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A Survey of Computer Anxiety Among Secondary English Teachers in St. Johns County

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A Survey of Computer Anxiety Among
Secondary English Teachers in St. Johns County

by

Michael J. Mullan

A thesis submitted to the
Department of Education in partial
fulfillment of the requirements
for the degree of
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# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>2</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>1 Introduction</td>
<td>3</td>
</tr>
<tr>
<td>2 Review of the Literature</td>
<td>9</td>
</tr>
<tr>
<td>3 Procedures</td>
<td>28</td>
</tr>
<tr>
<td>4 Conclusions</td>
<td>31</td>
</tr>
<tr>
<td>5 Summaries</td>
<td>40</td>
</tr>
<tr>
<td>References</td>
<td>44</td>
</tr>
<tr>
<td>Appendix A</td>
<td>47</td>
</tr>
<tr>
<td>Appendix B</td>
<td>48</td>
</tr>
<tr>
<td>Appendix C</td>
<td>49</td>
</tr>
</tbody>
</table>
A Survey of Computer Anxiety Among Secondary English Teachers in St. Johns County

Abstract

As a result, in part, of computer anxiety, many educators are not utilizing available computer technology, even though its innovations extend to the classroom. Forty-four secondary English teachers from St. Johns County, Florida were given the Computer Attitude Rating Survey (CARS) along with a follow-up questionnaire, to identify anxiety levels and possible correlations with gender, education level, computer experience, and in-service training for this sample. Results indicate that men have less computer anxiety than women, that computer experience and in-service training decrease anxiety, and that Masters degree students have lower anxiety scores than do Baccalaureate degree students. These findings mirror earlier results, and provide directional data for decreasing the computer anxiety of future educators.
A Survey of Computer Anxiety Among Secondary English Teachers in St. Johns County

Chapter One

Many educators would argue that computer usage in the secondary English classroom has not reached its zenith, partly because teachers have not fully accepted the computer as central to their educational lifestyles. Although 2.5 million computers are in the classroom, only fifteen percent of all teachers use them (Bruder, 1989). If the secondary English teachers in St. Johns County, Florida are similar to other teachers with respect to computer anxiety, they need to bridge the gap between the potential that computers offer to the educator and the level of their actual use in the classroom.

The St. Johns County School District has offered only two independent summer in-service computer courses during the two year period from June, 1988 to June, 1990. To be effective, computer instruction must include both recognition of teacher needs, attitudes, and abilities, and an agenda which motivates teachers to utilize the computer. Computer instruction through in-service instruction is one way to increase the use of computers in the classroom.

Recent research (Bellando & Winer, 1985; Bruder,
1989) indicates that computer usage in education is embarrassingly low, with only 15% of teachers using computers to their full potential. In light of this fact it is imperative that research examine teacher attitudes, to determine how variables such as age, gender, and prior computer experience correlate with attitudes toward computer use. An important link in this computer-oriented system resides with teachers. Researchers can draw upon the results of teacher attitude tests in order to predict which teachers will not tend to use computers and to explain why they resist this opportunity. Once researchers identify these patterns, a modification program can begin with a curriculum designed to overcome teachers' computer anxiety so that a new, positive set of computer behaviors is established.

Correlational studies, analyzing relationships between computer anxiety and selected independent variables, coupled with in-service training, are needed to discover ways to access the mind of the teacher (Bitter, 1989; Bruder, 1989). The literature discusses teacher reluctance to accept the computer in the classroom, but now researchers must concentrate on understanding the sources of that reluctance. This project investigates computer attitudes of English
teachers in St. Johns County Schools, to ascertain if these attitudes are consistent with previous research on teacher attitudes or whether they have changed with the evolution of educational computer technology.

Continued research is critical, since limited data on computer attitudes is available. Relatively speaking, computer technology in schools is still in its infancy, so if educators are to develop with this technology it is imperative that they understand teacher attitudes impeding its use. Neglecting the classroom teacher’s attitude at this point during the computer infusion could be a mistake for educators. Existing research on teacher attitudes toward computers has already signaled a trend similar to that of women with anxiety over mathematics. However, if researchers can see this tendency or other similar patterns before they affect teachers who contemplate using computers in the classroom, then the research will be worthwhile.

In this study, the Computer Anxiety Rating Survey (CARS), developed by Jo B. Brooke of the University of Florida, and an accompanying questionnaire were administered to forty-four secondary English teachers in St. Johns County to establish relationships between computer anxiety and various independent variables--age, sex, computer experience, and intentions of taking
in-service computer work. The results will be used to identify areas of concern for future research.
Definition of Terms

Anxiety - Although no consensus exits, the most common definition comes from Spielberger (1966) who defines it as being of two types: a personality characteristic (trait anxiety) and a transitory emotional state (state anxiety).

Trait anxiety - Spielberger (1966) describes trait anxiety as "a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening, and to respond to these with A-state reactions disproportionately in intensity to the magnitude of the objective danger" (p. 17).

State anxiety - Again, a commonly used definition by Spielberger, who defines state anxiety as "subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system" (p. 16-17).

Computer anxiety - Maurer and Simonson (1984) describe computer anxiety as "the fear and apprehension felt by an individual when considering the implications of utilizing computer technology, or when actually using computer technology... the fear of interaction with the computer, even though the computer possesses no
immediate or real threat" (p. 2). Brooke (1989) characterizes computer anxiety as "the tendency to experience unresolved apprehension or fear when anticipating interaction with a computer, as well as the tendency to experience exaggerated feelings of disorientation and uncertainty when interacting with a computer" (p. 12).

Computer - A general purpose machine with applications limited only by the creativity of the humans who use it; its power is derived from its speed, accuracy, and memory (Mandel, 1983).

Software - The operating programs used to direct the computer for problem solving and overseeing operations (Mandel, 1983).
Chapter Two

This review of the literature will suggest that computer technology is available for use in schools; however, educators have faced resistance in implementing such resources as part of classroom instruction. Although technology might be available, if a teacher hesitates to utilize this potential, its promise will not be fulfilled. Various trends in research analyze a number of variables, such as age, gender, previous computer experience, and personality type, to understand which variables affect the attitude of the teacher. This review examines studies that investigate teachers' attitudes about computers and discusses the concepts involved in the field.

Computer anxiety is perhaps the most prevalent concept addressed by this research. Researchers must understand computer anxiety to grasp teacher attitudes toward computers. Although experts do not agree upon an exact definition of computer anxiety, a review of journals, papers and textbooks discuss its existence (Gressard & Loyd, 1984; Cambre & Cook, 1984). Yet, even without consensus among researchers, this concept is critical to understanding attitudes of teachers who still have not accepted the computer as central to their
teaching style. Cambre & Cook (1984) use Epstein's (1972) definition of anxiety as a "state of diffuse arousal following the perception of threat, or alternatively, as unresolved fears." Epstein believed anxiety had three basic conditions: primary overstimulation--being overwhelmed with stimulation to an unbearable level of tolerance, cognitive incongruity--involving a discrepancy between what one believes and reality, and response unavailability--where the object producing the arousal is unknown.

Cambre & Cook identify two types of anxiety. The first type is "trait" anxiety, which is a stable, permanent personality characteristic. The second type is "state" anxiety, which is a transitory condition that fluctuates over time and treatment. Researchers generally agree that the concept of computer anxiety fits into the category of "state" anxiety rather than "trait" anxiety. A Likert Scale format applied by Cambre & Cook obtained the measurement of these characteristics by dividing responses into three to five categories on an agree-disagree response form.

Maurer & Simonson (1984) used trait and state anxiety in analyzing computer anxiety among students enrolled in an undergraduate instructional media class at Iowa State University. They developed a Computer
Anxiety Index (CAIN) to measure the trait of computer anxiety and its predictivity for the presence of "state" anxiety. This data was also used to assess instrument validity and reliability. The three goals of the researchers were to develop a general measure of computer anxiety, gather information on test reliability and validity of the instrument, and gather data to be used as norm references for the test. Like Cambre & Cook, Maurer & Simonson analyzed results with a Likert Scale. They followed four steps to insure validity of the Computer Anxiety Index (CAIN):

1. The CAIN was administered two weeks before the students' lab experience;
2. The State-Trait Anxiety Index (STAI) was administered after they were seated in front of their computer;
3. Observation of subjects took place while the students were using computers;
4. The final observation procedure was designed to compare the results of the three independent measures of Computer Anxiety.

The Computer Anxiety Index revealed valid and reliable results for measuring computer anxiety. A group tested and retested three weeks later had a reliability coefficient of .90 (r=.90). Application of Cronbach's
coefficient Alpha method for testing internal consistency resulted in a coefficient Alpha of .94 (r=.94).

Jones (1985) further investigated computer anxiety to see if a significant relationship existed between computer experience and computer anxiety. Standardized measures of computer anxiety and computer knowledge were administered to 21 graduate students in instructional technology and to 22 graduate students in education. These students were also given the Meyers-Briggs Type Indicator to assess the relationship of personality type to computer anxiety and to knowledge.

This descriptive study employed a multi-group pre-post design to answer the following questions:
1. As a result of exposure to computers, are there reductions in computer anxiety scores?
2. Is the level of computer knowledge related to computer anxiety scores?
3. Does the amount of computer exposure relate to computer anxiety scores?
4. Is personality type related to anxiety and to gains in computer knowledge?

Results show that continuous exposure and hands-on practice reduced computer anxiety scores and increased computer literacy scores. These results are consistent
with other correlational research that analyzed the relationship of the dependent variable, computer anxiety, with a variety of independent variables which effect computer anxiety (Koohang, 1987; Gressard & Loyd, 1984).

Gressard and Loyd (1985) examined teachers’ computer attitudes in relation to age and participation in a computer-related staff development program. The staff development program provided teachers with a brief history of computers, informed teachers about the uses of computers in education, gave teachers an introduction to computer terminology, computer processing, and the computer language, BASIC, and provided teachers with hands-on experience with microcomputers. The subjects of the study were 41 elementary, junior-high, and high-school teachers from three school districts in Virginia. All subjects were female, and had no previous computer experience.

The Computer Attitude Scale (Gressard & Loyd), which provided scores on three subscales--computer anxiety, computer confidence, and computer liking, measured computer attitudes. The procedures for administering this instrument varied for each of the three districts. One district implemented the staff development program over a ten-week period, with the
instrument being administered twice, once at the beginning and once at the end. The other two districts decided on a concentrated weekend format, with the instrument being administered only once. One district was tested before the program, while the other district was tested after the weekend program.

Gressard and Loyd concluded that computer anxiety was significantly affected by experience, but not by age; computer confidence was significantly affected by experience only; and computer liking was affected by experience only. In all subscales an increase in experience resulted in decreased anxiety, while increasing confidence and liking. Teachers enjoyed working with computers significantly more after the program than they did before their experience. According to Gressard and Loyd, the results of this study suggest that a staff development program can be very successful in improving teachers' attitudes toward computers and that age is not a contributing factor in computer attitudes of teachers.

Other studies analyzed teachers' attitudes using the Computer Attitude Scale (Gressard and Loyd, 1984) but looked at different contributing factors which might affect computer attitudes. Abler and Sedlacek (1987) studied computer orientation by "Holland type" (which
categorizes personality types into six domains—Investigative, Realistic, Artistic, Social, Enterprising, and Conventional) and sex. They analyzed the relationship between these types and computer attitudes.

Abler and Sedlacek’s study of computer orientation used a sample of 289 incoming freshmen (44% men and 56% women) at an eastern university. This group completed the Computer Attitude Scale (CAS). As with previous studies, the three subscales—computer anxiety, computer confidence, and computer liking—were the dependent variables. Sample items on the subscale include: "Working with computers make me very nervous" (Computer Anxiety); "I’m sure I could learn a computer language" (Computer Confidence); "Figuring out a computer problem does not appeal to me" (Computer Liking).

The results of the Abler and Sedlacek study suggest that men are significantly less anxious than women with regard to computer use; men are significantly more confident than women in using computers; and men like computers significantly more than women. In all dimensions—computer anxiety, computer confidence, and computer liking—Realistic and Investigative students expressed more positive computer attitudes than did Enterprising and Artistic students. According to
Holland, Realistic and Investigative students like to work with mechanical equipment and function better with things than with people, while Enterprising and Artistic students prefer people oriented tasks.

Other researchers have analyzed Holland type and have discovered similar results (Bellando & Winer, 1985). An analysis of Holland Types on 59 undergraduate students enrolled in an Introductory Psychology class at Texas Tech University revealed that Artistic and Social types reported a significantly higher amount of computer anxiety compared to the remaining four types. There were no significant differences among the other four types. The findings suggest that there is some validity to classifying people by Holland Types to determine levels of computer anxiety. Reasons for teacher apprehension include lack of teacher training, lack of teacher experience with computer related materials, and computer anxiety on the part of the teacher. The researchers were aware of the inappropriateness of generalizing these results because of the size and selection of the population studied.

Koohang (1987) studied gender, computer experience, and nature of computer experience as factors influencing computer attitudes, and like other researchers, he also used the Gressard and Loyd Computer Attitude Scale
(CAS). This study measured attitudes toward computers among 60 college students who were being trained to be teachers. Of concern was the relationship of gender, computer experience, and nature of computer experience to each computer subscale—computer anxiety, computer confidence, and computer liking.

The results of Koohang's study indicate that male subjects obtained higher mean scores on the CAS than did female subjects, that more extensive computer experience showed a positive correlation with positive attitudes toward computers, and exposure to computer programming or instructional applications of computers led to higher mean scores on the CAS. Koohang recommended that preservice teachers be provided more computer assistance, that computer programming courses be offered to student teachers, and that research continue on teacher attitudes toward computers.

Correlational research on sex differences on computer attitudes toward computer involvement was examined further by Dambrot, Watkins, Silling, Marshall, and Garver (1985). This study analyzed the sex differences in computer attitude and aptitude in relationship to these variables: math aptitude, math anxiety, and scholastic achievement to computer involvement. Results showed a positive relationship
between math attitudes and achievement and computer attitudes and involvement.

The subjects were student volunteers from a psychology class at a midwestern university. There was an 89% participation rate with 944 students tested. Forty-three answer sheets were incomplete, so the total number of students was 901, including 559 females and 342 males.

These students were given a series of tests. First, they were given the Computer Attitude Scale (CATT) consisting of 20 questions relating to computers. These questions were stated almost equally (11-9) in positive and negative form. The students were asked to rate the statements on a 5-point Likert scale from 5 (strongly agree) to 1 (strongly disagree). Second, the Fennema-Sherman Math Anxiety Scale was used to measure math anxiety. These statements were equally stated in positive and negative directions, and again a Likert scale was used to respond to items. Third, the Computer Aptitude Scale (CAPT) was used to assess the likelihood of success in computer science courses.

The results proved to be consistent with previous research. A multivariate analysis of variance yielded a significant effect for sex ($f^2 = 13.75, p<0.001$); males had significantly higher scores on computer
aptitude, math aptitude, experience in math courses, and experience with computers; females held more negative attitudes toward computers; and finally, the Computer Aptitude Test was positively related to math aptitude, math experience, and scholastic achievement. With the size of the sample, the uneven ratio of females to males does not seem significant enough to affect the results.

Morris (1988) examined the relationships between four independent variables--age, sex, income, and level of education--and attitudes regarding computers. His survey used an eight-item Likert scale, the "Computer Orientation Scale," to question a randomly selected telephone sample of 380 people during the Autumn of 1986 in Muncie/Delaware County, Indiana, also known as Middletown, U.S.A.. The age of the participants ranged from seventeen to ninety, with the largest number of people in the thirty to thirty-nine range. The modal number of years of education completed was twelve.

After the four independent variables--age, education, household income, and sex--were correlated with the Computer Orientation Scale (COS) scores, only age and education were retained for regression analysis. Both age and education showed direct effects on the COS scores, with education more likely to be of importance in determining computer attitudes. Morris concluded
that education, no matter at what age, could influence computer attitudes. His findings indicate that as a group, those who are older tend to have less education, therefore, lower scores on the COS.

This study differs in the significance placed on the independent variable of age, compared with the Gressard and Loyd study (1984). One reason for this difference could be in the selection of subjects. Gressard and Loyd used teachers as subjects, while the Morris' sample was randomly selected from a telephone book.

Although understanding teacher attitudes toward computers is critical in implementing a computer program which will eventually change the current curriculum and the attendant pedagogy (Gressard & Loyd, 1984), Wresch (1987) believed it important to take a close look at what it is we are promoting and what the next generation of English teachers can anticipate.

Wresch questioned whether prospective teachers in today's training programs are learning how to use the computer as an effective teaching tool. To conduct his survey, this issue was subdivided into three areas of concern. The first portion asked if the methods course taken by prospective teachers of English offered computer training as an integral part of the curriculum.
The second section examined the extent to which students were expected to use computers in their other English courses. And the last part examined computer availability and usage in the school districts where student teachers in English were placed, to see if adequate technology was available and if it was utilized by prospective teachers.

More than half of the students indicated that computers were an integral part of instruction in their methods courses, while many others felt that they had insufficient training to use the technology. Wresch described major applications of computer software as follows:

1. Word processing-----------------------(85 percent)
2. Use of "Spell-checkers"------------- (49 percent)
3. Evaluation of software--------------(47 percent)
4. Computer Assisted Instruction-------(39 percent)

The second part of the survey indicated that English faculty generally agree on the importance of computers as a writing tool and that computer labs would be beneficial. While 58 percent of the faculty had computers available, only 50 percent thought computers actually improved the quality of writing. This percentage can be contrasted to Bruder's (1989) data estimating that only a small percentage of teachers
actually will use a computer.

Bruder (1989) examined where teachers stand in their computer preparation. Since only half the states require or recommend that new teachers receive technology preparation (1987 State Educational Technology Survey) many teachers leaving college are unprepared to use computers. Bruder looked at some of the obstacles and possible solutions to increasing computer usage in our schools.

The first obstacle was time. Undergraduate classes are primarily focused on liberal arts studies, which leaves little time for specialized computer work. The university curriculum contains many objectives to cover in a very short time, thus producing a lot of pressure. Even so, universities still need to provide technology training for education students.

Another obstacle cited by Bruder in training future teachers concerned the effort of getting the university faculty to set in motion the practice of using computers. If the faculty does not use computers, this omission decreases the opportunity for students to see first hand the significance of computer application. It is the responsibility of colleges to recognize this situation and address the needs of future teachers by incorporating a computer curriculum at the university
level which will enhance computer practice of prospective teachers.

Literature also suggests that the lack of preparation in how to implement computers is as much a concern as is teacher attitudes toward computers. Herrmann (1988) reported on an inservice graduate course, "Writing With Computers: Teaching the Academically Able," which studied thirteen teachers over a three week period. The course met for three hours a day, five days a week. Herrmann’s objectives were to better understand the teachers’ attitudes and experiences in terms of writing, computers, and the teaching of writing with computers before and during the course.

This ethnographic research involved qualitative methods, using a variety of data-gathering techniques such as student journals, student papers, and projects, interviews, before and after the course, observational field notes and questionnaires administered before and after the course. Herrmann assumed that the teachers would be unfamiliar with the teaching of writing as a process and that many teachers would be unfamiliar with computer applications. The three principal goals of the course were to help teachers overcome anxiety concerning their abilities as writers and teachers of writing, to
help teachers overcome fears concerning their abilities as computer users, and to have teachers adopt their learning experiences to their particular teaching situations.

Results are in line with previous research. Most of the teachers had little experience with computers, either for their personal use or for teaching; further, they had little access to computers, although most of the schools in which teachers worked had computers somewhere in the building. This course, however, did lessen the teachers' fears of the computer and increased their confidence in using computers as tools for writing. Eight of the thirteen teachers adopted new computer instructional strategies for teaching writing based on the whole language approach.

Further research studied 28 nationally distributed urban school districts to see how they integrated computer-education into their curriculums and what improvements could be made to their existing programs (Sheingold, Martin & Endreweit, 1987). The researchers discovered that most districts encourage staff-training programs and that there is a high demand for these programs. However, the training received is often inadequate and does not provide realistically for classroom situations. Twelve of the twenty-eight
districts were found to be already committed to fully developed, specific computer education plans for their schools. These researchers believe more districts must follow suit. Computers are being used as "tools" to enhance students’ learning, but some of the software used is more appropriate to business applications than to educational uses. This business applications software must be redesigned as educational software to be most practical.

Additional findings by Sheingold, Martin & Endreweit show that predominantly minority schools were found to use their computers more for drill than for promoting new learning, as wealthier schools tended to do. Decision makers must address the cultural and economic implications that affect urban schools to insure equal delivery of computer education. These researchers believe that this is difficult to do when state and federal funds received are minimal and rarely provide for staff training. Finally, more state and federal funds must be accessed to meet student and teacher needs.

Bitter (1988), a professor at Arizona State University, and author of Computers in Education and Appleworks for Teachers, recommended the following for the ideal technological curriculum:
Every university faculty member must have a computer.
Each student must take at least one computer course.
The College of Education should provide a computer lab.
All College of Education courses should use a computer.
Students need field experience.
Software must be made available on a check-out basis.

Although these recommendations cannot be implemented entirely within the next few years, Bitter argued that we must make efforts in this direction if future teachers are to be expected to incorporate the computer effectively in the classroom.

This review of literature suggests that research in this area is still in its infancy. Although concepts like computer anxiety and computer liking are more definable than they were only a few years ago, there are still questions as to who is anxious and who is not. Computerized instruction changes so quickly that it is imperative for researchers to monitor the attitudes of teachers, so that teachers do not get lost in the machinery of change.
The studies in this review provide a background for further research in computer related education. As with these studies, this research looks at computer attitudes of teachers and tries to understand how teacher attitudes affect the implementation of computer assisted instruction. Once researchers identify anxious computer users, or non-users, then a process of change can be enacted that will help these teachers feel more confident about engaging in computer assisted instruction. Research must continue to concentrate on how to change the attitudes of the teachers so that effective computer implementation occurs. Once researchers interpret the attitudes of educators, perhaps it will then become possible to change their behaviors.
Chapter Three

The Computer Attitude Rating Scale (CARS) (see Appendix B) and a follow-up questionnaire (See Appendix C) were given to the principals of all the secondary schools in St. Johns County along with a cover letter (see Appendix A) explaining the reason for the request, for distribution to Secondary English teachers. That group were to complete and return these forms to their respective principals, who, in turn were to send them to Allen D. Nease Jr./Sr. High School. The questionnaires were distributed by the principals on June 7, 1990 and returned by June 11, 1990. A total of 44 teachers responded, from a pool of 60.

Secondary English teachers were chosen because of the variety of computer applications available for English teachers and since the results could apply to one specific area of education. Elementary teachers were not chosen because they taught a number of different subjects along with English; therefore, their responses would have skewed the results of the study.

The teachers involved in this study were employed at schools where the socio-economic background of the students varies greatly. On the high end of the socio-economic spectrum, Allen D. Nease Jr./Sr. High
School, located north of St. Augustine, has students attending from the affluent Ponte Vedra/Palm Valley area. Two other schools, Ketterlinus Middle School and St. Augustine Jr./Sr. High School, located in central St. Augustine, have students from the lower middle class downtown area. Murray Middle School, the fourth school included in the survey, located in the west end of St. Augustine, has students from the low end of the socio-economic spectrum. Murray's student population comes from the poverty stricken Kings St. area. Although the teachers involved in the study have similar salaries, the uneven distribution of educational amenities among the schools has long been a concern in St. Johns County.

Teachers were first given the CARS to measure their computer anxiety attitudes. Once analyzed, the results were compared with those questions on the follow-up questionnaire, to see if any significant relationships were present between the two instruments. The follow-up questionnaire asked if the teachers planned on taking any in-service training or college level computer courses, how many years of teaching experience they had, their highest degree earned, their plans on buying a computer, their ability to afford a computer of their own, and many other questions dealing with background
information concerning computers.

After the data was collected, it was subjected to computer analysis, using the Pearson Correlation Coefficient program to determine whether significant relationships existed between items on the two instruments. The results of that analysis are detailed in Chapter Four.
Chapter Four

The Computer Attitude Rating Survey (CARS) and follow-up questionnaire produced a seventy-three percent response rate among secondary English teachers in St. Johns County. These instruments obtained numerous results, pinpointing attitudes of concern in the area of computer anxiety. Results from the CARS, in conjunction with results on the follow-up questionnaire, provide significant correlations on many of the questionnaire items. Table 1 shows measures of central tendencies for the CARS.

Table 1.

Measures of central tendency for the CARS

Mean ................ 61.82 (95% confidence interval)
Standard Deviation .. 17.73
Variance ............ 314.34
Median .............. 61
Range ............... 85
Mode ................ 66

Comparison of these CARS results and the original findings taken by Jo B. Brooke indicate a lower mean score (61.82 to 70.24) for secondary English teachers on this instrument, compared to scores obtained on Brooke’s
sample of University of North Florida and Jacksonville University students. The initial study used 355 students who majored in Arts and Science, Business, and Education. Of these students, only 30.1% were in education. Due to the sample size and randomness of the subjects of the original study, this difference between means is expected.

Mean score responses on the follow-up questionnaire (Appendix C) revealed several interesting results. The survey contained two parts: the top section used a yes and no answer format, while the bottom section used a Likert scale format for responses. Following references to top and bottom reflect that division. When asked, "How much experience have you had with personal computers?" (Item 4, top) the mean score fell between (A) Very little, and (B) A moderate amount. Responses to, "I feel computers are useful in my area of instruction" (Item 1, bottom) using a Likert scale (Strongly Agree = 1 Strongly Disagree = 5) show a very low mean (1.6), indicating that teachers agree on computer usefulness. Three additional statements with significant means follow:

I feel pressure from administrators to use computers: 4.04 (Item 7, bottom)
I feel pressure from colleagues to use
computers: 3.8  (Item 8, bottom)
I’m willing to try new methods of instruction: 1.6
(Item 9, bottom)
These three items reveal that teachers feel little pressure from administrators and colleagues to use computers, and that teachers are willing to try new methods of instruction.

Thirteen items on the follow-up questionnaire (numbers 3, 5, 6, 7, 8, 9, 10, 11 on top, and numbers 2, 4, 5, 7, 10 on bottom) showed no significant correlation with the CARS results, while seven items (number 4 on top, and numbers 1, 3, 6, 8, 9, 11 on bottom) showed a statistically significant positive correlation, using the Pearson Correlation Coefficient. For all items showing significant positive correlations, these results have a level of significance of .05 or better. Most of these correlations reflect patterns already found in the review of the literature.

Results for the statement concerning the amount of computer experience (Item 4 top) shows a p-value of 0.0001, with a correlation coefficient of -0.66. The negative correlation reveals that the higher the respondent’s score on experience, the lower was the score on anxiety. As with previous research, it is not surprising to discover that the more experience one has
with a computer, the less anxious one becomes.

Findings from the follow-up questionnaire suggest that teachers do feel computers are useful for classroom instruction. Moreover, teachers feel knowledgeable enough to use a computer and believe that the software is user friendly. In addition to these findings, the survey shows that teachers do not experience pressure from other colleagues to use a computer in the classroom, teachers are willing to try new methods of instruction, and computer affordability does not present a problem. Table 2 shows significant correlations and p-values for items 1-5, bottom.

Table 2.

**Significant correlations and p-values**

Statement 1 bottom. I feel computers are useful in my area of instruction.

p-value = 0.0002  
correlation coefficient = 0.537

Statement 3 bottom. Our computer software is user friendly.

p-value = 0.0008  
correlation coefficient = 0.486

Statement 4 bottom. I feel knowledgeable enough to use a computer in my classroom.

p-value = 0.004
Statement 5 bottom. I feel pressure from colleagues to use a computer in my classroom.

$p$-value $= 0.0008$

correlation coefficient $= -0.490$

The negative correlation in item 5, bottom, signifies that the more a teacher disagrees with this statement, the less likely the teacher will experience computer anxiety.

Statement 6 bottom. I am willing to try new methods of instruction.

$p$-value $= 0.0118$

correlation coefficient $= 0.376$

Statement 7 bottom. I can afford to buy a computer for my own personal use.

$p$-value $= 0.0015$

correlation coefficient $= 0.064$

Item number one on the follow-up questionnaire identified the gender of the respondent. This data was analyzed to determine whether a correlation existed between gender and computer anxiety. Mean scores reveal that men are less anxious than women (59.71 to 62.21). The standard deviation for men is 13.81, and for women,
18.50. So these results support previous findings on computer anxiety which show men to be generally less anxious than women regarding the use of computers.

Also of interest is the difference in mean scores on computer anxiety, according to the highest degree earned. The mean score for teachers with a bachelor’s degree is 63.25, while the mean score for teachers with a master’s degree is 58.00. These results indicate that continued education can decrease computer anxiety.

Finally, teachers who have taken in-service computer training classes show a significantly lower mean score than those teachers who have not received in-service training. The mean score for those teachers who have taken in-service training is 59.75, contrasted with a mean score of 66.07 for those teachers who have not received in-service training. These results are shown in Table 3.

Table 3.

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<th>In-service training</th>
<th>Have taken</th>
<th>Have not taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>59.75</td>
<td>66.07</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>16.96</td>
<td>19.60</td>
</tr>
</tbody>
</table>
These results should be viewed cautiously in light of the magnitude of the standard deviation.

Table 4 reviews mean and standard deviation scores for questions on the top half of the follow-up questionnaire. These scores can range from 1.00 to 2.00.

Table 4.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have home computer</td>
<td>1.56</td>
<td>0.50</td>
</tr>
<tr>
<td>Plan to buy computer</td>
<td>1.77</td>
<td>0.42</td>
</tr>
<tr>
<td>Have computer access</td>
<td>1.45</td>
<td>0.54</td>
</tr>
<tr>
<td>Have taken in-service training</td>
<td>1.34</td>
<td>0.77</td>
</tr>
<tr>
<td>Plan for in-service training</td>
<td>1.59</td>
<td>0.54</td>
</tr>
<tr>
<td>Plan for college training</td>
<td>1.77</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Results indicate that many teachers have taken in-service training, but fewer plan on taking college training or plan on buying a computer.

Table 5 displays results from the bottom half of the follow-up questionnaire. These results can range from 1 to 5, with a low mean score indicating strong agreement with an item and a high score showing strong
disagreement.

Table 5.  
Mean and standard deviation results from follow-up questionnaire  

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find computers useful in my area of instruction.</td>
<td>1.68</td>
<td>0.98</td>
</tr>
<tr>
<td>I have access to software.</td>
<td>3.04</td>
<td>1.16</td>
</tr>
<tr>
<td>I find software user friendly.</td>
<td>2.18</td>
<td>0.81</td>
</tr>
<tr>
<td>I have time to work CAI into class.</td>
<td>2.81</td>
<td>0.81</td>
</tr>
<tr>
<td>I have access to a computer lab.</td>
<td>3.06</td>
<td>1.42</td>
</tr>
<tr>
<td>I am computer knowledgeable.</td>
<td>2.18</td>
<td>1.20</td>
</tr>
<tr>
<td>I feel pressure from administrators.</td>
<td>4.04</td>
<td>0.86</td>
</tr>
<tr>
<td>I feel pressure from colleagues.</td>
<td>3.86</td>
<td>1.20</td>
</tr>
<tr>
<td>I am willing to try new methods.</td>
<td>1.65</td>
<td>0.83</td>
</tr>
<tr>
<td>I find in-service training useful.</td>
<td>2.09</td>
<td>0.91</td>
</tr>
<tr>
<td>I can afford home computer.</td>
<td>2.90</td>
<td>1.37</td>
</tr>
</tbody>
</table>

The lowest mean scores indicate that teachers are willing to try new methods of instruction and that teachers find computers useful for instruction. However, further results reveal that teachers feel...
little pressure to implement such changes.
Chapter Five

The results of this study of computer anxiety in secondary English teachers range from expected and unexpected to encouraging. The expected results show that experience is related positively with anxiety; the unexpected results reveal that teachers feel little pressure from colleagues or administrators; and the encouraging findings indicate that continued education lowers computer anxiety. Although this study does not contradict previous research in any substantial way, it does provide updated evidence for future study and practice. These results indicate that changes are taking place, but that further innovations are needed.

As the review of the literature indicates, computer anxiety for many educators impedes the application of educational technology in the classroom. In education, this condition can be drastically reduced if researchers continue to analyze the sources of teacher computer attitudes and if educators implement appropriate in-service training programs. This research project provides evidence of the sources of computer anxiety levels of a group of teachers. Researchers can use this evidence to better understand the needed strategies to accomplish change in computer attitudes.
As expected, results of this study indicate that men still hold more positive attitudes about computer use than do women. Future research must investigate gender attitudinal differences for trends indicating treatments which result in a decrease in computer anxiety. With an increase in the number of computer assisted classrooms, where many teachers are women, continued research into this issue is a necessity. Researchers must decrease anxiety for both women and men, for computerized instruction to reach its fullest potential.

This project indicates that those teachers who feel computers to be useful for instruction are also the ones who are less anxious about using computers. Therefore, if efficient training programs are combined with computer availability, perhaps more teachers will acknowledge the worth of a computer in the classroom. If the merit of computer applications can be established among teachers through non-threatening hands-on experiences, then computer anxiety will be likely to decrease.

One way of showing teachers the worth of a computer is through demonstrating available educational software. Respondents who found computer software "user friendly" also scored low on the CARS. The software industry is
acutely aware of this need and is constantly updating and improving program quality. With rapid technological growth, public optimism regarding the educational potential of computers is not unwarranted.

Results of this project indicate that many teachers feel knowledgeable enough to use a computer in the classroom. As expected, an increase in teachers' computer knowledge decreases their computer anxiety, so with continued training, teachers should gain heightened skill and lessened anxiety. This training is typically offered either as college level course work or as in-service training.

In-service training classes provide teachers an excellent avenue for decreasing anxiety. The mean score results from this project show a difference of more than six points between those who have taken in-service training and those who have not (59.75-66.07). For many teachers this route will decrease computer anxiety. Therefore, effective in-service training must initially penetrate teacher attitudes before any change in behavior can occur. Researchers must develop in-service training programs in light of computer attitude surveys for training to be effective.

This project reflects the need for continued research in this relatively new field. Educational
leaders continue to express optimism for computer assisted classrooms, but ignoring teacher attitudes toward this new tool could dampen teacher enthusiasm before computer technology takes hold. Understanding this, researchers must concentrate their efforts on educating the teacher. Only then will the distance between computer potential and computer application merge.
References
References


Appendix A
Letter to St. Johns County School Teachers
Appendix A

Michael J. Mullan
A. D. Nease Jr/Sr High School
10600 Ray Road, St. Augustine, Fl 32084

June 7, 1990

Dear St. Johns County School Teacher:

With your assistance the results of this study will help educators better understand why teachers do not take advantage of available computer technology. Specifically, this research project will view secondary English teacher’s attitudes towards computers so that educators can assist in changing negative computer attitudes to positive ones. Without your help this work can not be accomplished.

Please take a few minutes to complete the accompanying questionnaire and computer attitude survey. Return them to your school office no later than June 11, 1990. I thank you for your cooperation.

Sincerely,

Michael J. Mullan
Appendix B
Computer Attitude Rating Survey
Survey instrument deleted, paper copy is available upon request.
Appendix C
Follow-up Questionnaire
Appendix C

FOLLOW-UP QUESTIONNAIRE FOR
COMPUTER ATTITUDE RATING SURVEY

1. What is your gender? Male _____ Female _____
2. What is your present age? ______
3. What is your highest degree earned ______
4. How much experience have you had with personal computers?
   None at all ______
   Very little ______
   A moderate amount ______
   A great deal ______
5. Do you have a computer at home? Yes _____ No ______
6. Do you plan on buying a home computer? Yes _____ No ______
7. Do you have access to a computer in your classroom? Yes _____ No ______
8. Have you taken any in-service computer training classes? Yes _____ No ______
9. How many years of teaching experience do you have? ______
10. Do you plan on taking an in-service computer class? Yes _____ No ______
11. Do you plan on taking a college level computer course? Yes _____ No ______

Directions: Read each of the following statements carefully and then blacken the appropriate space on your answer sheet to indicate how you generally feel regarding computers. There are no right or wrong answers. If a statement seems not to apply to you at the present time, answer according to how it might apply to you at some future time. Please make only one response to each statement.

Strongly Agree = 1  Agree = 2  Uncertain = 3
    Disagree = 4  Strongly Disagree = 5

1. I feel computers are useful in my area of instruction
   1 2 3 4 5
2. I have excellent access to computer software
   1 2 3 4 5
3. Our computer software is user friendly
   1 2 3 4 5
4. I have time to work computer assisted instruction into my classroom
   1 2 3 4 5
5. I have access to a computer laboratory  
   1 2 3 4 5

6. I feel knowledgeable enough to use a computer in my classroom  
   1 2 3 4 5

7. I feel pressure from administrators to use computer  
   1 2 3 4 5

8. I feel pressure from colleagues to use computers  
   1 2 3 4 5

9. I am willing to try new methods of instruction  
   1 2 3 4 5

10. In-service training programs are useful  
    1 2 3 4 5

11. I can afford to buy a computer for my own personal use  
    1 2 3 4 5