Attitudes of secondary teachers regarding

the instructional use of computers

by

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1. INTRODUCTION

The growth of computers has been astonishing over the last thirty years. Especially after 1979, roughly when microcomputers became popular (German, 1987-88), our society has experienced a technological revolution which is changing the way we communicate, the way we process information, even the way we entertain ourselves (Manarino-Lettett and Cotton, 1985). In a rather short time span, microcomputers became accessible in a wide variety of situations where previously cost and size would have prohibited their usage.

With computers being used in almost every facet of life, educators are challenged to recognize the need for computer education as well as the potential of computers to improve educational quality through innovative teaching. Actually the idea of computer literacy for the student population emerged as early as in 1972, when the report of the Conference Board of the Mathematical Sciences recommended computer classes to be taught in junior high schools (Colin, 1984). Computer courses have been featured in the curriculum of many schools for a considerable period of time but undoubtedly the coming of the microcomputer has accelerated the adoption of computers as an instructional tool by a great number of schools. Surveys in public schools revealed that an estimated total of about 52,000 microcomputers were available in the nation's public school system in Fall 1980 (Goor, Melmed, and Farris,

1982), while the number for 1985 was over a million (Becker, 1986a), and by 1990 this number is projected to be three million (Educational Turnkey Systems, Inc., 1985).

The expansion of computers within the educational system is unquestionably dramatic; however, a close examination still raises concerns about the availability of computers for instructional use by all teachers, the distribution of computers between the different areas of the school curriculum, as well as the attitudes of the teachers about the use of computers. Recent research supports these concerns. Schools have been found to lack sufficient number of computers, or computers were not available for instructional use (Office of Technology Assessment (OTA), 1988). Significant differences have been found in the use of computers among the different subject areas: computers were used the most in math and sciences, while computer use in social sciences was rather minimal (Becker, 1986b; Ehman and Glenn, 1987). Finally, the successful implementation of computers in the classrooms has been shown to depend greatly on the way teachers feel and perceive computers (Koohang, 1987).

The purpose of this study is to investigate the differences between secondary teachers teaching in the social sciences on availability, use, and attitudes toward computers. In particular this study will focus on three areas of the social sciences where similarities on the implementation of computers are anticipated: home economics, social studies, and health studies. Information gained from the analysis of results may be useful to secondary school program planners and curriculum specialists.

Objectives

1. To investigate the differences between home economics, social studies, and health secondary school teachers on availability, use, and attitudes toward computers.

2. To assess the relationship between the attitudes of home economics, social studies, and health secondary school teachers toward Computer Assisted Instruction (CAI), and their age, gender, school size, highest degree earned, and their computer related experience.

Definitions

Computer: A device that can perform computations, including arithmetic and logic operations, without intervention by human beings (Orta, 1984).

CAI: Computer Assisted Instruction is instruction which is assisted or aided through the use of computers or microcomputers (Harrod and Ruggles, 1983).

Microcomputer: A small, low-cost computer, containing at least one microprocessor and providing a user-oriented software option.

Social Sciences: The discipline consisting of areas of study related to the human condition. Includes the subject areas of health, history, social studies, home economics, sociology, psychology, and others.

Limitation

The results of this study can be generalized only to secondary school teachers teaching in the social sciences in the state of Iowa, and the findings cannot be extended to other states and programs.

Assumptions

1. Every participant will answer the questionnaire truthfully.

2. Every participant will interpret the questionnaire items correctly.

CHAPTER 2. REVIEW OF LITERATURE

As the number of computers in United States schools increased almost exponentially in the 1980s, interest increased concerning the ways computers are being used in education. Most computer-related educational studies focused on the effectiveness of computers as an instructional tool, the availability of computers in the schools, as well as the attitudes of students and teachers toward computers.

The results of studies on the use and availability of computers to educators were often contradictory. In addition, most of the studies focused heavily on specific subject areas, while research on other areas was rather limited. For example, mathematics and science received a large share of the research studies on computers in education, whereas, little has been reported for the social sciences. The main purpose of this study is to assess the availability and use of computers for social sciences teachers as well as to assess their attitudes towards the use of computers in classrooms. Literature to support the study was reviewed in the following areas:

1. Availability and use of computers

2. Application of microcomputers in education

3. Computer literacy of teachers

4. Teachers' attitudes toward computers

Availability and Use of Computers by Teachers

Surveys of public schools during the last decade give the following statistics on the availability and growth of microcomputers in American schools:

1. During fall 1980, a total of 52,000 computers were available for instructional use in the nation's public school system (Goor et al., 1982), while the number for 1984 was approximately 325,000 (Grayson, 1984).

2. Between spring 1983 and spring 1985, three-quarters of the schools that had never before used computers started doing so. The proportion of elementary schools with five or more computers jumped from 7% to 54%, while the proportion of secondary schools with 15 or more computers jumped from 10% to 56% (Becker, 1986a).

3. During the 1984-1985 school year, approximately 15 million students and 500,000 teachers used computers as a part of their school's instructional program.

4. During spring 1985, almost all secondary schools and five-sixths of the elementary schools in the United States had begun to use computers in their instructional program (Becker, 1986a).

5. During spring 1985, 90% of the U.S. school children attended schools that had at least one computer (Becker, 1986c).

6. From 1980 to 1988 U.S. schools have acquired nearly 2 million computers and while in 1981 one school in five had a computer, now all but 5% have at least one computer (Des Moines Register, 1988).

Even though computers are becoming widely available in schools, the number of computers per school is still small. Also computers may be available but are not being used to facilitate instruction in schools. Usually they become the personal possession of a relatively small number of staff and students (Colin, 1984). It is also found that the majority of teachers with access to computers use them rarely, and when they use them it is for demonstration or motivation purposes only (German, 1987-1988).

The Office of Technology Assessment (OTA), a nonpartisan agency that advises Congress on technological matters, reports that in the United States only half of the country's teachers have found ways to exploit the enormous potential of computers. OTA (1988) concludes that a number of information technologists point out that if business organizations used computers at the same rate as the schools, they would still use quill pens instead of electronic word processors. However, another recent study (McCoy and Haggard, 1989), which was conducted to investigate computer use by educators, indicates that 75% of the respondents reported intensive, regular, or occasional use of computer. Only 25% of the respondents reported little or no interaction with computers.

Even though researchers do not agree on the extent of the use of computers, most seem to agree that the time available to each student to work with a computer is very limited. Only seven percent of high schools and three percent of middle schools were able to provide 30 minutes computer time per week for each student during spring 1985 (Becker, 1986a).

The access and usage of computers is greatly dependent on the various subject areas that teachers teach in schools. Many times the priority is given to areas in which

computers seem to be more necessary than others, with priority given to mathematics, sciences, language arts, and business. In a study by Dickey and Kherlopian (1987), 75% of mathematics teachers reported having access to computers while only 45% of them actually used them. The corresponding percentages for science teachers were 62% and 41%, respectively.

Computer applications in social sciences seem to have lagged compared to progress in other content areas. According to Becker (1986b) only 1% of computer use in grades K-3 was for social studies, 4% in grades 4-8, and 1% in grades 9-12. Other studies agree that there is very little reported use of computers in social studies classrooms (Ross, 1988; Ehman and Glenn, 1987; Schug, 1988) or for any of the other content areas included in the social sciences.

Computer availability and usage is also low in home economics classes. In research conducted in Wisconsin in 1987, no computers were available for 37% of the home economics teachers and only 5% had seven or more computers available (Petrich, 1987). From those who had access to computers, not many were using them and few anticipated future usage. In a more recent study, Longstreth, Kelly, and Paris (1989) found that 58% of home economics teachers reported having access to computers, while only 26% actually use them for instructional purposes. No information was available in the literature about the access and use of computers for health teachers.

In particular for the state of Iowa, a report of the Research Institute for Studies in Education (RISE, 1983) revealed that only 20% of teachers used computers for classroom management tasks. Two-thirds reported that there were no computers in their classrooms for instructional purposes. In another study, home economics

teachers in Iowa reported that 40% did not have any computers available, even though the sample was chosen on the criterion of access to computers (Bouyer, 1982).

Application of Computers in Education

Computer applications in education have proven useful in many areas such as in administrative, managerial, and instructional tasks. Computers can aid teachers in a variety of teacher tasks. There are teacher grade books which keep student records and perform a variety of time-consuming operations, such as averaging, weighting scores and so forth. Other applications include: managing banks of test items, preparing posters, crossword puzzles and other visuals, and word processing. But the most important contribution that the computer can make to education in general is its potential to improve instruction (Hartman, 1981). The use of computers as a means to provide instruction to students is Computer Assisted Instruction.

Computer Assisted Instruction (CAI) is defined in general as the instruction which is assisted or aided through the use of computer (Harrod and Ruggles, 1983). Modes of CAI presently utilized include drill and practice, tutorial, simulation, problem solving, gaming, demonstration, and mini-programming (Orta, 1984; Rupe, 1986). In particular the above modes are described as:

Drill and Practice: the programs help students to remember and use information they have been previously taught. Often used to reinforce regular classroom instruction.

Tutorial: programs are usually associated with learning objectives at higher levels than drill-and-practice materials. The goal is to teach new concepts, to evaluate

them, and to allow practice of the skills being taught.

Simulation: programs test out ideas when a given environment is developed. Usually used when learning basic concepts and principles. The student interacts and becomes a part of the simulation.

Problem-solving: the students apply already learned skills, which in turn help them to develop new problem-solving skills.

Gaming: programs are games designed to help teach or reinforce an instructional objective. Good games require physical and mental involvement of the student.

Demonstration: programs used to help explain a new concept through visual presentation.

Mini-programming: programs help teachers develop their own programs, usually simple programs such as puzzles or word searches (Riedesel and Clements, 1985; Rupe, 1986).

There have been numerous studies which investigate the use and effectiveness of CAI. According to Becker (1986a), across all school levels, about one-third of computer instructional time directed to students is for CAI. CAI can be used with students of all ages and all ability levels, ranging from mentally retarded to the gifted, but evidently CAI is used in elementary, junior high, and senior high levels (Rupe, 1986). In general it has been found that well designed CAI will

- improve learning or be as effective when compared to traditional instruction (Riedesel and Clements, 1985; Kulik, 1983)

- increase success regardless of the type of computer or different modes of CAI (drill and practice, etc.) used (Riedesel and Clements, 1985)

- speed up learning when compared to conventional methods (Senter, 1981; Tanner and Armstrong, 1983)

- stimulate student's interest in learning (Kee, 1981)

- enhance student alertness during learning and encourage questioning behavior in students (White, 1983).

In the area of home economics, Faircloth, Clawson, and Codwin (1986) found that CAI is an effective method for teaching consumer credit courses to a diverse high school student audience. In the area of social studies, teachers tend to use mostly software tutorials and drills to deliver or reinforce factual knowledge. Computer-based simulation was also found in social studies classrooms (White, 1988). No information was found in literature about health teachers use of CAI.

Computer Literacy of Teachers

Even though computers proved to be a valuable instructional tool, studies show that educators are reluctant to use them widely in their classrooms. Reluctance to use computers might come from the fact that teachers do not have easy access to computers. However, studies showed that even when teachers have access to computers they would probably still not use them (OTA, 1988; Dickey and Kherlopian, 1987; Longstreth et al., 1989). Low use of computers is also partly based on educator's fears of losing authority in their class as well as an attitude of some teachers

that computers will dehumanize the student-teacher relationship (Bouyer, 1982). It is also found that even when teachers have positive attitudes toward the use of computers, they would still avoid using computers because they do not feel competent to teach with them (Steven, 1980). The lack of teachers' training and their unfamiliarity with techniques to incorporate computers in the classroom were very often identified as reasons for the reluctance of computer use (CONDUIT, 1978; Colin, 1984; Pantiel and Petersen, 1984). A vast majority of teachers (90%) agreed that they need training in computers (ULLETIN, 1986).

The training of teachers in all subject areas for using computers effectively is one of the largest but most essential barriers to achieving the full extent of computers as an instructional tool (Colin, 1984). Teachers need to be computer literate before they decide to incorporate computers in their programs.

O'Donnel defines computer literacy as "an awareness and understanding of the computer, its role in society, and its impact in education" (1982, p. 491). Colin (1984), however, puts emphasis on the distinction between computer awareness and computer literacy. In computer awareness more attention is given to the fact that teachers have to be aware of the extent to which computers are a part of our lives and our society. According to Colin, computer literacy includes a study of the history of computers, how computers work, what they can do, where to use them and how to use them. Becker (1982) adds that computer literacy for teachers includes experience in using microcomputers for text preparation, test scoring, ability to write BASIC language programs, as well as the ability to teach programming to students.

Such a level of literacy can be achieved only if teachers have personal and hands-on experience with computers. Resources to help teachers become computer literate

are increasingly available. Most universities offer courses which fit the need of teachers with different interests and abilities in instruction (Milner, 1980). It has even been suggested that each school can use its own computer experts to teach other teachers about computers. In addition computer magazines are being published in abundance. Large sections of educational magazines, especially during the 1980s, were dedicated to the computer literacy concept. A plethora of good books is also available.

Even though computer literacy is limited among the teaching profession, it seems that in general teachers of sciences and mathematics feel more comfortable with the use of computer (Colin, 1984). Lately more and more emphasis on teacher computer literacy is being given to the areas of social sciences. For social studies and home economics there is an increase in the effort of teachers to implement computers in their topics. No information was found in the literature specific to the training of health teachers.

Teacher's Attitudes Toward Computers

Computers cannot be successfully implemented into the classroom unless teachers have positive feelings toward them. Many studies have shown that negative attitudes of teachers have been one of the greatest resisting forces for the adoption of computers in classrooms (Berg, 1983; Bouyer, 1982). A person's attitude toward computers depends greatly upon his or her knowledge and ability to work with the computer effectively (Koohang, 1987). Based on this idea, Wright and Stone (1983) found that teachers' attitudes progress through four stages. The first stage is the stage of ignorance and it is characterized by fear and wonder, known as "computerphobia." Teachers fear computers because they cannot understand them. They

fear not being the experts in their classrooms, they fear embarrassing themselves in front of their students, and they fear that their authority is lessened (Information Technologies in Education, 1989). The second stage is dominated by feelings of helplessness. Teachers may have some contact with computers, but not enough to make them feel qualified and ready to experiment. In the third stage, a feeling of autonomy develops as teachers obtain more knowledge and skills. Last, in the fourth stage, teachers have overcome the initial problems and start thinking about how to use computers more effectively for their educational purposes; hence, this stage is called the enhancement of creativity stage.

A survey by Wright and Stone (1983) revealed that 66% of the teachers felt unprepared and almost half of them felt insecure and frustrated when they were thinking of using computers in their classrooms. Some teachers said that they dislike computers because they believe that computers will dehumanize education and lead to a further erosion of basic skills (Riedesel and Clements, 1985). For some teachers with poor mathematical background, computers are an impossible dream, because teachers view computers as a purely mathematical tool, while for others the "complication of the machine" brings them anxiety and consequently negative feelings. Further research, however, suggested that teachers relieved those feelings when they had some exposure to computer operations (Davis and Davis, 1983).

Recent studies point out that teachers' attitudes towards computers are changing and becoming more positive. In a 1985 study Manarino-Lettett and Cotton (1985) found that 90% of the teachers, teaching in all school levels and subject areas, viewed computers as a useful tool for the teaching learning process. Over three-fourths of the teachers surveyed agreed that computers provide advantages for instruction and

less than one-third felt frustrated when using them.

According to Becker (1986b), computer-using teachers were excited about the possibilities of using computers, and they reported significant outcomes occurring in four areas: student motivation, student cooperation and independence, opportunities for high ability students to be engaged in programing activities, and enhancement of other higher-order thinking and writing skills. Other studies also agree with Becker (Glenn, 1988). Teachers, teaching grades four to six, showed very positive feelings toward CAI and they said they enjoy working with students on computers. None of them felt that using computers was time consuming and they reported that they especially enjoy the fact that students were working at their own pace. According to a report of Information Technologies in Education (1989) it is also clear that most teachers view technology in their classroom positively, because they want to develop professionally and to do their job better. Also they want their students to be prepared for our future high-technology oriented world.

Factors other than computer literacy that affect teachers attitudes toward computers are gender, age, and educational background. Studies report that females tend to show a greater degree of anxiety toward the use of computers (Koohang, 1987; Popovich et al., 1987). However, Morris (1988-89) claims that the attitudes of teachers do not relate to gender but instead to years of education and age. According to Morris, older people tend to have less formal education. People with better educational background (more years of education) had more favorable opinions about technology and computer integration in schools.

CHAPTER 3.   METHOD OF PROCEDURE

The major purpose of this investigation was to assess attitudes of social sciences secondary teachers toward computers and their use as an instructional tool. The specific objectives of the study were:

1. to determine the differences between home economics, social studies, and health secondary teachers on availability, use, and attitudes toward CAI.

2. to determine the relationship among the attitudes of home economics, social studies, and health secondary teachers, and their age, gender, size of school, highest degree earned, and computer related experience.

Development of Data Collecting Instrument

To obtain the necessary data to accomplish the objectives of this study a mailed questionnaire format was chosen. This format seemed the most efficient method to obtain the information needed for this study. Previously developed instruments of similar studies were reviewed and evaluated (Ellsworth and Bowman, 1982; Loyd and Gressard, 1984). Upon inspection it was concluded that already existing questionnaires could not be used, because they did not fit exactly the objectives of the study. So it was necessary to develop a new questionnaire. The questionnaire developed consisted of three major parts:

1. Demographic information

2. Attitudinal scale

3. Open-ended questions

Demographic information was designed to identify personal characteristics of the teachers and contained fourteen items. Four items were to assess information about sex, race, age, and grade or subject taught. Three items were to describe education (i.e., highest degree earned and degree's major and minor). Two items pertained to information about the size of school and classes, and two other items referred to the availability and use of computers (i.e., how many computers were available to the teacher for use and how many hours he/she was actually using them). Finally, three items asked the teacher's level of involvement with computers and their knowledge about them.

The second part of the questionnaire was developed to assess the attitudes of teachers toward computers. The five-point Likert-type scale was used. Likert-type scale is a technique widely accepted for attitude measurements (Simonson, 1979). Nineteen items were written and teachers were asked to indicate how much they agreed or disagreed with each of the statements. The scale ranged from "strongly disagree" (coded as 1) to "strongly agree" (coded as 5). Sixteen items were designed to describe the following three types of attitudes: a) anxiety or fear of using computers b) liking or enjoying working with computers and c) confidence in ability to use computers. Three of the items (items 15, 22, and 23) were taken directly from Ahl's questionnaire (Ellsworth and Bowman, 1982), and two others (items 20 and 21) were modifications of items from the same questionnaire. One item (item 28) was taken

from a questionnaire reported by Loyd and Gressard (1984). The rest of the items were developed by the investigator to meet the specific objectives of the study.

The third part of the questionnaire was composed of three open-ended questions. These open-ended questions assessed information about the kind of software teachers use at school, the amount of money spent for software in their budget, and their perceived needs related to software development.

The first draft of the questionnaire was reviewed by three education and evaluation experts to verify that the instrument appeared to measure what it was intended to measure. The questionnaire was also reviewed by five graduate students at Iowa State University for usability. From their suggestions, revisions were made to increase content validity, and usability (Appendix A).

Administering the Pilot Test

The questionnaire was pilot tested during November, 1989, with seven participants who met the same criteria as the final sample but who were not included in the final sample. Two of the participants were social studies teachers, two health teachers, and three home economics teachers. Both clarity of the items and length of time needed to answer the questionnaire were examined. Results indicated that respondents felt no difficulty in interpreting the items and that the questionnaire could be completed in less than fifteen minutes. Because there were no problems, the instrument was judged ready for administration.

Sampling Plan

For this study a list of all home economics, social studies, and health secondary school teachers in the state of Iowa for the academic year 1988-1989, totaling a number of 2412 teachers (737 home economics, 1206 social studies, and 469 health), was obtained from the State Department of Education. A total of 201 teachers was determined as adequate for the sample with 67 teachers randomly selected from each group.

A stratified sampling was chosen as a method to select the 67 teachers of each group. The same procedure was followed for each group: For each subject area group, teachers names and addresses were listed in zip code order. Using a table of random numbers, a random starting number (different for each group) was chosen as a reference point. Then based on the total number of teachers in each group a name was selected at specified intervals (7 for health teachers, 11 for home economics, and 18 for social studies) until 67 names were selected in each group.

Human Subjects Committee Review

The Iowa State University Committee on the Use of Human Subjects in Research reviewed the procedures and questionnaire used in this study and concluded that there were no risks for the participants, and that the rights and welfare of participants were adequately protected by the confidentiality of data which was assured by written consent (Appendix B).

Data Collection

Data for this study were collected by mailed questionnaire during December 1989 and January 1990. The questionnaires were mailed to the sample on December 8, 1989. The questionnaires were mailed in a self-addressed, postage-paid booklet form for easier response. A cover letter (Appendix C) was included in the second page of the booklet explaining the purpose of the study, requesting participation, and assuring confidentiality of responses. Follow-up postcards (Appendix D) were sent to nonrespondents two weeks after the questionnaires were mailed. Eight weeks were allowed for data collection. The number of returned questionnaires was 99 out of the 201 sent (49.3 percent response rate).

Data Analysis

The completed questionnaires were coded in a manner suitable for statistical analysis. Descriptive statistics, including frequency distributions and percentages were computed first. These statistics were used mainly for analyzing demographic data and open ended questions. Means and standard deviations were computed for items relating to the number of children in school and classes and the money spent for computer software. A reliability coefficient to estimate internal consistency was computed for the three attitudinal subscales (computer anxiety, computer liking, and computer confidence). Inferential statistics, including analysis of variance were used to examine difference by subject area and relationships among demographic variables.

Multiple regression procedures were utilized for predicting relationships of a set of independent variables to each dependent variable of computer anxiety, computer

liking, and computer confidence. The independent variables were age, gender, number of students at school, computer use in relation to work, computer use not related to work, computer knowledge, computer availability, and use of computers by students. Stepwise analysis was chosen to identify the subset of available independent variables that will yield an optimal regression equation with a few terms as possible.

CHAPTER 4. FINDINGS AND DISCUSSION

The purpose of the investigator in this study was to assess and to compare the attitudes of social sciences teachers who teach home economics, health, and social studies at secondary school level. Relationships between teacher attitudes and the independent variables of age, educational level, gender, school size, computer related experience as well as teacher access and use of computers was investigated.

The data collecting instrument consisted of 36 items and was divided into three sections:

1. Demographic information (14 items)

2. Attitudinal scale (19 items)

3. Open-ended questions (3 items)

The instrument was developed to meet the needs of this particular study. Demographic information was necessary to assess the general characteristics of the sample. The attitudinal scale was designed to reveal the attitudes of teachers toward microcomputers. The last three open-ended questions give responses for teachers' most used software, the money spent for software, and teachers' specific needs for educational software development.

Mailed questionnaires were returned from 99 teachers (49.3% of the invited sample) and all of these provided usable data. Results from the analysis of data will be discussed in three sections:

1. General characteristics of teachers

2. Determinants of the attitudes toward computers

3. Software use and needs

General Characteristics of Teachers

In the first part of the questionnaire, teachers were asked to report general information about themselves. This information comprises the independent variables for this study. More specifically, the independent variables for the study were the personal and professional characteristics of the teachers (i.e., age, gender, educational level, etc.), as well as their access and use of microcomputers in their classrooms and their knowledge about computers. Specific data for each independent variable are given below.

Number of teachers in each group

Even though the invited sample consisted of three groups of teachers (social studies, home economics, and health teachers), only 80% reported teaching one of these subject areas for the present school year. This must be due to the fact that the sample was chosen on the basis of a previous year state-wide school list. From the group of 80 social science respondents, 29 (36%) were home economics teachers, 19 (24%) were health teachers, and 32 (40%) were social studies teachers. So, for some

Table 4.1:   Gender of teachers

Group	Male	Female	Total
Home economics	0	29	29
Health	9	10	19
Social studies	25	7	32
Total	34	46	80

of the statistical procedures where the distinction between the groups is important, a total number of 80 (n=80) is used, as opposed to the descriptive statistics where the entire set of respondents (n=99) was used.

Gender

Fifty-five out of ninety-nine respondents (55.6%) were females. Because the sample was chosen using a stratified random sampling method without regard to gender of the sample, the response is quite satisfactory. However as shown in Table 4.1, the distribution of gender between home economics, health, and social studies teachers is uneven. All home economics teachers were female. Health teachers were approximately half males and half females, and the majority of social studies teachers (78%) were males.

Age

Seventy percent of the respondents were between 30 and 49 years old. Examination of Table 4.2 reveals that the largest age group is in the range of 40 to 49 years (39.4%). The second largest group are teachers with ages ranging from 30 to 39 (30.3%). About 16% of the respondents were over 50 years old, while 11.1% were

Table 4.2:   Age of teachers

Age range	Number	Valid percent
20-29	11	11.45
30-39	30	31.25
40-49	39	40.62
50-59	12	12.50
over 59	4	4.16
missing	3	
Total	96	100.00

from age 20 to 29. Three people did not report their age.

Educational level

Findings revealed that most of the teachers' (69.7%) highest education level was a bachelor's degree and the rest (30.3%) hold a master's degree. There were no teachers with specialist's or doctorate degrees.

Use of computers on a personal level (not work related)

Table 4.3 shows that 55.6% of the teachers had no or little involvement with computers on a personal level, while the corresponding number for those with much or a great deal of involvement is 22.2%.

Use of computers on a professional level

Table 4.4 shows that 39.4% of the teachers did not use computers at all in relation to their work, or they use them very little. About a quarter of the respondents use computers much or a great deal and one-third use them somewhat.

Table 4.3: Use of computers on a personal level

Involvement	Number	Valid percent
None	26	26.5
Little	29	29.5
Somewhat	21	21.4
Much	19	19.3
Great deal	3	3.0
Missing	1	
Total	98	100.0

Table 4.4: Use of computers on a professional level

Involvement	Number	Percent
None	13	13.1
Little	26	26.3
Somewhat	33	33.3
Much	12	12.1
Great deal	15	15.2
Total	99	100.0

Table 4.5: Number of computers available for instruction

Number of computers	Number	Valid percent
None	15	16.5
1	17	18.7
2 - 9	17	18.7
10 - 19	15	16.5
20 - 29	17	18.7
more than 30	10	11.0
missing	8	
Total	99	100.0

Number of computers available

Table 4.5 reveals that 16.5% of the teachers did not have available any computer for instructional use while another 18.7% had just one computer available. About one-third of the respondents had 10 to 29 computers available to them. Only 11% of the teachers had more than 30 computers readily available for instructional uses.

Computer usage by students

From Table 4.6 it is clear that the students of 59% of the surveyed teachers did not use computers at all in their class. The students of 20.4% of the responding teachers spent approximately one hour per month using a school owned computer, while the proportion dropped to 16.2% for the students who used a school owned computer for two up to ten hours per month. Only 4.3% of the teachers reported that their students used computers more than 11 hours per month. However, data on Table 4.7 reveal that a major portion of home economics teachers (62%) reported that their students use computers in their classroom on an average of 1.6 hours per month.

Table 4.6: Hours of classroom computer usage by student per month

Hours	Number	Valid percent
0	55	59.1
1	19	20.4
2 - 10	15	16.2
11 - 20	4	4.3
missing	6	
Total	99	100.0

Table 4.7: Reported student classroom use of computers in hours per month for teachers who do use computers in their classroom

Group	Mean	Standard deviation
Home economics (n=18)	1.61	0.98
Health (n=9)	1.78	1.09
Social studies (n=7)	3.29	1.11

A smaller proportion of health teachers (47%) reported student computer usage of an average of 1.78 hours per month. Social studies reported the least proportion of teachers using computers for instruction (22%) but their usage time was much higher (3.29 hours per month).

Size of school

Table 4.8 shows that a quarter of the teachers are teaching in schools with up to 200 students, while 41.5% of the respondents are teaching in schools of 200 up to 600 students. Another 21.3% are teaching in schools of more than 600 and up to 1000

Table 4.8:   School size by enrollment

Student enrollment	Number	Valid percent
36 - 100	5	5.32
101 - 200	19	20.2
201 - 400	20	21.3
401 - 600	19	20.2
601 - 800	14	14.9
801 - 1000	6	6.4
1001 - 2000	11	11.7
missing	5	
Total	99	100.0

students and only 11.7% are teaching at schools with more than 1000 students.

Class size

The respondents were asked to give the number of students in the smallest, the average, and the largest class they are teaching. Data analysis showed that the mean for the smallest class was $\bar{x} = 13$ with a standard deviation of 6.2 while the mean for the average class was $\bar{x} = 18.7$ with a standard deviation of 5.5, and the largest class had a mean of $\bar{x} = 23.8$ and a standard deviation of 6.1.

Computer knowledge

Teachers gave their estimate of how knowledgeable they feel about computers in comparison to the other teachers in their schools. Results are reported in Table 4.9. It is clear that the largest proportion of respondents (37.8%) felt that they had the same knowledge about computers as the other teachers in their school, while 35.7% felt that they had less or much less knowledge compared to other teachers. Only 26.5%

Table 4.9:   Relative knowledge of computers
when compared to colleagues

Relative knowledge	Number	Valid percent
Much less	7	7.1
Less	28	28.6
Same	37	37.8
More	20	20.4
Much more	6	6.1
Missing	1	
Total	99	100.0

of the respondents felt that they had more or much more knowledge of computers when compared to their colleagues.

Determinants of Attitudes Toward Computers

The surveyed teachers responded to nineteen items on the questionnaire (items 15 to 33) designed to assess their attitudes toward computers. Responses were recorded on a five-point Likert-type scale ranging from strongly disagree (coded as 1) to strongly agree (coded as 5). The teachers' responses to each item (i.e., agree or disagree, etc.) gave a measure of their attitudes about computers. For a total score over the nineteen attitudinal items, negatively oriented items (items 15, 16, 18, 23, 27, 28, 30, and 31) were reverse coded, so that all items had a higher score to represent the most positive attitude.

A total score on the attitudinal assessment was computed by summing the responses over the nineteen items. Scores ranged from 41 to 91 with a mean of 66.6 and a mode of 67. The theoretical minimum was 19 (number of items times the lowest

Table 4.10: Most positive and most negative responses

Item	Mean score
Most negative	
15. A computer may someday take my job	1.303
33. I have multiple copies for all students of the software that I use	2.043
24. Using a computer could be very hard for me	2.112
18. Computers cause frustration in my classes	2.275
16. Computers are complicated to use	2.505
23. Computers isolate people by preventing normal social interaction among users	2.704
Most positive	
26. I find working with computers enjoyable and stimulating	3.511
30. Scheduling time for computer usage is a problem for me	3.694
19. Computers will enhance the teaching-learning process	3.869
22. Computers will improve education	3.929
21. Computers are a tool, just like a film projector or a pencil	4.194
20. I cannot escape the influence of computers	4.206

possible response) and the maximum was 95. The average item response for all items was 3.504 with a standard deviation of 0.50 indicating that teachers were somewhat positive in their attitudes toward computers. Further examination of the attitudinal statements indicated that 10 of the items had a mean above 3.0 and only two had a mean greater than 4. Just one item had a mean less than 2 (strongly negative). A more detailed list of the items with the most negative to most positive responses (prior to recoding negatively oriented items) is given in Table 4.10.

To view the responses of the items on the attitudinal scale from a different perspective, sixteen of the nineteen items were regrouped in the following three subscales: a) anxiety or fear of computers (items 15, 18, 23, and 28); b) liking or enjoying work-

Table 4.11: Subscale statistics for anxiety, liking, and confidence

Subscale	Average item score	Standard deviation	Reliability
Anxiety[a]			
Items 15,18,23,28	3.85	0.50	0.31
Liking			
Items 17,19,20,21,22,26,27,29	3.64	0.64	0.79
Confidence			
Items 16,24,25,31	3.30	0.71	0.56

[a]As anxiety score increases, the amount of anxiety perceived decreases, that is higher numeric values reflect more positive attitudes toward this scale.

ing with computers (items 17, 19, 20, 21, 22, 26, 27, and 29); and c) confidence in ability to use computers as an instructional tool (items 16, 24, 25, and 31). For a complete description of numbered items refer to Appendix A. The means and standard deviations of the subscale scores are presented in Table 4.11.

Table 4.11 shows that the average item scores for the subscales anxiety, liking, and confidence were 3.85, 3.64, and 3.30 respectively. These scores do not suggest strong positive or negative attitudes. However, a score of 3.85 for the anxiety test could be interpreted as an indication that teachers do not feel anxious or fear the use of computers. In a similar fashion a score of 3.64 for the liking subscale is a mild indicator that teachers have somewhat positive feelings for the use of computers in their schools. Finally, a mean of 3.30 (which is close to the undecided category) for the confidence subscale, does not support any significant confidence on the part of teachers when using or implementing computers in their classrooms.

Reliability

Reliability is one of the most important assessments of measurement devices. According to Gronlund (1985), reliability:

- provides the consistency that makes validity possible, and

- indicates how much confidence we can place in our results.

The Cronbach's alpha coefficient of internal consistency for the three subscales (anxiety, liking, and confidence) were calculated. It was found that for the anxiety subscale which consisted of four items, alpha was $\alpha = 0.31$. According to Ary (1986) a reliability coefficient in the range of 0.30 to 0.50 can be acceptable if the results are to be used for making a decision about a group or research purposes. The reliability for the liking subscale (8 items) was $\alpha = 0.79$ and for the confidence subscale (4 items) $\alpha = 0.56$.

Differences on availability, use, and attitudes toward computers

One-way analysis of variance was performed to determine whether significant differences in availability, use, and attitudes toward computers exist between home economics, health, and social studies teachers. The one-way analysis was performed on a sample of 80 teachers. It was found that there was a small but not significant tendency for the attitudes of teachers to differ between each group. After the Duncan multiple range post hoc test was used, it was found that a significant difference did exist in attitudes toward computers between home economics and social studies teacher groups, at the 0.05 level of significance (Table 4.12). Home economics teachers had more positive attitudes toward computers as compared to social studies teachers.

Table 4.12: One way analysis of variance

	Attitude		Use		Availability	
F-ratio	2.52		0.12		0.21	
Groups	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Home econ.	64.62[a]	8.08	0.67	0.83	13.15	18.96
Health	61.11	11.85	0.84	1.17	10.33	11.26
Social st.	59.34	8.52	0.74	1.48	13.03	15.30

[a]Home economics teachers differed significantly from social studies teachers at the 0.05 significance level.

No significant differences were found between home economics, social studies, and health teachers on the number of computers available for use in schools. In addition no differences were found between subject areas taught and the number of hours that students use computers in those classrooms.

Multiple regression

Stepwise multiple regression procedures were applied to predict the relationship of a set of independent variables and the dependent variables of computer anxiety, computer liking, and computer confidence. The independent variables were age, gender, number of students at school, computer use in relation to work, computer use not related to work, computer knowledge, computer availability, and use of computers by students. Table 4.13 shows which inpependent variables are included in the regression equations for each dependent variable. The three dependent variables, computer anxiety, computer liking, and computer confidence had adjusted R^2 values of 0.20 or greater and will be discussed below.

One variable, computer knowledge, entered the equation for computer anxiety.

This variable accounted for 20% of the variance on the anxiety subscale. The anxiety subscale was coded so that a higher numeric score indicates a more positive (therefore less anxious) attitude. Computer knowledge had a positive beta weight (0.449) in the equation indicating that as teachers are more computer knowledgeable, they are also more positive in their attitudes toward the anxiety subscale.

The equation for computer liking contained the variables of gender and computer use in relation to work. The beta weights were positive for both variables. For gender, this indicates that females were more likely to enjoy working with computers as compared to males (being female was positively associated with attitudes). For the computer use in relation to work, the positive beta weight suggests that teachers who use computers in their work tend to like computers better.

Four variables explained 59% of the variability in the confidence that teachers feel in their ability to use computers. Computer use related to work, computer use not related to work, and gender had positive beta weights. This suggests that those who use computers, whether for work-related or personal use, have more confidence compared to those who do not use computers. Females are more likely to feel more confident using computers as compared to males. The negative relationship of school size with confidence indicates that as the number of students enrolled in school increases, the confidence of teachers to use computers in their classes decreases.

Software Use and Needs

The last three open-ended questions of the questionnaire referred to software most often used, money spend on software, and particular needs for software development. Reviewing the responses, it was evident that when grouped in categories, the

Table 4.13: Results of stepwise multiple regressions

Dependent variable	Independent variable	Beta	Mult. R	Adjusted R^2
Anxiety	Computer knowledge	0.499	0.449	0.201
Liking	Computer use - work related	0.484		
	Gender	0.245	0.561	0.315
Confidence	Computer use - work related	0.482		
	Student enrollment	-0.201		
	Gender	0.219		
	Computer use - not work related	0.276	0.770	0.593

most used software were word processing programs, grading programs, and spreadsheet packages. Many different versions of software for different subject areas were used with the most frequent (14 times reported) being software for nutrition. Also a number of software game programs were reported. The money teachers spent for software per year is reported on Table 4.14.

From Table 4.14 it is concluded that the majority (82%) of teachers do not

Table 4.14: Money spent for software in
one year

Value (in dollars)	Number	Percent
0	81	81.8
1 - 50	4	4.0
51 - 100	6	6.1
101 - 200	5	5.1
201 - 500	2	2.0
Total	99	100.0

spend any money to buy software. Only 2.0% of the teachers reported amounts of $200 or more per year. It is interesting to note that only 17% of the teachers reported spending any money to purchase software.

Responding to the needs for software development, teachers most frequently pointed out the need for simpler and less expensive software. Also they reported the need of computer courses for educating teachers, as well as reliable previews for the plethora of software available. A number of teachers asked for social studies specialized software, while three of the teachers asked for computer overhead projectors (large screen display for whole class use). It should be noted, however, that the majority of the teachers (55.6%) did not answer the question.

CHAPTER 5. SUMMARY AND RECOMMENDATIONS

The purpose of the investigator for this study was to assess the attitudes of social sciences secondary school teachers in the state of Iowa towards computers. More specifically the objectives were as follows:

1. To investigate the differences between home economics, social studies, and health secondary school teachers on availability, use, and attitudes toward computers.

2. To assess the relationship between the attitudes of home economics, social studies, and health secondary school teachers toward Computer Assisted Instruction (CAI), and their age, gender, school size, highest degree earned, and their computer related use and experience.

The subjects for the study were selected from the lists of social studies, home economics, and health teachers teaching in secondary schools in Iowa for the academic year 1988-1989. The invited sample was determined by using a stratified random sampling method for each teacher group. This sample consisted of 201 teachers, with 67 teachers from each group.

A review of existing attitudinal surveys did not provide an instrument which could be adopted for this survey, hence, a new questionnaire was developed. However, a few items from previous questionnaires were included in the development of the

questionnaire, either unchanged or with appropriate modifications. Additional items were developed by the investigator and the final questionnaire was divided into three parts:

1. Demographic information

2. Attitudinal scale

3. Open-ended questions

The demographic information section consisted of 14 items, the attitudinal scale consisted of 19 items, and the third part had 3 open-ended questions. For the attitudinal scale a five-point Likert-type response mode was used to rate the level of agreement or disagreement with each of the statements included in the section. Sixteen of the items were subgrouped in three attitude subscales: a) computer anxiety b) computer liking and c) computer confidence.

The questionnaire was reviewed by education and evaluation experts for content validity and reliability. A pilot test was conducted in November, 1989, to insure usability. The sample of 7 teachers for the pilot test met the same criteria as the final sample, but they were not included in the final sample. After some final revisions, the questionnaire was mailed to 201 teachers. Ninety-nine questionnaires were returned and were used for the data analysis.

The data were analyzed using descriptive statistics, one-way analysis of variance, and regression. Data analysis is summarized in three sections:

1. General characteristics of teachers

2. Determinants of the attitudes toward computers

3. Software use and needs

Examination of the general characteristics of teachers revealed that there was a balanced response from males and females with 11% more females in the sample. Seventy percent of the respondents were between 30 and 49 years old. The majority (70%) reported their highest educational level obtained as a bachelor's degree and the remainder had a master's degree. Twenty-six percent of the respondents were teaching in schools with less than 200 children, while 41.5% were teaching in schools with 200 to 600 students. The average of the smallest, average, and largest class the respondents taught was 13, 19, and 24 students, respectively.

In relation to computer use, availability, and knowledge, the data analysis suggested that:

- The majority of the respondents (56%) had little or no involvement with computers on a personal level, whereas 22% had much or a great deal of involvement.

- Computer usage in relation to their work was much higher compared to computer usage on a personal level. Sixty-one percent of the surveyed teachers reported using computers somewhat, much, or a great deal for their work while the corresponding number for personal use was 43%.

- The majority of the respondents (65%) had more than one computer for instructional use. However, 59% of the teachers reported that they do not use computers at all and 20% use computers about one hour per month for instructional purposes.

- A greater proportion of home economics teachers report using computers with their students than health and social studies teachers. However, for teachers

who do use computers in their classrooms, the computer usage time per month for social studies students was three times as long as the time per month for home economics students.

Even though 99 teachers responded to the survey, 80 of them reported that they were teaching home economics, health or social studies during the time they responded to the questionnaire. Out of this group of 80 teachers, 29 were home economics teachers, 19 were health teachers, and 32 were social studies teachers. Hence, for the one-way analysis of variance $n = 80$ has been used, while for the descriptive statistics, regression and attitudinal scale analysis the total group of respondents $(n = 99)$ was used.

For the second part of the questionnaire (nineteen items), the attitude scale, an item analysis and reliability test were performed. The estimated reliability for the three attitude subscales of computer anxiety, liking and confidence, were, respectively, 0.31, 0.79, and 0.56. An examination of the total scores for the attitudinal statements revealed that the average item response was $\bar{x} = 3.504$, which indicates that the teachers held somewhat positive attitudes towards computers. More detailed examination of the item responses indicated that teachers do not feel anxious or fear computers; rather, they like using computers, but they do not show significant confidence to use computers in their classrooms. From the two most positive responses it is clear that computers are widely accepted as instructional tools and that teachers strongly believe that eventually they cannot escape the influence of computers.

Instructional software products are more available to teachers of required academic subjects such as mathematics, language arts, science and social studies and less available to teachers of elective subjects such as health and home economics.

Therefore, it is believed that teachers in elective subjects might be less involved and less positive about instructional use of computers in their classrooms. The results of this study do not support this belief. Home economics teachers' attitudes towards CAI were found to be significantly more positive when compared to the attitudes of social studies teachers. In addition, teacher's specialty had no effect on the availability and use of computers. Perhaps the popularity of nutrition software reported in this study contributes to the greater computer use by home economics and health teachers.

Females were found to be more likely to enjoy working with computers and to be more confident in their ability to use computers in their classrooms. Teachers who use computers in their work tend to enjoy and feel more confident with working with computers. Teachers who use computers for personal use are also found to be more confident in using computers in class. School size was negatively correlated with the confidence teachers feel about computers. Teachers' age seemed to have no effect on attitudes, use, and availability of computers.

The majority of teachers (81%) do not spend any money for buying software for instructional purposes from their budgeted instructional funds. Teachers mostly reported using word processors, grading, and spreadsheet software. Software for nutritional applications as well as games were also popular. Only 45% of the respondents mentioned their computer needs. Their responses point out the need for simpler and less expensive software as well as specialized computer courses for educators.

Recommendations

Based on the findings of the statistical analysis performed on the collected data, the following recommendations can me made:

- Results show that although the attitudes of teachers toward computers have positive trends, item means were close to the undecided or indifferent mark, which does not show strong support on the part of teachers for implementation of computers in their classrooms. Based on this fact, further research must be done to explore the barriers that keep teachers from having a more positive attitude toward computer assisted instruction.

- Results indicated that teachers do not feel confident to use computers in their classrooms. In addition they asked for computer courses to enhance their computer knowledge. Therefore the design and implementation of special short computer courses that familiarize teachers with computers and educational software could be very helpful in making teachers feel more confident in applying computers in their classwork.

- The present study focused on the differences in the attitudes, use, and availability of computers between home economics, social studies, and health teachers. As a supplement or an extension of this study, it is recommended that further research needs to investigate the specific ways that these three groups of teachers implement computers in their classrooms. For example, social studies teachers appeared to use computers in their classrooms differently from home economics teachers. Because home economics teachers are more apt to use computers but

use them for less time per month than social studies teachers, computer-assisted instructional episodes in these subject areas should be examined.

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APPENDIX A. DATA COLLECTING INSTRUMENT

To provide demographic data of the survey respondents, please indicate the most appropriate answer to the following questions to describe yourself at this time.

1. I am a _____ male, _____ female.

2. I am _____ white, _____ african-american, _____ other.

3. Birth year 19_____.

4. I teach _____ (grades and subjects).

5. My highest educational degree is

   _____ BA or BS   _____ Specialist

   _____ Masters   _____ Doctorate

6. My college major field was _____.

7. My college minor field was _____.

8. My involvement with computers on a personal level (not work related) is

   _____ None, _____ Little, _____ Somewhat, _____ Much, _____ A Great Deal.

9. My involvement with computers on a professional level (work related) is

   _____ None, _____ Little, _____ Somewhat, _____ Much, _____ A Great Deal.

10. In my school, _____ (number of) microcomputers are readily available to me for instructional use.

11. My students spend approximately _____ hours per month using a school owned computer under my instruction.

12. The school where I teach has _____ (number of) students.

13. The number of students per class that I teach is

    _____ smallest class, _____ largest class, _____ average class

14. Compared to other teachers at my school, my knowledge of computers as an instructional tool is

    _____ much less _____ less than _____about the _____ more than _____much more
          than most   most   same   most   than most

Indicate how much you agree or disagree with each statement by circling the appropriate number.

KEY: 1-Strongly Disagree
      2-Disagree
      3-Undecided
      4-Agree
      5-Strongly Agree

		SD	D	U	A	SA
15.	A computer may someday take my job	1	2	3	4	5
16.	Computers are complicated to use	1	2	3	4	5
17.	Computers are valuable teaching tools for me	1	2	3	4	5
18.	Computers cause frustration in my classes	1	2	3	4	5
19.	Computers will enhance the teaching-learning process	1	2	3	4	5
20.	I cannot escape the influence of computers	1	2	3	4	5
21.	Computers are a tool, just like a film projector or a pencil	1	2	3	4	5
22.	Computers will improve education	1	2	3	4	5
23.	Computers isolate people by preventing normal social interactions among users	1	2	3	4	5
24.	Using a computer would be very hard for me	1	2	3	4	5
25.	I have a lot of self-confidence when it comes to working with computers	1	2	3	4	5
26.	I find working with computers enjoyable and stimulating	1	2	3	4	5
27.	The challenge of solving problems with computers does NOT appeal to me	1	2	3	4	5
28.	Computers make me feel nervous and uncomfortable	1	2	3	4	5
29.	Computers should be used in all subject areas	1	2	3	4	5
30.	Scheduling time for computer usage is a problem for me	1	2	3	4	5
31.	I am uncertain about integrating computer technology with my teaching methods	1	2	3	4	5

	SD	D	U	A	SA
32. Most teachers at my school do NOT want to take the time to learn how to use the computer	1	2	3	4	5
33. I have multiple copies for all students of the software that I use	1	2	3	4	5

Please answer briefly the following questions (if applicable).

34. List up to five software products you use the most.

35. Approximately how much of your classroom budget (in dollars) do you spend yearly for software purchase?

36. List specific needs for software development not available today.

APPENDIX B. HUMAN SUBJECTS APPROVAL FORM

INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH
IOWA STATE UNIVERSITY
(Please follow the accompanying Instructions for completing this form.)
55

1. Title of project (please type): Attitudes of Secondary Teachers Regarding

    the Instructional Use of Computers

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

    Chryssoula Drizou T.   10/2/1989
    Typed Named of Principal Investigator   Date   Signature of Principal Investigator

    167-G University Village   296-7654   (Call Dr. Housafus
    Campus Address   Campus Telephone   4-5207   )

3. Signatures of others (if any)   Date   Relationship to Principal Investigator

    _____   10/2/1989   Major Professor

    _____   _____   _____

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

    ☐ Medical clearance necessary before subjects can participate
    ☐ Samples (blood, tissue, etc.) from subjects
    ☐ Administration of substances (foods, drugs, etc.) to subjects
    ☐ Physical exercise or conditioning for subjects·
    ☐ Deception of subjects
    ☐ Subjects under 14 years of age and(or) ☐ Subjects 14-17 years of age
    ☐ Subjects in institutions
    ☐ Research must be approved by another institution or agency

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5. ATTACH an example of the material to be used to obtain Informed consent and CHECK which type will be used.

    ☐ Signed informed consent will be obtained.
    ☒ Modified informed consent will be obtained.

                                                    Month Day Year
6. Anticipated date on which subjects will be first contacted: 10   15   1989

    Anticipated date for last contact with subjects: 12   15   1989

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and(or) identifiers will be removed from completed survey instruments:

                                                    Month Day Year

8. _____   Date   Department or Administrative Unit

                                      10/2/89   FCSEd.

9. Decision of the University Committee on the Use of Human Subjects in Research:

    ☒ Project Approved   ☐ Project not approved   ☐ No action required

    George G. Karas   10/5/89
    Name of Committee Chairperson   Date   Signature of Committee Chairperson

APPENDIX C.   LETTER TO PARTICIPANTS

Iowa State University *of Science and Technology* Ames, Iowa 50011-1120

Department of Family
& Consumer Sciences Education
219 MacKay Hall
Telephone: (515) 294-6444

November 8, 1989

Dear Educator,

We are currently conducting a study about the attitudes of secondary
teachers regarding the instructional use of computers. We are pleased
to write to you and ask for your help in obtaining the needed
information on attitudes of secondary educators about computers.
Results of this study will provide information for teacher educators to
develop appropriate strategies for more effective computer use in
secondary level classrooms.

You have been selected to participate in this study because you were a
secondary teacher teaching in a social sciences subject area in the
state of Iowa during the 1988-1989 school year. This questionnaire
should take you less than 15 minutes to complete, and we hope that you
will take the time to help us with this study. Select the response that
best expresses your feeling or your current status. Your response will
remain confidential. We realize that your time is valuable, and we are
grateful to you for your willingness to participate in this study.

Please staple the completed questionnaire and return it to us by
December 8, 1989.

Sincerely,

Cheryl Hausafus   Chryssoula Drizou
Assistant Professor   Graduate Assistant
Family and Consumer   Family and Consumer
Sciences Education   Sciences Education

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APPENDIX D. FOLLOW-UP CARD

December 14, 1989

Have you returned the completed questionnaire of the "Attitudes of Secondary Teachers Regarding the Instructional Use of Computers?" Your response is needed in order to complete our study. Results will provide information to help teachers develop appropriate strategies for more effective computer use in secondary level classrooms.

Because we need your response to complete our study, we are again asking you to return the completed questionnaire. If you did not receive the questionnaire earlier or need to receive another copy please call or write us.

Cheryl Hausafus   Chryssoula Drizou
Assistant Professor   Graduate Assistant

Family and Consumer Sciences Education
Iowa State University, Ames, Iowa 50011
Phone: (515) 294-5307

ACKNOWLEDGMENTS