated by gender for each of the three categories.

Thirty-five variables were run to determine the correlation coefficients. These correlation coefficients, their corresponding probability, and coefficient of determination were figured for all three categories of attitudes. Correlation analysis was also done on the students' perceptions of their teacher's computer habits. The level of significance used was $p<.01$.

Definition of Terms

Attitude is a term that refers to a positive or negative feeling toward a subject.

Computer anxiety is the anxiety toward or fear of computers which causes one to resist using the computer.

Computer confidence relates to confidence in one's ability to learn to use computers.

Computer liking is the positive feeling toward the computer and its use.

Perception is the understanding and awareness of one's computer knowledge and computer use.

CHAPTER IV

Results

General Descriptive Findings

The subjects in this survey were fourth-grade students. Of the 117 respondents, 63 were male and 54 were female. (See Table 1.) In order to facilitate this discussion, the responses "Strongly Agree" and "Agree" have been combined. The responses "Disagree" and "Strongly Disagree" have also been added together. However, Table 1 shows each response as a separate score. To further facilitate this discussion, the results will be discussed as percentages of all respondents, as well as for males and females separately. Percentages have been rounded to the nearest whole number in the discussion.

When asked questions in the category of **Confidence** using the computer, 52% stated that they knew a lot about working on a computer, and 47% stated they knew a little (Table 1). Less than 1% stated they knew nothing at all. Also, 98% replied that they need little or no help doing the work. Eighty-nine percent believed they are good with the computer. Ninety-five percent stated that they would be willing to try something new on the computer. A great majority of the students, almost 92%, are sure they could do school work on the computer. Almost 96% stated they feel satisfaction after having completed a project on the computer. Only 8% believed that using the computer is difficult. Of all respondents, 89% claimed to have self-confidence when working on the computer.

In the second category, **Anxiety** toward the computer, about 2% replied that computers scare them. (See Table 2.) Ninety-seven percent replied that computers do not scare them. Eight percent agreed that working on a computer made them nervous, while almost 91% did

Table 1

Variables, Frequencies, and Percentages for Computer Confidence* (N=117)

Variables	Responses	Males	Females	Males+ Females	% of N
Gender		63	54	117	100
Know how to work computer	a lot**	38	23	61	51.7
	a little	25	30	55	46.6
	not at all	0	1	1	0.8
Need help on computer	a lot	0	1	1	0.8
	a little	33	42	75	63.6
	not at all	30	11	41	34.7
Am good with computer	Strongly Agree	28	12	40	33.9
	Agree	28	37	65	55.1
	Disagree	7	5	12	10.2
	Strongly Disagree	0	0	0	0
Try something new	Strongly Agree	50	26	76	64.4
	Agree	10	26	36	30.5
	Disagree	3	2	5	4.2
	Strongly Disagree	0	0	0	0
Sure could do school work	Strongly Agree	41	28	69	58.5
	Agree	16	23	39	33.1
	Disagree	4	1	5	4.2
	Strongly Disagree	2	2	4	3.4
Feel satisfaction	Strongly Agree	44	35	79	66.9
	Agree	17	17	34	28.8
	Disagree	2	2	4	1.7
	Strongly Disagree	0	0	0	0
Using computer is hard	Strongly Agree	0	0	0	0
	Agree	6	3	9	7.6
	Disagree	19	25	44	37.3
	Strongly Disagree	38	26	64	54.2
Self-confidence working computer	Strongly Agree	36	16	52	44.1
	Agree	21	32	53	44.9
	Disgree	5	6	11	9.3
	Strongly Disagree	1	0	1	0.8

*Percentages may not total 100% due to rounding.

**The phrase "a lot" was used because it was believed to be easily understood by fourth graders.

Table 2
Variables, Frequencies, and Percentages for Computer Anxiety * (N=117)

Variables	Responses	Males	Females	Males+ Females	% of N
Gender		63	54	117	100
Computers scare me	Strongly Agree	0	0	0	0
	Agree	1	1	2	1.7
	Disagree	3	8	11	9.3
	Strongly Disagree	59	45	104	88.1
Computer makes me nervous	Strongly Agree	0	1	1	0.8
	Agree	5	4	9	7.6
	Disagree	15	20	35	29.7
	Strongly Disagree	43	29	72	61.0
Computer makes me uncomfortable	Strongly Agree	0	0	0	0
	Agree	1	3	4	3.4
	Disagree	11	18	29	24.6
	Strongly Disagree	51	33	84	71.2
Computer makes me uneasy	Strongly Agree	1	0	1	0.8
	Agree	1	5	6	5.1
	Disagree	16	25	41	34.7
	Strongly Disagree	45	24	69	58.5

*Percentages may not total 100% due to rounding.

not perceive themselves to be nervous. Only 3% stated that computers made them feel uncomfortable, while about 96% did not feel uncomfortable. Six percent stated that working on a computer made them feel uneasy and confused, while 93% did not feel uneasy.

In the third category, **Liking**, 87% agreed that using the computer during Math, Science, or Language classes would be helpful. (See Table 3.) Seventy-one percent were not willing to "let go of" a problem before solving it. About 72% replied that they could understand how

Table 3
Variables, Frequencies, and Percentages for Computer Liking* (N=117)

Variables	Responses	Males	Females	Males+ Females	% of N
Gender		63	54	117	100
Use in Math, Science, Language	Strongly Agree	32	24	56	47.5
	Agree	22	25	47	39.8
	Disagree	3	4	7	5.9
	Strongly Disagree	6	1	7	5.9
Cannot solve, so forget problems	Strongly Agree	5	4	9	7.6
	Agree	11	13	24	20.3
	Disagree	20	21	41	34.7
	Strongly Disagree	27	16	43	36.4
Do not understand spending time	Strongly Agree	14	6	20	16.9
	Agree	6	6	12	10.2
	Disagree	10	21	31	26.3
	Strongly Disagree	33	21	54	45.8
Hard to stop working computer	Strongly Agree	37	24	61	51.7
	Agree	15	19	34	28.8
	Disagree	4	8	12	10.2
	Strongly Disagree	7	3	10	8.5
Do little as possible on computer	Strongly Agree	1	1	2	1.7
	Agree	3	6	9	7.6
	Disagree	18	13	31	26.3
	Strongly Disagree	41	34	75	63.6

*Percentages may not total 100% due to rounding.

people spend so much time working on the computer and enjoy it. Almost 81% of the respondents stated that they find it hard to stop working with the computer. Almost 90% disagreed, and only about 9% agreed, when asked if they do as little work as possible on the computer.

In the next section of the questionnaire, the students responded to statements about successful experiences they have had on the computer. (See Table 4.). Ninety-six percent had performed drill-and-practice tasks, 94% had completed simulation games, 90% had printed graphics, 88% had learned some word processing, 81% had had keyboarding instruction, 74% had done an encyclopedia search, and 48% had completed a cut-and-paste task. About 98% stated they had used a computer at home. Very few, 18%, said they ever attended summer computer camp. However, 96% wanted to learn to use the computer. About 60% stated they use the computer weekly, and 33% use it daily.

The last six questions on the survey asked the students about their perception of their classroom teacher's attitude toward computers. (See Table 5.) Ninety-two percent had watched their teacher working on the computer. Eighty-six percent knew their teacher liked using the computer. Seventy-eight percent believed their teacher provided
for adequate time on the computer. Sixty-seven percent said their teacher demonstrated a variety of skills on the computer, but almost half as many, 32%, said their teacher did not demonstrate a variety of skills. Fifty-four percent stated their teacher instructed how to use the computer, while 45% stated their teacher did not instruct how to use the computer. Forty-five percent stated their teacher used the computer to teach various subjects, but an even larger number, 54%, stated their teacher did not use the computer to teach different subjects.

Descriptive Findings Based on Gender

Frequencies of responses by gender are also shown in Tables 1, 2, and 3. Similar results were found for the girls and the boys in that responses chosen by the majority of the girls were

Table 4

Variables, Frequencies, and Percentages for Computer Experience* (N=117)

Variables	Responses	Males	Females	Males+ Females	% of N
Gender		63	54	117	100
Use drill and practice	Yes	60	53	113	95.8
	No	3	1	4	3.4
Use simulation programs	Yes	59	52	111	94.1
	No	4	2	6	5.1
Have printed graphics	Yes	60	46	106	89.9
	No	3	8	11	9.3
Use word processing	Yes	55	49	104	88.1
	No	8	5	13	11.0
Had keyboarding instruction	Yes	52	44	96	81.4
	No	11	10	21	17.8
Use encyclopedia search	Yes	49	38	87	73.7
	No	14	16	30	25.4
Use cut-and-paste	Yes	33	27	60	48.3
	No	30	27	57	50.8
Use a computer at home	Yes	47	33	80	67.8
	No	16	21	37	31.4
Have attended computer camp	two times	2	1	3	2.5
	one time	8	11	19	16.1
	never	53	42	95	80.5
Want to learn computer	a lot**	50	44	94	79.7
	a little	10	9	19	16.1
	not at all	3	1	4	3.4
Use the computer	daily	29	10	39	33.1
	weekly	31	40	71	60.2
	never	3	4	7	5.9

*Percentages may not total 100% due to rounding.

**The phrase "a lot" was used because it was believed to be easily understood by fourth graders.

Table 5

Variables, Frequencies, and Percentages for Perception of Teacher Habits* (N=117)

Variables	Responses	Males	Females	Males+ Females	% of N
Gender		63	54	117	100
Have watched teacher doing work	Yes	60	49	109	92.4
	No	3	5	8	6.8
Can tell that teacher likes computer	Yes	52	50	102	86.4
	No	11	4	15	12.7
Get adequate time on computer	Yes	51	41	92	78.0
	No	12	13	25	21.2
Teacher shows different kinds of work	Yes	37	42	79	66.9
	No	26	12	38	32.2
Teacher teaches how to use	Yes	28	36	64	54.2
	No	35	18	53	44.9
Teacher uses to teach subjects	Yes	33	20	53	44.9
	No	30	34	64	54.2

*Percentages may not total 100% due to rounding.

also chosen by the majority of the boys. For example, both boys and girls selected the "Strongly Agree" response to the statement, "I feel satisfaction after I have completed a project on the computer" (Table 1). However, differences in frequencies of responses were found in the variable, "I am good with computers." The majority of the girls selected the "Agree" response, while the boys were evenly split between "Strongly Agree" and "Agree." Differences in frequencies of responses were also found in the variable, "I would feel OK about trying something new on the computer." The boys overwhelmingly selected the response "Strongly Agree," while the girls were evenly split between "Strongly Agree"

and "Agree." "I have a lot of self-confidence when it comes to working with computers" is another variable where a difference was noted. The majority of boys selected "Strongly Agree," while the majority of girls selected "Agree." As a result, the attitude of boys was found to be more positive than that of the girls.

The next section of the questionnaire asked about tasks the respondents had performed successfully. (See Table 4.) Each response showed the majority of the girls selecting the same response as the majority of the boys. An overwhelming majority of boys and girls responded yes, that they had successfully used drill-and-practice programs, simulation programs, printed graphics, used word processing, had keyboarding instruction, and had performed an encyclopedia search. Cut-and-paste was the only activity which fewer than half of all the respondents had accomplished.

In the last section of the questionnaire, the students responded to statements about their teacher's computer usage. (See Table 5.) Again, the majority of the boys and the majority of the girls usually selected the same response. An overwhelming number of boys and girls stated they had seen the teacher using the classroom computer. Almost an equal number of boys and girls believed their teacher likes the computer. Again, a majority of boys and girls believed they have adequate time on the computer. A smaller majority of boys and girls stated the teacher shows them how to do different kinds of work on the computer. There were only two statements to which they responded differently. More than half of the girls responded "yes," that their teacher instructs the class how to use the computer. More than half of boys responded "no," that their teacher does not instruct how to use it. When asked if their teacher uses the computer to teach different subjects, more than half of the girls responded "no," but the boys' responses were almost evenly divided between "yes" and "no."

In order to compare frequencies of responses from the boys to frequencies of responses from the girls in each category, a Category Score was formulated. Means and standard deviations of each Category Score were calculated for both genders. (See Table 6.) Because each Category Score has a different possible total, comparisons between category results are not appropriate. However, a comparison of the means for both genders shows that the boys scored slightly higher than the girls in each category.

Table 6

Mean Category Scores and Standard Deviations of Attitudes Toward Computers

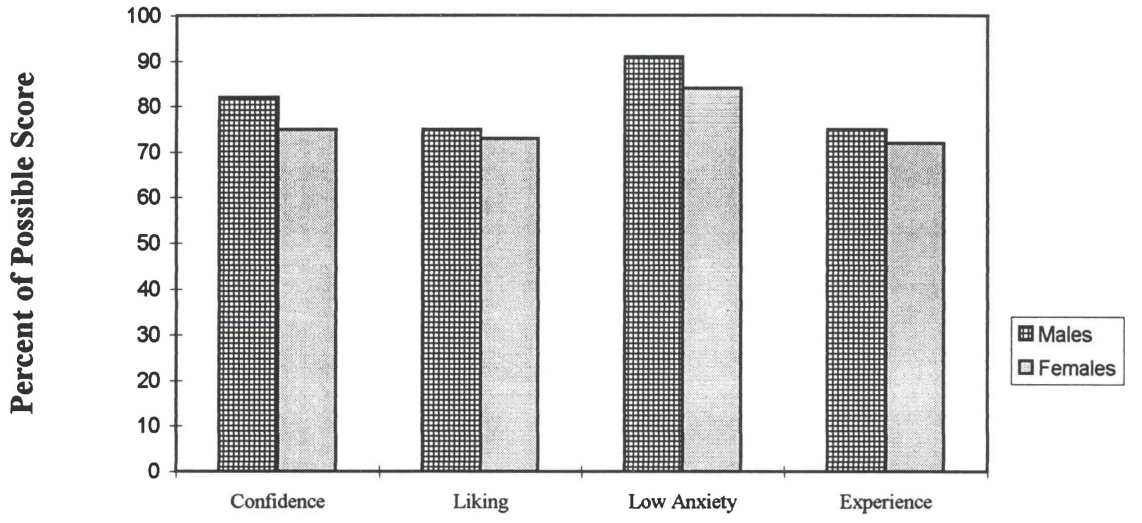
Categories	Males (n=63) Mean (S.D.)	Females (n=54) Mean (S.D.)
Confidence	78.92 (14.30)	71.70 (14.55)
Anxiety*	43.68 (6.11)	40.37 (7.05)
Liking	44.95 (9.47)	43.63 (10.60)

*The higher the number, the lower the anxiety.

The total frequency of responses in each category from the girls was compared to the total frequency of responses from the boys. (See Figure 1.) Because each total category score was different, percentages have been used. Each percentage represents a proportion of the total possible Category Score for the specified category. For example, the mean male **Confidence** Category Score was 82% of the total possible. The total possible for the category **Confidence** was 96; the mean Category Score for males was 78.92, which is 82% of the total possible. In the **Anxiety** and the **Confidence** categories, the gaps between total percentages were equal. (Recall that due to the structure of the **Anxiety** questions, as the score increases, **Anxiety** decreases.) There was a difference of 7 percentage points between the total for the girls and the total for

Figure 1

Frequencies of Response in Each Category



the boys in both of those categories. In the **Liking** category, there is a difference of only 2 percentage points between both genders. Also, there is a difference of 3 percentage points between the totals for Experience. The girls felt more anxiety, had less confidence, and had less liking for the computer than the boys.

Correlation Results

This study began with 35 variables describing a fourth grader's perception of himself/herself with respect to computer use. Correlations were run using all 35 variables. Thirty-one variables showed at least one significant relationship ($p<.01$). (See Table 7.) Only significant relationships are shown on Table 7. Significant relationships are shown within the three categories. (See Appendix C for complete identification of the variables in Tables 7 and 8.)

Table 7

Correlations for Each Category of Perception

		Gender	Comp	Use	Work	Help	Good	New	Sure	Hard	Conf	Satis	Scare	Nervous	Uncomf	Uneasy	MSL	Under
Confidence	Use	-0.2665*	0.4925	1.00	0.3105	0.3097												
		(.004)**	(.000)		(.001)	(.001)												
		.071***	0.243		0.096	0.096												
	Work		0.2481		1.00													
			(.007)															
			0.062															
	Help	-0.2948			0.4871	1.00												
		(.001)			(.000)													
		0.087			0.237													
	Good		0.232	0.3978	0.5754	0.5424	1.00											
			(.012)	(.000)	(.000)	(.000)												
			0.054	0.158	0.331	0.294												
	New	-0.2641			0.2496			1.00										
		(.004)			(.007)													
		0.07			0.062													
	Sure			0.3026	0.3215	0.3275	0.4784		1.00									
				(.001)	(.000)	(.000)	(.000)											
				0.092	0.103	0.107	0.229											
	Hard				0.3334	0.3611	0.4509	0.2513	0.2505	1.00								
					(.000)	(.000)	(.000)	(.006)	(.006)									
					0.111	0.13	0.203	0.063	0.063									
	Conf			0.3419	0.3896	0.375	0.5594	0.3389	0.3823	0.3501	1.00							
				(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)								
				0.117	0.152	0.141	0.313	0.115	0.146	0.123								
	Satis				0.2325		0.2824	0.2636	0.3637		0.3234	1.00						
					(.012)		(.002)	(.004)	(.000)		(.000)							
					0.054		0.08	0.069	0.132		0.105							
Anxiety	Scare						0.2369	0.2791	0.4012	0.2485	0.3952		1.00					
							(.010)	(.002)	(.000)	(.007)	(.000)							
							0.056	0.078	0.161	0.062	0.156							
	Nervous				0.2875	0.2871	0.273	0.3114		0.5456	0.311		0.2595	1.00				
					(.002)	(.002)	(.003)	(.001)		(.000)	(.001)		(.005)					
					0.083	0.082	0.075	0.097		0.298	0.097		0.067					
	Uncomf				0.2783		0.3052	0.3786		0.2623	0.2908		0.2624	0.5296	1.00			
					(.002)		(.001)	(.000)		(.004)	(.001)		(.004)	(.000)				
					0.077		0.093	0.143		0.069	0.085		0.069	0.28				
	Uneasy	-0.2471			0.3313	0.3322	0.4412	0.3542	0.326	0.4521	0.3698		0.3107	0.443	0.4866	1.00		
		(.007)			(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)		(.001)	(.000)	(.000)			
		0.061			0.11	0.11	0.195	0.125	0.106	0.204	0.137		0.097	0.196	0.237			
Liking	MSL								0.3119								1.00	
									(.001)									
									0.097									
	Forget																0.2493	
																	(.007)	
																	0 062	
	Under										0.229		0.2455					1.00
											(.013)		(.008)					
											0.052		0 06					
	Stop										0.3748	0.2346	0.2521					
											(.000)	(.011)	(.006)					
											0.14	0.055	0.064					
	Little								0.267	0.3002					0.3066	0.2778		
									(.004)	(.001)					(.001)	(.002)		
									0.071	0.09					0.094	0.077		

* Correlation Coefficient

** Probability

*** Coefficient of Determination

The variable "gender" showed significant correlation with three variables in the category **Confidence**, and with one in the category **Anxiety**. The relationship between "gender" and "use" (frequency of use) was significant. The negative coefficient says the girls used the computer less frequently than the boys. "Gender" and "help" (need help on computer) also showed a significant relationship. The negative coefficient means girls responded that they needed more help when working on a computer. "Gender" and "new" (willing to try something new) also showed a strong relationship. The negative coefficient says girls were less willing to try something new. In the category of **Anxiety**, "gender" showed a significant relationship with "uneasy" (feel uneasy). The negative coefficient again says girls felt uneasy and confused more than the boys. Within the category of **Confidence**, several correlations were significant. There was a strong relationship between "work" (knowing how to work on the computer) and "good" (perceiving oneself as being good). This correlation was the strongest of all the correlations in the category of **Confidence**. Another strong correlation was found between "good" and "conf" (having a lot of self-confidence). The students who believe themselves to be good with computers also have a lot of self-confidence when it comes to working on the computer. The variables "help" (need help on the computer) and "good" (perceiving oneself as being good) also showed a very strong relationship. The students responding that they need little or no help believed themselves to be good with computers. Another strong relationship was found between "good" and "sure" (sure of being capable to do school work on the computer). These were the significant findings within the category **Confidence**.

Several strong correlations were found in the category **Anxiety**. The variables "hard" (computer is very hard) and "nervous" (computer makes me nervous) showed a strong correlation. A significant finding resulted between the two variables "uncomf" (feel

uncomfortable) and "uneasy" (feel uneasy) showing that students who feel uncomfortable using the computer also feel uneasy and confused. Also, there was a strong correlation between "hard" (using computer is hard) and "uneasy" which could mean that these two variables were measuring the same feeling.

In the **Liking** category, a variable was found to overlap with one in the **Confidence** category. "Stop" (hard to stop) and "conf" (have self-confidence) showed a strong correlation. Students who find it hard to stop working once they get started on the computer also said they have a lot of self-confidence using the computer.

Table 8 shows the significant correlations of the students' perceptions of the classroom teachers' relationship with the computer. The strongest significant correlation was found between the variables "kinds" (teacher shows different kinds of things) and "teacher" (teaches how to use computer). This means that the classroom teacher instructs the students not only how to use the computer, but also how to do different kinds of skills on the computer. However, it could also mean the two variables are measuring the same thing. Another significant correlation resulted between "kinds" (teacher shows different kinds of things) and "like" (teacher likes the computer). This means the teacher who shows different kinds of skills on the computer is perceived to like the computer. A final point to mention is the significant correlation between the variables "teacher" (teaches how to use computer) and "like" (teacher likes the computer), meaning that the classroom teacher who teaches the students how to use the computer also is perceived to like computers.

Discussion of Findings

The fourth-grade students who responded to the questionnaire perceive themselves to be confident computer users. They have low anxiety when working on the computer, and they like

Table 8

Correlations of Perceptions of Students Toward Teacher's Computer Habits

	Gender	Comp	Use	Work	Help	Good	New	Sure	Hard	Conf	Satis	Scare	Nervous	Uncomf	Uneasy	MSL	Under	Wp	Dp	Ency	Key	Graph	Simu	Teacher	Kinds	Tease
Wp								0.3043*				0.2373			0.2474			1.00								
								(.001)**				(.010)			(.007)											
								0.093***				0.056			0.061											
Dp							0.2832												1.00							
							(.002)																			
							0.08																			
Ency		0.2742	0.25	0.2419	0.2887	0.2259		0.3824										0.2907		1.00						
		(.003)	(.007)	(.009)	(.002)	(.014)		(.000)										(.001)								
		0.075	0.063	0.059	0.083	0.051		0.146										0.085								
Cp			0.23		0.2602	0.2375		0.3323		0.3524								0.2539		0.2892	0.2571					
			(.013)		(.005)	(.010)		(.000)		(.000)								(.006)		(.002)	(.005)					
			0.053		0.068	0.056		0.11		0.124								0.064		0.084	0.066					
Graph								0.2895	0.2386				0.2925		0.4028			0.352	0.2617	0.2803		1.00				
								(.002)	(.010)				(.001)		(.000)			(.000)	(.004)	(.002)						
								0.084	0.057				0.086		0.162			0.124	0.068	0.079						
Simu																		0.2877					1.00			
																		(.002)								
																		0.083								
Teacher																	0.2445			0.2914			0.2555	1.00		
																	(.008)			(.001)			(.005)			
																	0.06			0.085			0.065			
Kinds																							0.2525	0.6155	1.00	
																							(.006)	(.000)		
																							0.064	0.379		
Watched												0.2636						0.2275					0.3976		0.318	
												(.004)						(.014)					(.000)		(.000)	
												0.069						0.052					0.158		0.101	
Tease																				0.2591		0.234		0.3452	0.448	1.00
																				(.005)		(.011)		(.000)	(.000)	
																				0.067		0.055		0.119	0.201	
Like																							0.3745	0.37	0.498	0.2976
																							(.000)	(.000)	(.000)	(.001)
																							0.14	0.137	0.248	0.089

* Correlation Coefficient

** Probability

*** Coefficient of Determination

using the computer. Overall scores were very positive. Of the 63 male respondents, the mean Category Score for **Confidence** was 78.92 out of a possible total 96. In the category of **Anxiety**, the mean Category Score was 43.68 out of a total of 48. (The higher the number, the lower the anxiety.) The mean Category Score for **Liking** was 44.95 out of a possible total of 60. Of the 54 girls who responded to the questionnaire, the mean Category Score for **Confidence** was 71.70, the mean Category Score for **Anxiety** was 40.37, and the mean Category Score for **Liking** was 43.63. These results may be due to the fact that these students have had the computers available to them for one semester. They are beginning to develop an attitude toward the computer, and have had positive experiences using it in the classroom. According to Gilman and Brantley (1988), even though their time with the computer was relatively short, they were able to see themselves as competent users. In addition, the environment at the school was a positive one. Staff members had recently participated in training on computer use and integrating programs into the regular curriculum. The experience level of the teachers and the students was fairly uniform. All of these factors helped create a learning-rich environment which contributed to the positive outcome.

The instrument which was used in the present study was based on the CAS developed by Loyd and Gressard (1984b). This instrument was found to be a valid tool by Kluever et al. (1994), Colley et al. (1994), and Kinnear, (1995). The statements in the questionnaire used in the present study were adapted from the statements of the CAS to make the language more appropriate for fourth-grade students.

The results found in the present study were similar to those found by Bear et al. (1987). The results of both studies found that elementary students have positive attitudes toward the computer. Differences between the two studies are that Bear et al. (1987) found positive

relationships between attitudes toward the computer and computer experience. Amount of experience was not considered a factor in the present study since all students had approximately the same length of time in school with a computer and home use was not measured.

CHAPTER V

Summary, Conclusions, and Implications

Summary

The purpose of this research study was to analyze the attitudes of fourth-grade students as they were beginning computer experiences in their classrooms. The questionnaire used was adapted from the CAS developed by Loyd and Gressard (1984b). Results showed that these young people perceive themselves to be capable and confident computer users. It is a common belief that girls are not as willing to work on the computer as boys. According to Kinnear (1995), girls avoided the computer and chose to take part in more social activities, while boys were not hesitant to try new skills and often chose the computer as a free-time activity. However, this researcher found that the female subjects scored almost equally to the male subjects with respect to attitude toward the computer. The girls had only slightly less confidence than the boys, had slightly more anxiety about using the computer than the boys, and had only slightly less liking for the computer than the boys. Correlations were run for all 35 variables which resulted in several significant relationships being found. Significant relationships were found within all three categories of attitudes as well as between categories.

Conclusions

The role a computer will play in the adult lives of today's youth is certainly expanding. Young people of today will find it necessary to be computer literate to be successful in almost any profession. Therefore, today's youth need to be given the instructional curriculum and the opportunity to experience using the computer in a friendly and relaxed educational environment. They need to be given the opportunity to develop a positive attitude toward the computer now, so

that this attitude can continue into their adult lives. Students need to perceive themselves as confident and successful users of computers. Ertmer et al. (1994) stated that if students are to embrace computer technologies, such as word processing, e-mail, and data base systems, they must feel comfortable and confident using them. Elementary school systems have begun implementing computer education programs. To be successful, these programs must provide students the educational opportunities to develop positive attitudes.

Implications

Little is known about attitudes toward computer usage of elementary students. Kinnear (1995) and Bear et al. (1987) stated the studies of young children's attitudes were seldom done. Therefore, research studies similar to this one need to be continued in other elementary grades. Computer experience plays an important role in developing attitudes toward the computer. Colley et al. (1994) found that experience, including using computers at home, affected the attitudes of both males and females. Unlike other research studies, age and experience were factors not thoroughly investigated in the present study. Since all subjects were fourth-grade students, all were nearly the same age. Also, since all subjects who were surveyed had one classroom computer only for one semester, experience levels were very similar and could not be a true factor to be considered in this study. Research suggests that gender also plays a role in the shaping of attitudes. Therefore in further studies, the role gender plays should be investigated. Gender related differences have been noted in studies by Kinnear (1995) and Levin and Gordon (1989). Girls have been stereotyped as having greater anxiety toward the computer than boys. Their experiences with the computer have been less frequent and less positive than those of the boys. This suggests research should continue to pinpoint the cause of this gender difference.

The Likert-type questionnaire was an excellent evaluation and analysis tool for use with fourth graders. It provided an organized structure for surveying the students' attitudes toward the classroom computer. The questionnaire used was very similar to Loyd and Gressard's CAS. The CAS was designed to be used with high school and college students, as well as with teachers. The instrument used in this research study was designed to be used with fourth graders. An obvious difference in the two questionnaires was the language used. This researcher realized the need to alter some of the content of the CAS to make it easily understood by younger computer users. For example, the CAS asked for responses about "computer courses" and "computer language." The instrument used by this researcher asked for responses about doing "school work with the computer." Appendix B shows a comparison of statements from the CAS and from the adapted scale used in the present study. This researcher recommends future studies use this type of questionnaire.

Results from the present research study indicate that teacher attitudes toward the computer and the method of implementing the computer as a learning tool may also affect the attitudes of elementary students. Evans-Andris (1995) concluded that teachers need to be encouraged to integrate the computer into the regular classroom curriculum. Teachers need to know how the amount of time spent on the computer and the quality of activities done on the computer influence their students' feelings toward the computer. If students are to truly choose to use the computer as adults, it is important that educational programs be designed to achieve that goal. To be successful computer users, students must develop and retain a positive attitude. In order to evaluate students' attitudes in the future, it will be important to track the surveyed students from year-to-year. The evaluations should take place at the end of each school year,

after the students have gained more experience using the computer. Results could then be compared to those of previous studies using the same subjects to determine if the attitudes of the students have remained positive. These results could be used to help develop and revise curriculum taught in the classrooms.

If an educational goal for students is to attain a degree of computer literacy which enables them to choose using the computer as a problem-solving tool, then sound educational programs must be developed and implemented. It is important that the proper amount of time using the computer be made available for the student, and that the quality of the curriculum be carefully planned. Students must be encouraged to develop the confidence to use the computer, to develop a liking for the computer, and to have low anxiety while working on the computer.

APPENDIX A

Rate your feelings about using the classroom computer. Circle the response that best describes you and your computer experiences. Please answer as honestly as possible.

1. I am a

   GIRL **BOY**

2. I use a computer at home.

   YES **NO**

3. I have attended computer camp at school in the summer.

   TWO TIMES **ONE TIME** **NEVER**

4. I know how to work on a computer.

   A LOT **A LITTLE** **NOT AT ALL**

5. I need help when working on a computer.

   A LOT **A LITTLE** **NOT AT ALL**

6. I want to learn how to work on a computer.

   A LOT **A LITTLE** **NOT AT ALL**

7. I use the computer

   DAILY **WEEKLY** **NEVER**

8. I am good with computers.

   Strongly Agree **Agree** **Disagree** **Strongly Disagree**

9. I would feel OK about trying something new on the computer.

   Strongly Agree **Agree** **Disagree** **Strongly Disagree**

10. I am sure I could do school work with the computer.

    Strongly Agree **Agree** **Disagree** **Strongly Disagree**

11. I think using a computer is very hard.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

12. I have a lot of self-confidence when it comes to working with computers.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

13. Computers scare me.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

14. Working with a computer makes me nervous.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

15. Computers make me feel uncomfortable.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

16. I feel satisfaction after I have completed a project on the computer.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

17. Computers make me feel uneasy and confused.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

18. I think using the computer during Math, Science, or Language class would help me.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

19. When there is a problem on the computer that I cannot solve right away, I usually forget about it and go on to something else.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

20. I do not understand how some people can spend so much time working on the computer and enjoy it.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

21. Once I start to work on the computer, I find it hard to stop what I am doing.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

22. I will do as little work on the computer as possible.

Strongly Agree **Agree** **Disagree** **Strongly Disagree**

23. Which of the following have you done successfully on the computer?

YES **NO** word processing

YES **NO** drill-and-practice

YES **NO** encyclopedia search

YES **NO** keyboarding instruction

YES **NO** cut and paste

YES **NO** printed graphics

YES **NO** simulation programs

24. My classroom teacher teaches me how to use the computer.

YES **NO**

25. My teacher makes sure I get adequate time to use the computer.

YES **NO**

26. My teacher shows me how to do different kinds of things on the computer.

YES **NO**

27. I have watched my teacher do work on the classroom computer.

YES **NO**

28. My teacher uses the computer to help teach different subjects.

YES **NO**

29. I can tell that my teacher likes computers.

YES **NO**

30. Three words I can use to describe my feelings toward the classroom computer are:

    1.

    2.

    3.

Comparison of Variables on the Computer Attitude Scale and the Adapted Scale

Computer Attitude Scale	Adapted Scale
Confidence	**Confidence**
I am *no* good with computers.	I am good with computers.
Generally, I would feel OK about trying *a new problem on the computer*.	I would feel OK about trying something new on the computer.
I am sure I could do work with computers.	I am sure I could do *school* work with the computer.
I think using a computer *would be very hard for me*.	I think using a computer is very hard.
Anxiety	**Anxiety**
Computers *do not* scare me *at all.*	Computers scare me.
Working with a computer *would make me very nervous.*	Working with a computer makes me nervous.
Liking	**Liking**
When there is a problem with a computer *run* that I can't immediately solve, *I would stick with it until I have the answer*.	When there is a problem on the computer that I cannot solve right away, I usually forget about it and go on to something else.
I don't understand how some people can spend so much time working with computers and *seem* to enjoy it.	I do not understand how some people can spend so much time working on the computer and enjoy it.
Once I start to work with the computer, I *would* find it hard to stop.	Once I start to work on the computer, I find it hard to stop *what I am doing*.

Codes and Variables as on the Adapted Questionnaire

Codes	Questionnaire Variable
gender	I am a girl/boy.
comp	I use a computer at home.
camp	I have attended computer camp at school in the summer.
work	I know how to work on a computer.
help	I need help when working on a computer.
want	I want to learn how to work on a computer.
use	I use the computer.
good	I am good with computers.
new	I would feel OK about trying something new on the computer.
sure	I am sure I could do school work with the computer.
hard	I think using the computer is very hard.
conf	I have a lot of self-confidence when it comes to working with computers.
scare	Computers scare me.
nervous	Working with a computer makes me nervous.
uncomf	Computers make me feel uncomfortable.
satis	I feel satisfaction after I have completed a project on the computer.
uneasy	Computers make me feel uneasy and confused.
MSL	I think using the computer during Math, Science, or Language class would help me.
forget	When there is a problem on the computer that I cannot solve right away, I usually forget about it and go on to something else.
under	I do not understand how some people can spend so much time working on the computer and enjoy it.
stop	Once I start to work on the computer, I find it hard to stop what I am doing.

Codes and Variables as on the Adapted Questionnaire (cont.)

little	I will do as little work on the computer as possible.
wp	word processing
dp	drill-and-practice
ency	encyclopedia search
key	keyboarding instruction
cp	cut-and-paste
graph	printed graphics
simu	simulation program
teacher	My classroom teacher teaches me how to use the computer.
time	My teacher makes sure I get adequate time to use the computer.
kinds	My teacher shows me how to do different kinds of things on the computer.
watched	I have watched my teacher do work on the classroom computer.
tease	My teacher uses the computer to help teach different subjects.
like	I can tell that my teacher likes computers.

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