

WHAT EXPERIENCES HAVE EARLY PRESERVICE TEACHERS HAD WITH  
COMPUTERS AND HOW DOES THAT RELATE TO THEIR INCLINATIONS TO USE  
COMPUTERS IN THEIR FUTURE CLASSROOMS?

by

MARY ANN HORNE

(Under the Direction of Nancy Knapp)

ABSTRACT

This study analyzed the responses of 234 preservice teachers to a 201-item survey of their prior and current computer related technology (CRT) use, and their inclinations to use CRT in their own classrooms when they become teachers. The analyses indicate that these preservice teachers are familiar with and use common CRT applications like word processing, but are less familiar with the creative possibilities that CRT offers the classroom teacher. The study found evidence that CRT familiarity and previous educational use of CRT correlated with higher inclination to use CRT in their future classrooms. Earlier CRT gaming was the other factor that correlated significantly with inclination to use CRT in future classrooms.

INDEX WORDS: preservice teachers, computer related technology

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## DEDICATION

This work is dedicated to my father who always encouraged me to quest.

It is also dedicated to my children who continue to inspire me.

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Thesis

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Mary Ann Horne

Chapter 1: Introduction

I will begin on a personal note. My children's difficult experiences in school fueled my initial passion to improve schools. This passion was only increased as I learned more about the poor school outcomes of so many other children, especially poor and minority children. As an educational psychologist, I hope to make a contribution to improving the school experiences of future children so as to better enhance their cognitive and emotional development.

Although there are many promising avenues to school improvement, computers and their related technology caught my attention as having great promise. I believe that appropriate, creative use of technology can help all children to have empowering experiences of successful, joyful learning. This study is a first step toward bringing this vision closer to reality.

Research shows that computer-related technology (CRT) use can have a beneficial effect on student achievement and engagement. Studies of the effects of school CRT use show evidence of increased student achievement, engagement, motivation, attendance, and positive attitude toward learning, as well as decreased dropout rates (Hale, R., 2003). Unfortunately, students in most schools do not get enough opportunity to use CRT to experience its benefits (National Center for Education Statistics, 2000).

From politicians to parents, there have been many calls (Kent & McNergney, 1999) for teachers to use CRT both more often and more effectively, in order for students to get the full benefits that these technologies offer.

There are several factors that have been found to hinder teachers from using CRT in the classroom: lack of training, lack of time, lack of support, and negative attitudes toward technology and related pedagogy (Becker, 1999). A factor that seems to have been little investigated is the influence of teachers' own prior experiences with CRT, both in their education and in their personal lives. This study hopes to contribute to that body of research by investigating the experiences preservice teachers have had with CRT and what relationships, if any, exist between their prior experiences and their present inclinations toward using CRT in their future classrooms.

## Chapter 2: Literature Review

In this literature review, I will first summarize the research showing the benefits of computer related technology (CRT) use in education. Next, I will report on research showing that CRT is not being used to its full potential in classrooms. After that, I will discuss the important factors that seem to affect whether and how teachers use CRT. Lastly, I will focus on what research says about preservice teachers and CRT.

### *Benefits of CRT Use in Education*

Research suggests that CRT use in schools has a positive affect on students. Most research studies primarily evaluate CRT in relation to academic achievement, although some studies also report on other student-improvement measures. Such studies generally report student increases in achievement as well as more positive student attitudes and self-concept associated with CRT use. Other studies looking at the effect CRT has on teacher pedagogy have found that CRT use is associated with more student-centered practices and more constructivist teaching. Overall, CRT has a generally positive effect on students, as shown by the research results I will present in the remainder of this section.

The West Virginia Basic Skills/Computer Education program gave researchers an opportunity to evaluate the academic effects of a large, well-supported, long-term CRT integration project. In this project, beginning with the 1990 Kindergarten cohort, every West Virginia Kindergarten classroom was provided with 3-4 computers equipped with basic skills software, and each teacher was given intensive professional development on using the technology. Each year thereafter, the technology and teacher development were

expanded, following the cohort of children up into the next grade level. Mann, Shakeshaft, Becker, & Kottkamp (1999) evaluated the fifth graders who, in 1996, had experienced the technology-enhanced learning environment since Kindergarten. They found powerful and significant basic skills achievement score increases. Their regression analysis showed that the program accounts for 11% of the variance in achievement ( $p < .001$ ). The authors go on to report “the program helped all children perform better, but seemed to help the neediest children the most. Children without computers at home scored better on total basic skills, total language, expressive language, total reading, reading comprehension, and vocabulary” (p13).

In 2002, a large-scale study of Idaho schools showed the same positive CRT-student achievement pattern as found in the West Virginia study. This study of all Idaho schools in 2002 showed a significant positive correlation between school-wide CRT use and school-wide student achievement (Ravitz & Mergendoller, 2002). Using the Idaho School Technology Inventory, standardized tests of student achievement, and a teacher survey, Ravitz & Mergendoller synthesized the data to derive relations between school-wide computer use and school-wide student achievement. They compared students and teachers in schools with similar demographic characteristics to see if school-wide technology use was associated with student achievement. Comparing overall school-wide teacher technology use, there were “substantial and statistically significant” effect size differences in the achievement gains of schools based on whether their teachers were characterized as high or low technology-using. They reported similar between-school results when comparing both school-wide teacher software use with students and school

achievement gains and school-wide teacher software capability with school achievement gains.

The West Virginia study and the Idaho study provide complementary evidence; whether the dependent measure is individual student achievement or school-wide achievement, CRT was correlated with increases in academic achievement. Backing up the findings in these individual studies, two major reviews of the research covering the years from 1990-2002 indicated that school CRT use was associated with increases in student achievement. In a review of the research done from 1990 to 1994, Sivin-Kachala & Bialo (1994) reported that CRT use demonstrated significant positive effects on student achievement. Positive effects were found for all major subject areas, in preschool through higher education, and for both regular education and special needs students. In Ringstaff & Kelley's (2002) extensive survey of research done from 1993-2002 on the effects of CRT use in schools, they also reported that CRT use was correlated with increased student achievement. In addition to increases in student achievement, Sivin-Kachala & Bialo's 1994 review found that CRT had positive effects on student attitudes toward learning and student self-concept.

A second benefit of CRT use in the classroom may be that it encourages teachers to move toward a more student-centered and constructivist pedagogy. Research indicates that CRT seems to increase student-centered practices and both student-student and student-teacher interaction (Sivin-Kachala & Bialo, 1994). Becker & Ravitz (1999) surveyed 441 teachers in 152 schools of the National School Network and found that teachers who used CRT with their students regularly over a three year period were about

twice as likely to report having made some constructivist changes in their teaching as were teachers who did not engage in this kind of CRT use.

As common sense might lead one to expect, the positive effects of CRT vary due to differences in implementation. In their review of research, Sivin-Kachala & Bialo (1994) included a caveat to the positive evaluation of CRT effects: “The level of effectiveness of education technology is influenced by the specific student population, the software design, the teacher’s role, how the students are grouped, and the level of student access to the technology” (p2). Likewise, in Wenglinsky’s 1998 examination of the data from the 1996 National Assessment of Educational Progress (NAEP) in mathematics, he concluded that CRT can be associated with increased student achievement and more positive school climate, but only if it is used to reinforce higher-order thinking skills (in mathematics).

#### *Prevalence of CRT Use in Classrooms*

Despite the demonstrated educational benefits that CRT can bring to the classroom with optimal use, the actual use of CRT in schools lags behind its potential. Many researchers have reported a lack of use or lack of effective use of CRT in the classroom. For instance, in 1993, Chin & Hortin surveyed elementary teachers in Kansas. These teachers were asked how much time they spend per day in the preparation and utilization of instructional technology. Of 283 teachers in grades 1-6, 28% reported spending 30 minutes per day, 50% reported that they spent 15 minutes per day, and 14% reported that they did not use technology at all.

In an early qualitative approach to evaluating CRT use in the classroom, Hickey (1993) reported participant-observation ethnographic results showing that “when computers were used at all, they were used for general enrichment and to fill time for students who needed something to do” (p219). In her study, 83 preservice teacher interns in elementary classrooms filled out a two-page observation instrument for which they had previously received training. In answer to the question about which students had access to computers, 70% of the observers answered “all,” but many qualified that response with statements indicating that only some students actually got to use the computers, such as those students who finished their work early. Additionally, the observers reported that 52% of the classes had access to computers once a week or less.

Over the next six years, the amount of CRT use seems not to have increased. In 1999, the Department of Education conducted a survey of 1674 elementary and secondary classroom teachers who were selected to be representative of the nation’s teachers. Results indicated that only about half (53%) of the teachers with computer technology available in their schools used them for classroom instruction. (National Center for Education Statistics, 2000)

To further complicate the issue, the term “use” varies widely across studies. To focus more specifically on the issue of what exactly teachers are doing with CRT, Russell, Bebell, O’Dwyer, & O’Connor (2003) surveyed 2,894 teachers in Massachusetts about their use of CRT in six categories. The six categories were

1. Teacher use of technology for preparation,
2. Teacher use of technology for delivery,
3. Teacher-directed student use of technology,

4. Teacher use of technology for special education and accommodation,
5. Teacher use of e-mail, and
6. Teacher use of technology for recording grades.

Correlations between uses of CRT in the various categories were positive, suggesting that teachers who use CRT for one purpose are likely to use CRT for another purpose. The survey results indicated that teachers use technology for preparation and work-related e-mailing most often, with the mean responses being “several times a month” and “several times a year”, respectively. This amount of reported CRT use, even in the most-used categories, is quite low, given the possibilities of today’s technology. Another important point is that most of the CRT use that the teachers reported occurred outside of the classroom, for professional use. As the authors remark, “Based on this pattern, it seems that the skills teachers have developed – whether through their own experiences, professional development, or preservice training- may be leading to substantial use of technology outside of the classroom but have had smaller effects on instructional uses in the classroom” (p302).

Studies of students back up these findings. When Becker (1998) analyzed data from the 1992 IEA Computers-in-Education Study of middle and high school students, he found low overall student CRT use. In most subjects, the surveyed students typically reported they used CRT in class only once or twice over most of the school year (Becker, 1998). Because Becker’s data was somewhat old, one might think his study does not reflect current student CRT use; however, more recent studies, like that of Cuban, Kirkpatrick, & Peck in 2001, show similar results. Cuban, et.al.’s study reveals that even in “high-tech” schools with ample technology, administrative support, and a culture

encouraging CRT use, teachers still make little use of it with students. Observations and interviews in two high schools in California, selected because they were “high-tech” schools, found that "the 'typical' teacher provides students with fewer than ten opportunities to use computers during a school year" and that "a majority of high schoolers' frequent computer experiences occur outside of the academic subjects." (Cuban, Kirkpatrick, & Peck, 2001)

Also, CRT is often used in ways that fails to capitalize on its true potential to enhance learning. In Cuban, et. al.'s study of the “high-tech” high schools, teachers and high school students reported that they use CRT mostly for word processing (Cuban, Kirkpatrick, & Peck, 2001). Word processing, while a valuable skill, seems like a pedestrian, uncreative use of CRT. In his 1998 article critiquing the use of CRT in the classroom, Cuban says, “Both college faculty and public school teachers make limited, unimaginative use of new technologies despite having equipment available.”

#### *Factors shown to affect CRT use by teachers*

What are the factors that can increase the effective use of CRT in the classroom? Success or failure of technology is more dependent on human and contextual factors than hardware or software. Beyond the necessary hardware, software, and quality connectivity, the teacher is the key component in bringing the full potential of CRT into the classroom (Ryan 1991). Cuban (1998) suggests that teachers' lack of effective CRT use “is partially the result of teachers' attitudes toward computers in the classroom, conflicting beliefs about the purposes of schools, and teachers' feelings about rapidly changing technology.”

School CRT hardware has become more and more available. The Department of Education 1999 survey of 1674 representative elementary and secondary teachers reported that 99% of teachers have access to CRT somewhere in their school (National Center for Education Statistics, 2000). However, one must bear in mind that all CRT is not equal; an unknown percentage of teachers may be coping with flawed or not easily accessed equipment. Even so, the lag in use of CRT is probably not primarily due to lack of equipment.

While there are many factors that contribute to whether teachers are more or less inclined to make use of the CRT they do have available, the following qualities of teachers are of interest to this study:

- Self-perceived computer expertise,
- adequate training and/or experience and/or familiarity with CRT,
- home access to CRT,
- attitude toward and beliefs about educational CRT use,
- age and length of teaching.

Three of these qualities seem to be the key components impacting the likelihood of teacher CRT use. These components are teachers' age and length of teaching, their attitudes and beliefs about educational CRT use, and their perceptions of their own CRT expertise. Research suggests that both attitude/beliefs toward CRT use and self-perceived computer expertise are related to previous experiences/training/familiarity with CRT. However, not all experience or training seems to lead to either a positive attitude toward CRT use or toward actual teacher CRT use. In the remainder of this section, I

will review what research indicates about the factors increasing teachers' positive CRT attitudes/beliefs and self-perception of expertise, leading to increased CRT use.

Prior experience with CRT has been found to correlate with teacher attitudes. Honeyman & White (1988) surveyed 18 teachers and administrators who were taking a computer applications course. The survey was done to see which factors like age, gender, and CRT experience influenced anxiety about learning about the computer. In this study, gender and age showed no significant influence (perhaps due to the small number of participants), but reported prior experience with CRT correlated significantly with reported lower CRT anxiety.

In another approach to connecting individual teacher characteristics with CRT use, Rosen & Weil (1995) developed the concept of technophobia, which they defined as

(a) anxiety about current or future interactions with computers or computer-related technology; (b) negative global attitudes about computers, their operation or their societal impact; and/or (c) specific negative cognitions or self-critical internal dialogues during actual computer interaction or when contemplating future computer interaction. (p11)

When they surveyed 587 teachers in California in the late 1980's, they found significant differences between elementary teachers, secondary humanities teachers, and secondary math/science teachers, with elementary teachers scoring highest in technophobia, then secondary humanities teachers, and lowest, secondary math/science teachers. The factor that was most highly correlated with technophobia was little or no prior computer experience, although Rosen & Weil also found significant effects for gender (females were more technophobic), ethnicity (non-whites were more technophobic), and teaching experience (those with more teaching experience were more technophobic).

Though prior CRT experience and training are important predictors of a more positive attitude toward CRT, at least one study reported results that

indicated they might not be sufficient. In a survey of 113 classroom teachers from K-12, Stanley, Lindauer, and Petrie (1998) found a weak but positive relationship between amount of inservice training on computers for teachers and teachers' reports of amount of time students use computers in their classrooms. However, this survey found no significant relationship between teachers' amount of undergraduate or graduate classes in CRT and amount of time their students use computers. Although these results have unknown generalizability, they suggest that some training experiences (for instance, teacher inservice training) may contribute to more classroom CRT use, while other training experiences (like the college classes of these teachers) may not. However, this study does not provide information about what the differences might be, and why different training might lead to differing results. More research on this issue might give insight into the possible differences in training effects.

Since research indicates experience or training by itself may not insure that teachers will use CRT in their classrooms, other factors may be involved as well. Bradley & Russell (1997) posit that the quality of the CRT experience and/or training is crucial in developing a positive attitude. In their study of 350 primary and secondary Australian teachers they found the quality of prior computer learning experiences is correlated with CRT anxiety and is an important predictor of teachers' future self-perceptions of CRT competence. They define quality as "pleasant, rewarding, important, without coercion . . . nonthreatening and understandable". Bradley & Russell continue, "... (P)eople need plenty of

what in German is referred to as ‘Spielraum’, that is, ‘a room to play in,’ or, less literally, the freedom to experiment at one's leisure” (pp. 436-437).

Previous and current pleasant CRT experiences may affect teachers’ classroom CRT use in another way. Ertmer, Addison, Lane, Ross, & Woods (1999) interviewed seven elementary teachers about their reasons for using CRT in the classroom. In addition to student-related benefits like preparing them for the future, keeping their interest, meeting differing learning styles, and creating excitement, four teachers mentioned their own enjoyment in using technology and becoming more competent as a reason for using CRT. So, teachers who use CRT in the classroom may not be doing so solely for the benefit of their students, but also because they themselves derive enjoyment from using it.

Access and familiarity are also important variables affecting teachers’ attitude toward CRT use. In their previously mentioned study, Russell, Bebell, O’Dwyer, & O’Connor report “...for every technology tool or scenario, teachers who actually have access to a specific technology more strongly value that technology than do teachers who do not have access” (p303).

Perhaps we can use Bradley & Russell’s idea of Spielraum combined with Russell, et.al.’s finding about access and familiarity to explain why having a computer at home is associated with higher self-reported CRT expertise. When Becker (1999a) examined the results of a national survey of 2250 public and private school teachers in grades 4-12, conducted in 1998, a variable that increased the likelihood that teachers would have more self-reported expertise was having a computer at home and especially having had a computer at home for more years. I suggest that having a computer at home

can give teachers enough Spielraum and CRT familiarity to develop their sense of CRT expertise.

There seem to be differences in the amount of teacher CRT use based on the teachers' perception of his/her own CRT expertise. Becker's previously mentioned study (1999) found that teachers who had the most self-reported CRT expertise were also those who had their students use CRT more often, and in more ways. Other researchers found similar results. Hanks (2002) conducted a non-random survey of 308 teachers in Louisiana, and found that longer previous use of CRT and higher self-reported CRT expertise were associated with increased minutes of reported student CRT use in the classroom. Chiero (1997) surveyed 36 classroom teachers enrolled in university courses and found that self-described CRT expertise was the strongest predictor for reported frequency of professional use of CRT.

Ivers (2002), using a different research method, obtained results that provided additional support for the idea that teacher CRT use is affected by the teachers' perception of his or her CRT expertise. In her study involving 200 K-12 teachers in Orange County, CA, Ivers compared teachers' self-reported degree of expertise with CRT with the teachers' portfolios showing examples of how they were using CRT in the classroom. Her conclusion was that teachers who rated themselves higher in CRT expertise created a portfolio that showed CRT use as a teaching/management tool as well as a tool for teacher-directed student use. Those teachers who rated themselves as less expert in CRT included in their portfolios examples of teacher-generated worksheets and presentations, but little

evidence of student CRT use. Teacher self-perceived CRT expertise appeared to increase both overall teacher CRT use and teacher-directed student CRT use.

Intuitively, it would seem that younger teachers would be more comfortable with CRT, as well as more likely to use it, since they have presumably had more exposure to its use. Research partially supports this intuition. The youngest and least experienced teachers do seem to be more comfortable with CRT, and to report using CRT more for their professional work. However, teachers who are somewhat older and more experienced may use CRT more in the classroom. In the Becker study (1999a), where he examined the results of a national survey of teachers, newer teachers felt better prepared to use CRT than their more experienced colleagues. For many instructional activities, teachers who reported feeling better prepared to use CRT were generally more likely to use it than teachers who indicated that they felt less prepared. In his specific analysis of Internet use, Becker (1999b) found that both teacher age and length of teaching experience seemed to interact. The survey categorized teachers into three groups of teaching experience: Less than 4 years, 4-10 years, and more than 10 years. Younger and newer teachers valued having the Internet available in their classrooms and used it more for professional purposes, but teachers who had 4-10 years teaching experience used the Internet more for student research. This would perhaps indicate, as Becker suggests, that although younger, less experienced teachers may have a more positive attitude toward using CRT, and know how to use it for themselves, they need time to discover how to use it in their classroom. Another possible explanation for this finding may be that new

teachers are overwhelmed with management issues, and this blocks their CRT classroom use. Teachers with more than 10 years teaching experience used the Internet less either for themselves or their students than the other two teacher groups, indicating that perhaps these teachers, being in the profession longer and presumably being older, lag behind their less experienced peers in adopting CRT use. Echoing Becker's findings, the Russell, et.al. 2003 survey reported that teachers with five or fewer years experience teaching were more likely to use CRT for their own professional work, but less likely to have their students use CRT than teachers who had been in the profession 6-15 years.

Similar results regarding the relation between length of teaching and CRT use were found by Smerdon, Cronen, Lanahan, Anderson, Iannotti, & Angeles (2000). Analyzing the Department of Education's 1999 fast response survey of 1674 representative elementary and secondary teachers, they report: Among teachers with home CRT, newer teachers were more likely than experienced teachers to use it to gather information for planning lessons (76 percent compared with 63 percent) and create instructional materials (91 percent compared with 82 percent). Newer teachers were also generally more likely than experienced teachers to use CRT to access model lesson plans at school and at home, although this finding may be due to more experienced teachers already having lesson plans and not needing CRT to obtain them.

Approximately one-third of all the surveyed teachers reported feeling well prepared or very well prepared to use CRT for classroom instruction, with less experienced teachers indicating they felt better prepared (Smerdon, et.al, 2000). It is not

clear how this study's category "feeling well prepared" to use CRT may or may not differ from the self-reported CRT expertise of other research studies.

Continuing their analysis of the survey, Smerdon, et.al., reported that teachers cited independent learning (again, possibly harking back to the "Speilraum" idea) most frequently as preparing them for CRT use (93 percent), followed by professional development activities (88 percent) and assistance from their colleagues (87 percent). Half of all teachers reported that college and graduate work prepared them to use CRT. This is an interesting correlate to the finding reported earlier that 53% of teachers do use CRT. In a hopeful finding, less experienced teachers were generally much more likely than their more experienced colleagues to indicate that their education prepared them to use CRT.

Beliefs about the value of CRT are another factor that seems to influence how teachers use CRT. In Russell, et.al.'s 2003 survey, beliefs about the importance and usefulness of technology were the strongest predictors of teacher CRT use for both instructional delivery in the classroom and teacher-directed student use.

In this same study, Russell, et. al. (2003) went on to explore the relationship between length of teaching, use of CRT, and confidence/beliefs about CRT. Newer teachers report more confidence with CRT than teachers who have been teaching six or more years, but beliefs about the positive impacts of CRT on student learning do not differ between these two groups of teachers. In a surprising finding, Russell, et. al., report that newer teachers have significantly stronger beliefs about the negative impacts of technology on student learning.

They say, “New teachers are more likely to believe that use of technology harms specific aspects of student learning. These negative impacts include making students more lazy, decreasing research skills, and decreasing the quality of student writing.” (p305)

Summarizing, research suggests that some of the factors that contribute to teachers’ use of CRT, beyond access to sufficient hardware, software, and technical support, are self-perception of expertise with CRT, prior experience (including training) and familiarity with CRT, attitudes toward CRT, and beliefs about CRT. Since these factors affect inservice teachers, they may affect preservice teachers as well. In the next section, I will present what research indicates about these factors and preservice teacher CRT attitudes.

### *Preservice Teachers and CRT*

Much attention is currently focused on preparing preservice teachers to use CRT. Since prior experience/training/familiarity, perception of expertise, and attitudes and beliefs about CRT seem to be important factors contributing to inservice teachers’ classroom use of CRT, it seems logical to examine these factors in relation to preservice teachers. However, little research appears to have been done regarding the relationship between preservice teachers’ prior personal CRT experiences and either their attitudes toward educational CRT use or their inclinations to use CRT in their future classrooms.

The literature contains scant evidence of research that focuses primarily on exploring the relationship between the prior CRT experiences of preservice teachers and

their attitudes toward CRT in the classroom and/or their inclinations to use CRT in their future classrooms. Most of the studies reporting on some aspect of prior preservice teacher CRT use have focused on the effects of an intervention aimed to increase students' CRT knowledge. Several researchers have looked at aspects of the relationship between prior experience with CRT and general attitudes toward CRT. Many of these studies measured more global attitudes toward CRT such as computer anxiety, confidence, liking, and usefulness; specific attitudes toward educational CRT use were not assessed in these studies. A few studies have looked at educational CRT attitudes more specifically, as will be detailed below, but these studies do not follow the trail from prior CRT experience through educational CRT use attitudes and into future inclinations to use CRT.

An early study of preservice teachers that looked at changes in CRT attitude pre-post computer programming training found that prior use was an independent factor that increased positive attitudes (Woodrow, J, 1992). She used a pre-post design to measure increases in teacher education students' computer literacy and attitudes toward computers. The following quote from her report gives a good example of the kind of studies that were being done at the time:

Computer attitudes were defined as those attributes measured by four computer attitude scales professing to measure different dimensions of computer attitudes. These scales were (a) the 30-item Computer Attitude Scale of Gressard and Loyd, which is used to measure the Computer Liking, Computer Confidence, and Computer Anxiety attitude dimensions, (b) the 10-item Attitudes Toward Computers of Reece and Gable, which is used to measure the Computer interest attitude dimension, (c) the 11-item attitude and anxiety Computer Survey of Stevens, which is used to measure the Computer Awareness attitude dimension. Prior computing experience was subdivided into two categories: programming experience and word-processing experience. Students were asked to indicate how often they had programmed a computer or used a computer as a word processor. The responses to both questions were dummy coded on a 3-point scale with 1 for

never, 2 for 1 to 10 times, and 3 for more than 10 times. This division of prior experience was predicated upon Koohang's finding that attitudes toward computers are significantly related to the nature of computer experience. (p200)

Most of the students in her study had little familiarity with CRT and none had had any formal CRT training. She found a significant relationship between the amount of previous programming experience and positive attitude toward general (not educational) CRT use, but did not connect this positive attitude with inclination to use CRT.

Savenye, Davidson, and Orr (1992) reported a study that asked specifically about different software experiences. Out of 68 preservice teachers at the beginning of an educational computing course, 74% had used computer games, 62% had used word processing, 24% had done some computer programming, and 21 % had used computer-assisted instructional programs. Some students had prior experience with graphics programs (18%), databases (16%), and spreadsheets (12%). Savenye, et al, did not connect this information about prior experience to attitude or future CRT use. In a similar study, Cardinale (1992) measured 255 preservice teachers' reports of prior CRT use in word processing, game-playing, databases, spreadsheets, and email. Word processing and game-playing were the most used categories in her study. Providing some more recent evidence about what prior experience with CRT preservice teachers have, Kirby and Schick (1998) did a longitudinal study of the preservice teachers at the beginning of a required instructional technology course. Between 1995-1998, they surveyed 606 graduate and undergraduate students as to their use of six computer applications. Word processing was used the most frequently, then information tools like email, CD-ROMs, and the Internet. Spreadsheets and

databases were used the least. As with Savenye, et. al., however, neither Cardinale's study nor Kirby and Schick's study made connections between prior experience and educational CRT attitude or intended future use.

Many studies have been done to measure the impact of preservice teacher CRT courses or training programs. While most used a pre-post survey measure of CRT attitude and/or CRT efficacy, their reports provide only data about the pre-post change (see, for examples, Gunter, Gunter, & Weins, 1998; Milbrath. & Kinzie, 2000; Molebash & Milman, 2000; Yildirim, 2000; Abbott & Faris, 2001). Not only do these reports not include evidence about preservice teachers' prior CRT experience, they also do not report evidence as to what the students' initial attitude and efficacy were.

The last four studies I will discuss have looked at some aspects of the connections between preservice teachers' prior CRT experiences/familiarity and their attitudes toward educational CRT use or their inclinations to use CRT in their future classrooms. These studies provide some hints that prior CRT experience/familiarity may influence preservice teachers in the same way it does inservice teachers.

Nash & Moroz (1997) surveyed 289 graduate education students to explore the effects of gender and prior experience with CRT on attitudes toward CRT. They found no correlation between gender and attitude toward CRT, but a significant relationship between prior experience and attitude. Those graduate students who were high work users had a significantly more favorable attitude towards CRT in terms of computer anxiety, confidence, liking, and usefulness. Likewise, graduate students who were high home users had a significantly more

favorable attitude towards CRT. As with inservice teachers, it seems that preservice teachers' prior experience and familiarity with CRT contributes to a more positive attitude.

In a small qualitative study that begins to connect preservice teachers' prior CRT experiences with both CRT educational-use attitudes and prospective CRT classroom use, Marjerum-Leys & Marx (1999) conducted semi-structured interviews with 9 preservice English teachers about their previous experiences with CRT and their thoughts about using CRT in the classroom. These preservice teachers reported that for the most part they had learned CRT through experimentation and exploration on their own, combined with help from friends and family. They reported that they preferred this informal kind of learning to formal learning experiences with CRT. They were knowledgeable about and comfortable using email, word processing, and Internet searching. When asked about what uses they saw for CRT in classrooms, most mentioned the computer as a tool for teachers, keeping grades or making presentations. This view of using CRT may be a reflection of their experiences being taught this way, indicating how prior experience can affect preservice teachers' views of CRT in education.

Beyerbach, Walsh, & Vannatta (2001) studied how preservice teachers' views of classroom CRT use changed pre-post a practicum experience with infusing technology into classroom learning. They used survey & interview data to determine how 360 preservice teachers envisioned using CRT in the classroom. Survey participants were generally positive about using educational CRT. Many participants reported that, before the practicum experience, they only knew email and word processing themselves, and so

email and word-processing were what they thought they would have their own students doing. This study provides some evidence that preservice teachers are initially inclined to use CRT in ways that they have done previously, revealing the effects of prior experience and familiarity on future use.

I found one study that claims to find an association between preservice teachers' own personal use of CRT and their positive evaluation of the usefulness of CRT for students. Willner & Willner (2002) surveyed 128 preservice teachers who had completed a semester of tutoring elementary and secondary students. The survey contained Likert-scale questions about 1) whether their tutees had wanted to do the computer component of the tutoring program, 2) whether the tutee's motivation was increased by computer use, 3) whether the tutee's learning was increased by computer use, and 4) whether the tutee's attention-span was increased by computer use. For each area, the authors reported that the tutors' personal use of CRT significantly increased the positive evaluations of the effects of CRT on the tutees. However, a closer examination of Willner & Willner's survey instrument showed that it did not contain an item asking about the tutor's personal use of CRT. The only survey item they might have been referencing was a question that actually asked if the tutor thought the experience of using computers with their tutees would be useful to them professionally. Given this problematic analysis, the conclusions of Willner & Willner's study must be viewed with caution.

There seems to be no research that investigates the prior CRT experience of preservice teachers with their attitudes about CRT uses in school and with their

inclinations to use various CRT applications in their future classrooms. Since research suggests that prior CRT experience/familiarity is one of the factors that influence both inservice teachers' attitudes toward CRT and use of CRT, it would be helpful to trace that prior experience back before the future teachers enroll in technology courses, to see what CRT experiences they have had in their personal lives and education.

The present study hopes to provide clues to the CRT experiences and familiarity that early preservice teachers bring with them as they begin their teacher education courses. The survey used in the present study is intended to measure what preservice teachers have experienced in personal and educational CRT use and their inclinations to use CRT in the future, when they themselves teach. This survey contains items that explore their specific prior experiences in several ways. It asks about familiarity with various types of software and hardware. It asks about previous educational and personal CRT uses, and it asks about where CRT was learned and how long the students have used CRT. This extensive survey offers data on the views of classroom CRT use early preservice teachers bring with them, based on their previous experience with the technology. By better understanding the experiences with and propensities toward using CRT that early education students have prior to formal training in Instructional Technology, teacher educators can better evaluate what needs these students have and how to address those needs.

*Main Research Question for this Study*

What is the relationship between the experiences that students taking EPSY 2020 at the University of Georgia in Fall, 2004, have had with computer-related technology (CRT) in their own life and their inclination toward using CRT in their classroom when they become teachers?

*Specific research questions which will be addressed in the study:*

- Research Question 1: What personal experience and familiarity with CRT do these respondents have?
- Research Question 2: What are the inclinations of these preservice teachers as far as using CRT in their future classrooms?
- Research Question 3: What is the relationship between the respondents' personal experience with CRT and their inclinations to use CRT in their future classrooms?

## Chapter 3: Methods

### *Data Collection*

The data for this study are taken from responses to a survey (Knapp, Recesso, Orrill, & Shepperd, 2004) given to 289 undergraduate students taking EPSY 2020 at the University of Georgia, Fall 2004. The survey was developed as part of the ETEACH program and is intended to measure preservice teachers' experience with and attitudes toward computer-related technology (CRT). The entire survey is included in Appendix A. EPSY 2020 is an undergraduate level introductory educational psychology course required of all students seeking teacher certification at UGA. However, this course attracts students from other majors across the university; therefore, some of the students in the course do not intend to become teachers. Data from respondents who did not intend to become teachers (54 out of 289 respondents answered Item 8 "Do you plan to be a teacher" with #2, a negative response) were not included in this study, because this study's research concerns the precursors of attitudes and behaviors of teachers. One respondent had to be deleted from the database because of a nonsensical response (choosing answer #4, which was not an option). Therefore, 234 respondents had usable data. Since EPSY 2020 is usually the first course taken by intended education majors, students are presumed to have not yet taken specific college-level Instructional Technology courses, so that whatever familiarity they have with computer-related technology (CRT) is drawn from other experiences in their lives.

The survey consisted of 102 multiple-choice items. This study will examine only a subset of the total item responses obtained in the survey; the subset of items was chosen based on its' perceived relevance to the research questions of this study. The items I used

can be divided into two groups: questions dealing with respondents' prior experience with CRT in and out of the classroom, and questions dealing with inclination to use CRT in their future classrooms. These items can be further categorized as follows: (a) questions 11-23 and 24-44 investigate respondents' personal use of and familiarity with CRT, respectively, (b) questions 65-83 examine respondents' academic history of use of CRT, and (c) questions 84-102 examine respondents' inclination to use CRT in their classroom when they become teachers.

### *Data Analysis*

All survey responses were entered into a computer database using the Statistical Package for the Social Sciences (SPSS) software program (SPSS for Windows, 1999), which was used for all subsequent analyses.

The descriptive statistics, summarized in the Results section of this report, were determined for the selected subset of survey questions. Next, I examined the data as follows to address my specific research questions:

- Research Question 1: What personal experience and familiarity with CRT do these respondents have? I obtained descriptive statistics for items 11-14 (prior CRT use), 18-23 (current CRT use), 24-44 (CRT familiarity), and 64-83 (educational CRT use).
- Research Question 2: What are the inclinations of these preservice teachers as far as using CRT in their future classrooms? For this question, I analyzed items 84-102 (inclinations to use CRT in future classrooms) to obtain descriptive statistics.

- Research Question 3: What is the relationship between the respondents' personal experience with CRT and their inclinations to use CRT in their future classrooms? For this question, I explored the relationship between selected items addressing personal CRT experience (items 12-14, 23, 24-44, and 64-83) and items addressing inclination to use CRT (items 84-102).

In order to compare responses on groups of items, I created composite measures for each respondent. I created this composite measure by taking the mean of item-group responses concerning CRT familiarity (FAMIL), previous educational CRT use (PEDUC) and inclinations to use CRT in future classrooms (FTCH). For instance, I found the mean for all the responses to items 84-102 (inclination to use CRT in a future classroom, FTCH) for a given respondent; that mean could then be compared with that respondent's mean response for items 24-44 (familiarity with CRT, FAMIL). Then, by comparing item-group composite measures for all respondents, I obtained overall between item-group correlations. The correlational results will be presented in the Results section.

I compared two other factors to composite inclination to use CRT in the classroom. These factors are: age of first becoming comfortable with CRT and current amount of CRT use.

I looked at the responses to the demographic questions in relation to my subset of survey items, to see if gender, age, 'main content area planned to teach', or 'preferred age group to work with' are factors that should be considered. Because the sample was so

similar in race and background, I only compared gender, age, area planned to teach, and age planned to teach with composite inclination to use CRT in the classroom (FTCH).

## Chapter 4: Results

In this section, I will first summarize the demographic data and future teaching plans reported by participants. Next, I will present what the results of the data analysis indicate regarding each of my research questions. Because of rounding, the percentages reported may not add up to 100.

As explained in the Methods section, the 234 survey responses included in this study were those from respondents who identified themselves as being possible preservice teachers through their answer to Item 8, “Do you plan to be a teacher?” Of the 234 total, 184 answered yes and 50 answered maybe to this question. Research indicates that the future career plans of these students tend to be fluid, and that in actuality the two groups are not likely to be that different (Knapp, 2005), so data from both groups were included in this study.

### *Demographic Data*

In this group, there were 46 males and 188 females. The ages ranged from 17-35+, with the great majority (96.2%) of respondents being traditional-aged college students between ages 17 and 24 (see Table 1).

Table 1

#### Participant Age in Percent

17-20	20-24	25-35	35+
69.7	26.5	2.6	1.3

In this group, 69.7% were students in their second or third year of college (see Table 2).

Table 2  
Participant Year in College in Percent

1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup> or higher
15.4	40.6	29.1	9.4	5.6

This group of preservice teachers was overwhelmingly White with only 8.1% choosing any other category. This low proportion of minorities reflects the usual make-up for EPSY 2020 classes (Knapp, 2005).

Table 3  
Participant Race/Ethnicity in Percent

African American	Asian American	White	Hispanic	Other
3.8	1.3	91.9	.9	2.1

Likewise, 91% of respondents grew up living in a house their family owned, (see Table 4), which probably indicates at least middle-class socio-economic status.

Table 4

Type of Main Childhood Home in Percent

Rented Apt	Rented House	Mobile Home	Owned House	Military or other employer Housing	Missing
2.1	1.7	2.1	91.0	2.6	.4

Most (79.1%) respondents grew up in either suburb or small town (see Table 5). Only 9.8% grew up in a city, while the remaining 11.1% grew up in a rural area.

Table 5

Location of Main Childhood Home (percent)

City	Suburb	Small Town	Rural
9.8	54.3	24.8	11.1

*Future Teaching Plans*

In this group of preservice teachers, more (61.5%) intend to teach older children (see Table 6); 144 plan to teach either high school or middle school. There were 86 who indicated they wish to teach elementary or pre-K children.

Table 6

Respondents' Preferred Age to Teach (percent)

Pre-K	K-2	3-5	6-8	9-12	Missing
3.0	19.7	14.1	7.7	53.8	1.7

In answer to item 10, Intended Main Content Area Focus, 75 (32.1%) respondents chose “other” (see Table 7). It seems likely that most of the respondents choosing “other” are those who plan to teach younger children in a self-contained classroom. The remaining respondents were roughly equally divided between Math/Science, Language Arts, Social Science/History, and Fine Arts, with the latter being somewhat less chosen.

Table 7

Respondents' Intended Area to Teach (percent)

Math/Science	Social Science/History	Language Arts	Fine Arts	Other	Missing
21.4	15.0	18.8	12.0	32.1	.9

*Research Question 1: What personal experience and familiarity with CRT do these respondents have?*

In order to answer research question 1, I analyzed responses to the following item groups (See Appendix A):

1. Items 11-14, concerning early CRT use
2. Items 17-23, concerning current CRT use
3. Items 24-44, concerning CRT familiarity
4. Items 65-83, concerning past educational CRT use

*Respondents' Early CRT use*

Of this sample of 234 preservice teachers, 111 (47.4%) reported first becoming comfortable with CRT at home and an equal number (111) reported first becoming comfortable with CRT in K-12 school (Item 11). College was the next (10) most frequent response. Only two respondents reported not being comfortable with CRT at present. Items 12-14 concern the age when respondents first used CRT for games, for school or work, and for other personal uses (see Table 8). The vast majority, 203 (87%), of respondents had first used CRT in at least one of the three categories before they were 13. As reflected in Table 8, respondents tended to use CRT for games slightly earlier than for school, work, or other uses. Very few had not used CRT for any of these uses by age 16.

Table 8

Respondents' Age When 1<sup>st</sup> Used CRT (percent)

	<13	14-16	18-22	23+	Never
For Games	82.1	12.0	1.7	.4	3.8
For School or Work	70.9	26.1	2.6	.4	0
Other Personal	33.8	60.3	4.3	.9	.9

*Respondents' Current CRT use*

Respondents currently spend more hours using CRT for personal/communication/entertainment purposes (Item 22, M = 2.43 on a 1-5 scale) and for personal tasks (Item 20, M = 2.03) than they do for gaming (Item 21, M = 1.39), but schoolwork (Item 18, M = 2.46) is the highest reported category of use. Although only two respondents can be considered “serious” gamers (gaming more than 20 hours/week), 78 others reported using CRT for games (see Table 9). The mean overall current weekly CRT usage by these respondents is 3.43 on a 1-5 scale, in other words, between 6-20 hours per week. Of the survey participants, 80 (34 %) use CRT for 10-20 hours per week total. The next most chosen frequency of use (76, 32%) was the category “between 6 and 10” hours per week. Additionally, there were 26 students who maintain a personal web page.

Table 9

Respondents' Present CRT Use (percent)

CRT Uses	Hours/Week					Missing
	None	1-5	6-10	10-20	>20	
School	1.7	58.5	31.6	8.1	0	0
Communication/ entertainment	1.7	66.7	23.1	4.3	4.3	0
Personal Tasks	15.0	70.5	12.0	2.1	.4	0
Gaming	65.4	30.8	2.6	0	.9	.4
Job	76.1	17.1	2.6	1.7	2.6	0
Total Weekly	.4	18.4	32.5	34.2	14.1	.4

### *Respondents' Perceived Familiarity with CRT*

A large majority of these respondents see themselves as quite familiar with four types of CRT. These types are (with mean reported familiarity on a scale of 1-5): email (4.96), Internet search engines (4.86), word processing (4.84), and IM/chat (4.59). The types of CRT with intermediate mean reported familiarity include information databases on the internet (3.88), presentation software (3.63), Internet stores (3.53), spreadsheet software (3.42), digital camera (3.38), scanner (3.24), mp3 software (3.19), image-editing software (2.82), drawing software (2.70), and digital video camera (2.35). Least familiar types of CRT for this sample are PDA, desk-top publishing, web design software, drafting/industrial software, data analysis software, and multimedia development software (see Table 10).

Because I wanted to compare the relationship between respondents' familiarity with CRT and their inclination to use CRT in their future classrooms, I decided to create a composite familiarity measure. A Cronbach's alpha of 0.85 across all of the "familiarity" items (Items 24-44) was obtained, justifying the creation of a composite measure (FAMIL). To create FAMIL, I combined the scores for each item into an overall item mean for each participant. I used this composite measure in correlational analyses reported later in this study.

### *Respondents' Previous Educational CRT Use*

Items 65-83 were intended to focus more specifically on previous educational use of CRT. However, these items provided ambiguous data due to somewhat flawed answer options. Because of the scantron answer sheet format, the original survey

Table 10

Perceived Familiarity with Types of CRT (percent of total responses)

Type	Responses					Missing
	1 Don't Need	2 Want to Learn	3 Used Once or Twice	4 Used Some	5 Used Much	
Email	.4	0	0	2.1	97.0	.4
Internet Search	.4	0	.9	10.3	88.0	.4
Word Processing	.4	.9	.4	11.1	86.8	.4
Instant Message	3.8	2.1	2.6	14.1	76.9	.4
Info Databases	4.3	5.1	18.8	41.9	29.5	.4
Presentation	3.0	9.0	30.8	34.2	23.1	0
Internet Stores	13.2	11.5	14.1	31.2	29.9	0
Spreadsheet	9.0	9.0	31.6	31.6	18.8	0
Digital Camera	10.7	18.4	15.4	32.9	22.6	0
Scanner	15.4	14.5	17.1	35.9	16.7	.4
Itunes/MP3	15.0	19.7	20.9	19.2	24.8	.4
Image-editing	18.8	23.5	26.9	18.4	12.4	0
Draw/Painting	28.6	12.0	28.6	20.9	9.4	.4
Digital Video	32.5	26.1	21.4	13.2	6.4	.4
PDA	53.4	20.5	13.7	5.6	6.8	0
Multimedia	48.3	27.4	13.2	5.6	5.1	.4
Financial	53.0	28.6	10.7	3.4	4.3	0
Web Design	52.1	31.6	11.5	2.6	1.7	.4
Desktop Publishing	56.4	26.1	12.8	3.4	1.3	0
Data Analysis	73.1	20.1	4.3	1.3	.9	.4
Drafting	76.5	15.8	5.6	2.1	0	0

forced respondents to choose only one of the following options regarding each CRT application listed (see Appendix):

1. I have never used
2. I used once or twice in K-12
3. I used more than once or twice in K-12
4. I have used once or twice in college
5. I have used more often than once or twice college

Because amount of use and place of use were thus confounded in these options, it seems likely that two of these statements could be equally true for any one respondent. For example, response 2 and 4 might both be true; likewise, response 3 and 5 might both be true. As a best-fix solution, in consultation with the main survey author, I decided to recode the answer data for these items to foreground the respondent's overall previous educational experience with each type of CRT. I did so by retaining 1 as 1 (no use), recoding 2 & 4 as 2 (less frequent past use), and recoding 3 & 5 as 3 (more frequent past use). Cronbach's alphas of 0.79 for the original data and 0.74 for the recoded data show that recoding did not significantly impact the reliability of the measure.

The results of the recoding are displayed in Table 11. Most respondents had previously used email (86% of respondents), word processing (83% of respondents), virtual classroom software (83% of respondents), class websites (83% of respondents), and online encyclopedias/dictionaries/databases (74% of respondents) more than once or twice in their K-12 and or college education. Just over half had used graphing calculators

Table 11

## Respondents' Previous Educational CRT use

Item#	Type of CRT Use (most to least)	Responses (as percent of total responses)			
		1 (Never)	2 (Once/ Twice)	3 (More often)	Missing
65	Word Processing	0	3.8	83.3	12.8
71	Email	1.7	1.3	86.3	10.7
70	Virtual classroom/web CT	1.3	11.1	83.3	4.3
74	Online encyclopedias/dictionaries/databases	1.7	15.0	74.4	9.0
72	Class website w/ homework assignments	4.3	15.8	74.8	5.1
67	Presentation software	8.5	31.6	54.7	5.1
77	Graphing calculators/math reasoning & modeling	20.1	13.2	59.0	7.7
73	Listservs/online discussion groups	17.9	21.4	55.6	5.1
66	Spreadsheet	10.7	43.2	41.0	5.1
75	Internet reference research	22.2	22.2	49.6	6.0
68	Drawing/image- editing/multimedia/desktop publishing	19.7	35.0	41.0	4.3
76	Drill/review/testing for my content area	26.9	22.6	44.0	6.4
81	Typing tutors	29.5	20.5	46.6	3.4
79	Self-paced instructional tool	43.6	14.1	39.3	3.0
80	Social studies simulation programs	41.0	20.9	34.6	3.4
82	Grammar/edit/writing	54.3	15.8	26.1	3.8
69	Web design software	50.0	32.1	15.0	3.0
83	Foreign language or ESOL	59.8	14.1	22.2	3.8
78	Hands-on knowledge building programs	62.4	17.5	15.8	4.3

(59% of respondents), and online discussion groups (56% of respondents), or presentation software (55% of respondents) more than once or twice in their education. Less than half of these respondents had used the remaining types of CRT with any frequency (see Table 11).

As was the case with familiarity, I wanted to create a composite measure of previous educational use of CRT, so that I could investigate the relationship between previous educational use, and inclination to use CRT in future teaching. Because of the previously mentioned Cronbach's alpha level of 0.74 that was obtained over the recoded items 64-83, there was justification to create a composite measure of educational use (PEDUC). PEDUC was computed by using the mean of each of the item 65-83 recoded scores for each respondent. This composite measure was used in correlational analyses reported later in this study.

To what extent does CRT familiarity correlate with previous educational CRT use? The correlation of FAMIL with PEDUC yielded a Pearson Product Moment correlation coefficient of .494, which is significant at the .01 level. Therefore, CRT familiarity and previous educational CRT use are moderately correlated.

*Research Question 2: What are the inclinations of these preservice teachers as far as using CRT in their future classrooms?*

The data to address research question 2 are taken from items 84-102. These items ask about the respondents' inclination to use various types of CRT when they become teachers. Unfortunately, like items 65-83, this group had

somewhat problematic answer options. Again because of the scantron format, participants were given the following answer options but could only choose one:

- 1 = I would never use for my own professional work
- 2 = I would never have my students use
- 3 = I would use as a teacher for my own professional work
- 4 = I might have my students use for a special project
- 5 = I would definitely have my students use for more than just a special project

It is possible, and perhaps even likely, that two of these options might well be true for a given respondent. For example, a respondent might intend to never use a content area drill/review/testing program for their “own professional work” but for that same CRT type intend to “have my students use it for more than just a special project.” Since the answer format forced the respondent to choose between these options, the validity of the response data may be somewhat compromised.

Though several ways of recoding the item 84-102 data were tried, none was satisfactory. Therefore, the original answer data was not recoded, and is presented in Table 12. Data examination revealed that quite a few respondents had left several of the items in this final section blank, possibly due to the confusing answer options, fatigue from answering such a long questionnaire, or a combination of these two factors. Before computing a composite measure for this section (as explained later), I removed the data of the 33 respondents who had left more than three items blank for items 84-102. This culled data (i.e. all data from the remaining 201 respondents) was then used in the correlational analyses. Respondents were most likely ( $M = 4.56$  on a 1-5 scale) to foresee using word processing in their future classroom. Next, they intended to use online

encyclopedias/dictionaries/databases (M = 4.18) and email (M = 4.06). Class website w/ homework assignments (M = 3.98), drill/review/testing for my content area (M = 3.89), presentation software (M = 3.85), Internet reference research (M = 3.84), (M = 3.70) are the CRT categories next most frequently cited for future classroom use. The respondents did not seem quite as inclined to use the remaining categories of CRT types in their future classrooms (see Table 12).

As mentioned previously, I wanted to compare previous uses of and familiarity with CRT with inclinations to use CRT in a future classroom. To do this, I decided to create a composite measure for future inclination to use CRT as a teacher. Cronbach's alpha of 0.91 was obtained across items 84-102, justifying creation of a composite measure of future inclination to use CRT as a teacher. The composite measure (FTCH) was computed from the mean of the item scores for each individual (after removal of the previously mentioned 33 respondent's data). The resulting composite measure was used in the correlational analyses reported later in this study.

*Research Question 3: What is the relationship between the respondents' personal experience with CRT and their inclinations to use CRT in their future classroom?*

Before addressing question 3, I checked for the possible effect of demographic variables on intended future use of CRT. I correlated responses to Items 1 (age), 2 (gender), 9 (preferred age to teach), and 10 (preferred area to teach) with the composite measure for inclination to use CRT in a future classroom (FTCH), using one-way ANOVAs. None of these demographic factors was found to have a significant

Table 12  
Inclination to Use Types of CRT in Future Classroom<sup>a</sup> (in percent of total responses)

Item	CRT Type	Responses					
		1	2	3	4	5	Missing
84	Word Processing	0	1.3	12.8	8.5	64.1	13.2
93	Online encyclopedias/dictionaries/databases	3.0	7.3	5.6	27.4	44.4	12.3
90	Email	0.4	3.4	31.2	6.8	44.4	13.7
91	Class website w/ homework assignments	5.6	9.8	13.7	9.4	48.3	13.2
95	Drill/review/testing for my content area	7.3	8.1	7.3	29.1	35.5	12.8
86	Presentation software	1.7	4.7	17.9	43.2	19.7	12.8
94	Internet reference research	6.8	7.7	8.1	34.2	30.3	12.8
101	Grammar/editing/writing tutorial programs	8.5	8.5	5.6	29.5	32.1	14.8
98	Self-paced instructional tool	11.5	8.5	4.7	34.2	29.5	11.5
100	Typing tutors	11.5	12.4	4.7	30.8	29.1	11.5
97	Hands-on knowledge building programs	11.5	9.8	5.1	37.6	23.5	12.4
96	Graphing calculators/math reasoning & modeling	11.5	13.7	7.3	25.6	30.3	11.5
89	Virtual classroom/web CT	9.4	11.5	18.4	18.8	29.9	12.0
87	Drawing/image-editing/multimedia/desktop publ	8.5	6.0	15.0	45.7	11.5	13.2
85	Spreadsheet	4.3	7.3	30.8	31.6	13.2	12.8
99	Social studies simulation programs	11.5	13.7	6.0	37.6	19.2	12.0
102	Foreign language/ESOL programs	16.7	12.4	5.6	29.9	19.2	16.2
92	Listservs/online discussion groups	15.4	20.9	10.7	16.2	24.8	12.0
88	Web design	14.1	15.4	24.4	30.8	4.3	11.1

a. "Considering the following computer-related educational applications, indicate how you would use them as a teacher."

1 = I would never use for my own professional work

2 = I would never have my students use

3 = I would use as a teacher for my own professional work

4 = I might have my students use for a special project

5 = I would definitely have my students use for more than just a special project

grammar/editing/writing tutorial programs ( $M = 3.81$ ), and self-paced instructional tools relationship to FTCH. Because the sample had so little variation in race and SES, I did not use these variables in my analyses.

To explore the question of how previous CRT experience might relate to future inclinations to use CRT, I correlated each of several prior and current CRT experience variables with respondents' inclinations to use CRT in future classrooms.

In order to test the relationship between previous educational experience with CRT and the respondents' inclinations to use CRT in their future classrooms, I correlated the composite measure for previous educational CRT experience (PEDUC) with the composite measure for inclination to use CRT in future classrooms (FTCH). The resulting Pearson Product Moment correlation coefficient ( $r$ ) was .285, significant at the .01 level (see Table 13).

Next, to test the relationship between CRT familiarity and the respondents' inclinations to use CRT in their future classrooms, I correlated the composite measure for CRT familiarity (FAMIL) with the composite measure for inclination to use CRT in future classrooms (FTCH). The  $r$  for this correlation was .255, significant at the .01 level.

I then explored what relationship might exist between respondents having first used CRT at an earlier age and their inclinations to use CRT in future classrooms. I correlated Q13 (How old were you when you first used CRT to play games?) with FTCH. The correlation indicates that there is a significant relationship between using CRT to play games at an earlier age and inclination to use CRT in future classrooms ( $r = -.210$ , which is significant at the .01 level.). (Note that the negative correlation is due to the

numbering of the answer options; a lower number means a younger age.) When I correlated Q12 (How old were you when you first used CRT for school or work?) with FTCH, the correlation was  $r = -.134$ , which is non-significant. When Q14 (How old were you when you first used CRT for other personal uses?) was tested with FTCH, the resulting correlation ( $r = .004$ ) was nearly zero.

Since I also wondered about the relationship between amount of current CRT use and inclination to use CRT in future classrooms, I correlated Q23 (Total weekly CRT use) with FTCH. The  $r$  was  $.126$ , a non-significant result.

I conducted a linear regression analysis to see which aspect(s) of CRT experience seems to predict FTCH. I used PEDUC, FAMIL, and items Q13, Q12, Q14, and Q23 (in descending order of correlation values) as the independent variables and FTCH as the dependent variable. I ran the regression forward, backward, and stepwise and got the same results. PEDUC is a significant predictor of FTCH (R Square =  $.082$ ,  $p < .01$ ). Q13 is also a significant predictor (R Square =  $.023$ ,  $p < .05$ ). Together, PEDUC and Q13 account for about 11% of the variance in FTCH. None of the other independent variables was a significant predictor.

Table 13

Respondents' prior experience and current use correlated with FTCH

	<u>Correlation Matrix</u>						
	<u>Q12</u>	<u>Q13</u>	<u>Q14</u>	<u>Q23</u>	<u>FAMIL</u>	<u>PEDUC</u>	<u>FTCH</u>
Q12: earlier CRT use for schoolwork	1.000	.544**	.478**	.041	.041	-.127	-.134
Q13: earlier CRT use for gaming	.544**	1.000	.409**	.004	-.022	-.158*	-.210**
Q14: earlier other CRT use	.478**	.409**	1.000	-.117	-.010	-.223**	.004
Q23: amount of current CRT use	.041	.004	-.117	1.000	.513**	.306**	.126
FAMIL	.041	-.022	-.010	.513**	1.000	.494	.255**
PEDUC	-.127	-.158*	-.223**	.306	.494**	1.000	.285**
FTCH	-.134	-.210**	.004	.126	.255**	.285**	1.000

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Chapter 5: Discussion

In this section, I will be discussing the major results and implications of my analysis of the survey of 234 University of Georgia students who were enrolled in ESPY 2020 in Fall, 2004. My analysis focused on 1) what experiences and familiarity with computer-related technology (CRT) this sample of students had at an early point in their preservice teacher education, 2) what might be their inclinations to use CRT in their future classrooms, and 3) whether there is a relationship between the two. The sample was a fairly homogenous group of traditional students, and therefore, the results of this study may not generalize to the wider group of preservice teachers; however, survey results for this group show a fairly high degree of prior and current CRT use and familiarity, a fairly high degree of intention to use CRT in their future classrooms, and evidence of a significant relationship between prior CRT experience/familiarity and future intentions to use CRT in their classrooms.

### *Demographics of the Sample*

The demographic data collected in the survey indicated that the group participating in the survey was heavily white, mostly female, and came from at least a middle-class background. In these ways, the sample is representative of the general population of preservice teachers in the United States, as reported by Zimpher (1989). For the University of Georgia as a whole, the 2003 freshman cohort was 87 % white and 61 % female (Office of Institutional Research, University of Georgia); the survey participants were thus somewhat more white and much more female than the general

student population at UGA. Most of the preservice teachers in this study grew up in a small town or suburban area and are of traditional college age. Although the survey did not address previous scholastic achievement, because the University of Georgia is currently a selective institution, these students must have been reasonably successful in prior educational endeavors in order to be admitted. Freshmen entering in 2003 had an average SAT score of 1237 (Office of Institutional Research, University of Georgia).

Unlike some previous studies (Rosen & Weil, 1995), for this sample, gender was not a significant factor associated with the composite measure for inclination to use CRT in future teaching (FTCH). Perhaps the gender differences found in earlier studies have been moderated, in the case of at least this sample, by nearly universal CRT usage.

Previous research has reported many age-related differences in CRT use by inservice teachers (Becker, 1999a, 1999b). This survey, however, showed no significant association between age and FTCH. This may have been because the sample was so homogenous in terms of age (96.2% were between 18-24).

*Research Question 1: What personal experience and familiarity with CRT do these respondents have?*

#### *Earlier and Current CRT Use*

This group of preservice teachers seems to have begun using computer-related technology (CRT) at an early age. A large majority used CRT for gaming and/or schoolwork before the age of 13. Virtually all had used CRT for gaming, schoolwork, and other personal tasks, like email, by the age of 16. These students have grown up

accustomed to using CRT in various ways; they have used CRT for entertainment, education, and communication.

Nearly half of these respondents reported first becoming comfortable with CRT at home. This is another indication of their SES background; their families were able to and chose to provide a computer for their use at home. The same percentage first became comfortable with CRT at school, indicating that their schools probably had adequate CRT resources available to them. Because these students had early opportunities to become comfortable with CRT, it is important to remember in interpreting the results of this study that they may have different inclinations to use CRT than other preservice teachers who may not have had the same opportunities.

Since 81% use CRT at least six hours per week, for most of these preservice teachers, CRT use is a common, everyday activity. The survey respondents currently use CRT the most for school-related work. Following closely in terms of hours of use a week are the personal communication/entertainment (email, chat, web-surfing) category and the personal uses (bill-paying, purchasing, seeking consumer information) category. This amount of CRT use seems quite different from research reports of CRT use by inservice teachers (Becker, 1999a, 1999b; Russell, Bebell, O'Dwyer, & O'Connor, 2003). The CRT use of these preservice teachers is much more than has been reported in previous research on preservice teachers, as well (Savenye, et al, 1992; Kirby & Schick, 1998).

The respondents report relatively little CRT gaming at present. Indeed, 153 out of 234 report no time spent gaming at all. This is somewhat surprising considering that gaming was the earliest use of CRT for a majority of respondents. In light of this study's finding that early CRT gaming is significantly correlated with future inclination to use

CRT in teaching (FTCH), it was disappointing to discover that only 2 respondents report presently gaming more than 10 hours per week. This being too small a number to analyze statistically, perhaps in the future a qualitative method could be employed to explore what inclinations serious gamers such as these two have toward CRT use in teaching.

Overall, these responses suggest that this sample of preservice teachers is not likely to exhibit as much computer anxiety or “technophobia” as has been reported in the past literature (Rosen & Weil, 1995). It seems likely that having used CRT at home and/or for gaming and personal use may have allowed these students enough ‘Speilraum’ (freedom or opportunity to experiment at leisure, as defined previously by Bradley & Russell, 1997) so that they could play around with CRT and become comfortable with using it.

#### *Previous Educational Experience with CRT*

As you may recall, a certain amount of recoding (using the recoding system previously described) of responses to items 65-83 (previous educational use of CRT) was necessitated by the overlap between potential answers. It seems that this sample of preservice teachers used word processing, email, virtual classroom/web CT, online encyclopedias/dictionaries/databases, and class websites with homework assignments most frequently in their past educational experiences at all levels. All respondents reported using word processing in their education, and all but nine had used it more than once or twice. This finding aligns with the findings reported by Cuban, Kirkpatrick, & Peck, 2001, that both high school teachers and students report using CRT most often for

word processing. Results were very similar for email, virtual classroom/webCT (which is frequently used in classes at the University of Georgia), online encyclopedias/dictionaries/databases, and class websites with homework assignments.

Interestingly, each of these most used categories (with perhaps the exception of online encyclopedias/dictionaries/databases) would be more in line with a “transmission” style of education. Transmission style education is one in which teaching is viewed as “telling” students what they need to know (for example, in a lecture), in order to transmit the knowledge from the expert’s head into the novice’s head. As Peterson & Knapp (1993) explain, in transmission style education “...knowledge was thought to be constructed by experts (researchers) and transmitted to practitioners (teachers), just as knowledge was thought to be constructed by experts (teachers and adults) and transmitted to novices (students)”. This style of education can be contrasted to the constructivist approach in which knowledge is thought to be constructed by the learner in the course of making sense of their experiences, as well as through their social interactions. Some of the types of CRT these students report having used the least in their past education, such as presentation software, drawing/image-editing/multimedia/desktop publishing, or social studies simulation programs, would seem to hold more promise for a more constructivist pedagogy. For example, hands-on knowledge building programs and social studies simulation programs would give the learner more control over his/her own learning. Listservs/online discussion groups would provide opportunities for collaborative learning. Taken as a group, these lesser used CRT categories would seem to offer more creative, innovative educational uses than the more used CRT categories. Yet even this group of fairly privileged and talented students seems not to have had very much

experience with the more creative uses for CRT in their own prior education. Again, this reflects findings in previous studies that teachers often direct students to use CRT in “limited and unimaginative” ways like word processing (Cuban, Kirkpatrick, & Peck, 2001; Cuban, 1998).

### *Familiarity with CRT*

Results from items 24-44 on these students’ self-perceived familiarity with various types of CRT showed that word processing, email, internet search, and instant messaging/chat are the most familiar to these respondents, results very similar to the results for prior educational experiences with CRT discussed above. Not surprisingly then, the correlation between familiarity with CRT (the composite measure FAMIL) and previous educational experience with CRT (the composite measure PEDUC) was high ( $r = .494$ ) and significant at the .01 level.

Teacher educators should note that students with this level of CRT familiarity would not tend to be afraid of CRT, or worry about breaking the hardware. In planning IT courses for a group of students such as these, one might not need to start at the very elementary level, but could presume a certain level of CRT familiarity with word processing and other commonly cited uses.

It is important to remember also that nearly half of the respondents reported first using/becoming comfortable with CRT in the home, so this strong correlation between FAMIL and PEDUC should not be interpreted to mean that prior educational use is the only or even predominant predictor of CRT familiarity in this sample. It does however, suggest the advantages of educational experience

with CRT, perhaps especially for students who did not seem to have as much or as early home access, the nearly half who reported first becoming comfortable with CRT use at school.

Evidence from the survey items dealing with CRT familiarity reinforces the idea that although these students are comfortable with CRT in general, they may not be that familiar with some specific types of CRT that would be useful in teaching. Therefore it seems that these preservice teachers could benefit from Instructional Technology courses that focus on the more creative educational CRT uses.

*Research Question 2: What are the inclinations of these preservice teachers as far as using CRT in their future classrooms?*

Items 84-102 were intended to address the participants' intentions to use CRT in their future classrooms. Respondents were most likely to foresee using word processing in their future classroom. Again, this finding agrees with the research reports that current teachers and students say they use CRT most often for word processing (Cuban, Kirkpatrick, & Peck, 2001), and also may reflect students overwhelming familiarity and prior educational experiences with word processing. They also intended to use online encyclopedias/dictionaries/databases and email in their future classrooms. Other CRT types they intended to use (although these were cited less commonly than the previously mentioned types) included class websites w/ homework assignments, drill/review/testing for my content area, presentation software, Internet reference research,

grammar/editing/writing tutorial programs, and self-paced instructional tools.

The respondents did not seem quite as inclined to use the remaining categories of CRT types in their future classrooms. It must be noted, however, that the overlapping answer choices for items concerning respondents' inclination to use CRT in future classrooms may make these data a bit less reliable than they should be.

A closer look at the data indicates that these respondents are foreseeing idealized future classroom CRT use, and may not have the requisite knowledge of the actual circumstances under which they will be teaching and which CRT resources they will have available. An example of this is Web CT, a computer application that 67% of respondents reported they would use in their future teaching. Web CT, however, is not normally available in K-12 classrooms; rather, it is used mostly at the college level.

The top four types of CRT that this sample is inclined to use in their future classrooms are the same four types they reported using in their previous education. These data would seem to suggest a relationship between preservice teachers' prior experiences with specific forms of CRT and their reported inclination to use these specific forms in their future teaching. Although this study does not explore the relationship at this level of specificity, perhaps it would be a fruitful avenue to pursue in the future. However, the general relationship between the composite measures for familiarity (FAMIL) and previous educational experience (PEDUC) were correlated with the composite measure for inclination

to use CRT in future classrooms (FTCH). These results will be discussed next, in regard to Research Question 3.

*Research Question 3: What is the relationship between the respondents' personal experience with CRT and their inclinations to use CRT in their future classroom?*

A number of researchers have reported on the influence of prior experience and familiarity with CRT on inservice teachers' use of CRT in the classroom (Becker, 1999; Russell, et.al., 2003; Ivers, 2002). Therefore, in order to investigate whether these relationships held true for this sample of preservice teachers, I compared the prior CRT experience of preservice teachers with their overall inclination to use CRT in their future classrooms.

The results suggest that prior experience was related to preservice teachers' inclinations to use CRT in their future classrooms. Early CRT game-playing ( $r = -.210$ ), familiarity with CRT (FAMIL) ( $r = .255$ ), and prior educational use of CRT (PEDUC) ( $r = .285$ ) were all significantly ( $p < .01$ ) correlated with preservice teachers' inclinations to use CRT in future classrooms (FTCH). Early use of CRT for school ( $r = -.134$ ) and current amount of CRT use ( $r = .126$ ) were also correlated with inclination toward future classroom use, but not at a significant level. The regression analyses pointed to both previous educational CRT use and early CRT game-playing as being good predictors of inclination toward future use of CRT in these preservice teachers' classrooms.

The interpretation of these correlations must be cautious because, although they are all positive, and some are statistically significant, the relationship is low to moderate in all cases. This lower level of relationship may be due to the previously described problems with the survey design. It may also reflect a lack of variation in the responses to some items in this survey such as Item 65 (word processing software), which almost all respondents reported using and being familiar with and Item 69 (Web Design software) which almost all reported having used rarely.

Since the results of these correlations reinforce the findings of previous research that teachers use the CRT types they are familiar with, there are implications for teachers and teacher-educators. First, teacher-educators must look to their own pedagogy. It is important that they model the kind of classroom CRT use they want the preservice teachers to use in the future. Second, preservice teachers will benefit from CRT experiences that include plenty of Spielraum. Third, inservice teachers need to be aware that the amount and creativity of CRT experiences they give their students now may well effect how the next generation of preservice teachers uses CRT.

#### *Suggestions for subsequent surveys*

This survey has provided some useful information about what preservice teachers at the University of Georgia already know about CRT from their previous experiences. It also has provided some insights into how they envision the use of CRT in the classroom, before most have been exposed to coursework in

Instructional Technology or specific educational methods. As discussed above, this information can inform both the curriculum and pedagogy of these subsequent classes. If the intention is to maximize the students' potential to use CRT and use it well in the classroom, this survey provides necessary information to teacher educators about preservice teachers' level of CRT familiarity. As a whole, information about what the students know and do not know about CRT, as provided by this survey, will aide preservice teacher course design.

Nevertheless, this survey could be improved in several ways. The most important change I would recommend is to change the answer options for the items concerning prior educational CRT use and the items concerning inclinations to use CRT in the future. I can think of two ways to change the answers to improve the survey. Either the answer instructions could be changed to allow respondents to choose more than one answer, a change that would mean using another survey format besides scantron, or the answer options could be changed for each group of items. For items concerning prior educational CRT use, the answers could be rewritten as they were recoded for this study. That would result in the answer options being a) never used, b) used once or twice, and c) used more than once or twice. In the case of items concerning future use, a possible way to change the answer options would be a) never use, b) use only for my professional use, c) use only for students, and d) use for my professional use and for my students.

In regard to the types of CRT use offered for future classroom use in items 84-102, some are clearly useful for only certain disciplines. For example, a future

language arts teacher might not foresee having his/her students use a graphing calculator or a hands-on knowledge-building program like Virtual Solar System. Likewise, a future math teacher would not be expected to envision having his/her students use a grammar/editing/writing tutorial program or foreign language/ESOL program. This makes the resulting data harder to interpret. The results do not necessarily answer the intended questions. If we are looking to measure preservice teachers inclination to use CRT, a “No” answer to any of these items that are more discipline-specific does not mean a non-inclination to use CRT in their class.

Another major area to consider for revisions is length of the survey. Respondents taking a 102-item survey could well tire of answering items and simply stop answering without finishing, or else begin to answer more carelessly toward the end. This may have happened in this administration of the survey because in the last group of items (84-102), there were 33 respondents who left at least 4 items blank. I have some suggestions for eliminating some questions and consolidating others, which I will detail next.

Since so many respondents have used word-processing, email, and Internet web-surfing/internet search, perhaps the items regarding familiarity with these types of CRT could be eliminated. Also, perhaps the familiarity section and the prior educational CRT use section could be combined. As mentioned the Results section, these two groups of items are moderately correlated: .494 ( $p < .01$ ).

### *Limitations of the study*

This study has at least two major limitations. First, because they attend the flagship university in a state that offers free tuition to all above average students at state institutions, the survey participants are an unusually academically talented and economically privileged group of preservice teacher candidates. Therefore, their responses to survey items may not be representative of the general population of preservice teachers. Second, the survey instrument contains somewhat flawed answer options for two major groups of items – the items concerning prior educational CRT use and the items concerning inclinations to use CRT in future classrooms. Because of this, the results of the survey must be viewed with caution. Additional research with other samples of preservice teachers, using a revised version of this survey, is needed, in order to test the generalizability of this study's findings.

## Chapter 6: Conclusions and Implications

This study provided information about the prior CRT experiences and familiarity of a group of preservice teachers. It also provided information on the inclinations of these preservice teachers toward using CRT in their future classrooms, and looked at how the two might relate.

This group of preservice teachers has considerable familiarity with CRT and most began using CRT before the age of 13. They have used word processing, email, and Internet reference resources for their own education, and foresee having their students use these forms of CRT as well. However, these respondents have not had as much experience with the more creative and interesting educational uses of CRT, such as multimedia and hands-on knowledge-building programs, and perhaps as a consequence, do not foresee using CRT in these other ways. This would seem to imply that perhaps these preservice teachers do not need an introductory computer technology course as much as previous students may have. Instead, it seems likely that these students could benefit from more courses that address the creative and innovative uses of CRT specifically for the classroom.

Additionally, just as has previously been reported for inservice teachers (Becker, 1999a), this study found significant relationships between these preservice teachers' prior experiences with CRT and their inclinations to use CRT in their future classrooms. More research is needed to determine whether these levels of experiences and relationships hold true for a larger and more diverse sample of preservice teachers. Therefore, it is recommended that the current

survey be revised as suggested above and, after another field test, be made available to teacher education programs at institutions throughout the state of Georgia. Information from such surveys could not only enable each institution to tailor CRT-related teacher education content and pedagogy to the specific, known needs of their students, but could also inform statewide policy-making and resource allocation related to preparing teachers to best use CRT in Georgia classrooms.

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## APPENDIX A: SURVEY

### EPSY 2020 Computer-related Technology Survey Nancy Knapp, Arthur Recesso, Chandra Orrill, & Craig Shepperd

Please mark ONLY ONE answer for each question, unless indicated otherwise

#### DEMOGRAPHIC QUESTIONS

1. Age

1. 17-20
2. 20-24
3. 25-35
4. 35+

2. Gender

1. M
2. F

3. Year in college

1. 1<sup>st</sup>
2. 2<sup>nd</sup>
3. 3<sup>rd</sup>
4. 4<sup>th</sup>
5. 5<sup>th</sup> or higher

4. Ethnicity

1. African American
2. Asian American
3. Caucasian American (other than Hispanic)
4. Hispanic American
5. Other

5. Type of main childhood home

1. Rented apartment(s)
2. Rented house(s)
3. Mobile or manufactured home(s)
4. Owned house(s)
5. Military or other housing provided with employment

6. Location of main childhood home

1. City
2. Suburb
3. Small town
4. Rural area

7. Are/were any of your close family teachers (please mark all that apply)

1. Mother
2. Father
3. Another relative
4. Several other relatives
5. None

8. Do you plan to be a teacher? (If No, skip to question 11)
1. Yes
  2. No
  3. Maybe

9. Preferred age group to work with
1. Pre-K
  2. K-2
  3. 3-5
  4. 6-8
  5. 9-12

10. Intended main content area focus:
1. Math/science
  2. Social Science/history
  3. Language arts
  4. Fine arts
  5. Other

#### PERSONAL COMPUTER EXPERIENCE

(Please note: In the following questions, “computers” means standard desktop or laptop models, NOT hand-held calculators, PDAs, or strictly gaming machines like X-box or Playstation.)

11. In what setting did you first become reasonably comfortable using computers?
1. In my home
  2. In K-12 school
  3. In college
  4. On a job
  5. I don't consider myself “reasonably comfortable using computers”

About how old were you when you first used computers in the following ways:

12. To do school or job-related work
1. Under 13
  2. 14-18
  3. 18-22
  4. 23+
  5. Never

13. To play games
1. Under 13
  2. 14-18
  3. 18-22
  4. 23+
  5. Never

14. For other personal activities (personal Email/chat, web-surfing, purchases, bill-paying etc.)
1. Under 13
  2. 14-18
  3. 18-22
  4. 23+
  5. Never

15. Do you currently own a desktop computer?
1. Macintosh
  2. PC/Windows machine

3. None

16. Do you currently own a laptop computer?

1. Macintosh
2. PC/Windows machine
3. None

17. Do you maintain a personal web page?

1. Yes
2. No

Approximately how many hours a week do you spend using computers in the following ways?

18. School-related work

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

19. Job-related work

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

20. Personal tasks (e.g., bill-paying, purchasing, seeking consumer information)

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

21. Computer gaming

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

22. Other personal communication/entertainment (e.g., personal Email, chat, web-surfing)

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

23. Total weekly computer use

1. None
2. 1-5 hours
3. 6-10 hours
4. 10-20 hours
5. Over 20 hours

How familiar are you with the following computer-related devices and applications/software?

(Use the following response categories for questions 24-44)

1. I don't really need or use
2. I don't use, but would like to learn how
3. Used once or twice, would need a refresher
4. Use occasionally, pretty comfortable
5. Use regularly, very familiar

24. Scanner
25. Digital Camera
26. Digital video camera/webcam
27. PDA (e.g., Palm Pilot)
28. Word processing software (e.g., Word or WordPerfect)
29. Spreadsheet software (e.g., Excel)
30. Presentation software (e.g., Powerpoint)
31. Drawing or painting software (e.g., Illustrator, Kid Pix)
32. Desktop publishing software (e.g., InDesign or Quark)
33. Web design software (e.g., FrontPage or DreamWeaver)
34. Drafting/industrial software (e.g., CAD-CAM)
35. Business or personal financial software (e.g., Quicken)
36. Data analysis/statistical software (e.g., SPSS, SAS)
37. Image-editing software (e.g., Photoshop)
38. Multimedia development software (e.g., Hyperstudio or Flash)
39. Email
40. Instant messenger/chat
41. Internet search engines (e.g., Google, Yahoo)
42. Information databases on the Internet (e.g., GALILEO, Medline)
43. iTunes/MP3 software
44. Internet stores/auctions (e.g., Ebay, Amazon)

#### EDUCATIONAL COMPUTER USE

Please indicate to what extent you agree or disagree with the following statements about the use of

computers in teaching and learning:

(Use the following response categories for questions 45-64)

1. Disagree strongly
2. Disagree
3. Not sure/neutral
4. Agree
5. Agree strongly

45. Most K-12 students have a least one computer at home to use.
46. Students tend to stay on-task more when they are using computers than when they are doing regular classwork.
47. Computer-based activities are most important when teaching gifted or advanced students.
48. When students are doing research on the Internet, it is best for the teacher to preview and give them a list of all the sites they should use.
49. The money schools spend on computers could often be better spent somewhere else.
50. The quality of students' writing (not just their spelling or neatness) tends to be better when they write on computers.
51. A disadvantage of computer-based activities is that students are so isolated, all staring at their own screens.
52. Computer activities are particularly useful as a reward or break from more rigorous classroom learning activities.
53. It is important to have school computer labs easily accessible to students before and after school.
54. Students who do too much work on computers can become too dependent on technology to do their work for them.
55. Computer-based activities are more useful for teaching older students than younger students.
56. When doing computer-based activities, students often get too distracted having fun and don't focus enough on the learning they should be doing.
57. Computer-based activities can encourage students to do more complex, thoughtful work.
58. Students should not do most of their writing on computers until they have mastered the fundamentals of handwriting and spelling.
59. Copying and plagiarism is a much bigger worry when assignments are written on computer.
60. When doing computer-based activities, students who have been lower-achieving often surprise

you with unusually good work.

61. It's hard to depend on computers for a major learning activity; they tend to "crash" or the software doesn't work right just when you need it.
62. A teacher who uses a lot of computer-based activities has to give up too much instructional control—she doesn't have enough time for real teaching.
63. Students tend to interact and help each other more during computer-based learning activities than during more traditional classroom activities.
64. Perhaps the most important use of computers in the classroom is to give students extra practice on concepts they have learned, and let them have fun doing it.

Considering the following computer-related educational applications, indicate if used them *in your own education*.

(Use the following response categories for questions 65-83)

1. I have never used
2. I used once or twice in K-12
3. I used more than once or twice in K-12
4. I have used once or twice in college
5. I have used more often than once or twice college

(You may fill in more than one response for this section)

65. Word processing software
66. Spreadsheet/data analysis software
67. Presentation software (e.g., Powerpoint)
68. Drawing/painting/image-editing/multimedia/desktop publishing software
69. Web design software
70. WebCT or other "virtual classroom" software
71. Email
72. Class website with homework assignments listed
73. Listservs/online discussion groups
74. Online encyclopedias/dictionaries/databases
75. Internet reference research (e.g. Citeseer)
76. Drill/review/testing programs for my content area
77. Graphing calculators or mathematical reasoning and modeling programs (e.g., Geometer's SketchPad)
78. Hands-on knowledge building programs (e.g., Virtual Solar System, Virtual Physics Lab)

- 79. Self-paced Instructional Tool (e.g. Accelerated reader, Accelerated Math)
- 80. Social studies simulation programs (e.g., SimCity, Civilization II, Decisions, Decisions)
- 81. Typing tutors
- 82. Grammar/editing/writing tutorial programs (beyond spell or grammar check in WP programs)
- 83. Foreign language or ESOL programs

Considering the following computer-related educational applications, indicate ***how you would use them as a teacher***. If you are not going to be a teacher, do not answer questions in this section.

(Use the following response categories for questions 65-83)

- 1. I would never use for my own professional work
- 2. I would never have my students use
- 3. I would use as a teacher for my own professional work
- 4. I might have my students use for a special project
- 5. I would definitely have my students use for more than just a special project

(You may fill in more than one response for this section)

- 84. Word processing software
- 85. Spreadsheet/data analysis software
- 86. Presentation software (e.g., Powerpoint)
- 87. Drawing/painting/image-editing/multimedia/desktop publishing software
- 88. Web design software
- 89. WebCT or other “virtual classroom” software
- 90. Email
- 91. Class website with homework assignments listed
- 92. Listservs/online discussion groups
- 93. Online encyclopedias/dictionaries/databases
- 94. Internet reference research (e.g. Citeseer)
- 95. Drill/review/testing programs for my content area
- 96. Graphing calculators or mathematical reasoning and modeling programs (e.g., Geometer’s SketchPad)
- 97. Hands-on knowledge building programs (e.g., Virtual Solar System, Virtual Physics Lab)
- 98. Self-paced Instructional Tool (e.g. Accelerated reader, Accelerated Math)

99. Social studies simulation programs (e.g., SimCity, Civilization II, Decisions, Decisions)
100. Typing tutors
101. Grammar/editing/writing tutorial programs (beyond spell or grammar check in WP programs)
102. Foreign language or ESOL programs