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STUDENT ATTITUDES TOWARD USING COMPUTER COMPONENTS IN FAMILY SCIENCES COURSEWORK

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF EDUCATION AND HUMAN ECOLOGY

BY

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DENTON, TEXAS

MAY 1998

TEXAS WOMAN'S UNIVERSITY
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_____
Date

To the Associate Vice President for Research and Dean of the Graduate School:

I am submitting herewith a thesis written by Mary Bold entitled "Student Attitudes Toward Using Computer Components in Family Sciences Coursework." I have examined this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Family Studies.

Gladys J. Hildreth
Gladys J. Hildreth, Major Professor

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ABSTRACT

STUDENT ATTITUDES TOWARD USING COMPUTER COMPONENTS IN FAMILY SCIENCES COURSEWORK

Mary Bold

Master's Thesis, May 1998

The purpose of this study was to explore Family Sciences students' attitudes toward using technology in coursework. A survey was completed by 109 undergraduate and graduate students who had been assigned a required computer component. Most of the students had easy access to computers. The majority reported confidence in computer use and an interest in learning more about computers while in college. Overall, the students' responses were similar in that most reported positive attitudes toward the use of technology in coursework. Some differences between groups were seen. Undergraduates were more likely than graduate students to say that they would use e-mail to state an opinion rather than state it orally in class. There were also differences between experienced e-mail users and novice e-mail users. Experienced users were more likely to say they needed little computer training and more likely to want more computer components in their coursework.

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CHAPTER I

INTRODUCTION

The use of computer technology in undergraduate and graduate education has increased dramatically in recent years. The impact of computer technology is experienced in all fields, including the Family Sciences. The technology is utilized on multiple levels, from administrative functions to teaching.

In coursework, the utilization of technology has been dependent largely on the individual instructor's interest level and technical proficiency. In spite of this dependence on individuals' efforts, the use of computer technology and its inclusion in instructional design are becoming institutionalized quickly. It will become an integral part of education (Lawless, 1995). According to Schneider and Block (1995), the World Wide Web (WWW) already is becoming "a de-facto standard as information tool on the Internet" (p. 6). In incorporating computer technology, universities respond to demands of the marketplace as well as demands of students who have grown up using the technology (Spotts & Bowman, 1995). There is already a growing expectation among

college students for increasing use of technology in coursework ("Building the Syllabus," 1997).

Griffin (1995) described the incorporation of digital networking in education as "consistent with the information access paradigm shift where information goes to people rather than people going to information repositories (libraries)" (p. 1). He went on to say that "technology barriers are falling away" and that financial pressures make digital learning environments "inevitable" (Griffin, 1995, p. 1). According to Wang and Sleeman (1993), the computer should be viewed as an integral part of the educational process.

In the Family Sciences, computer technology has been incorporated in undergraduate and graduate education at a number of universities. Uses of the technology include computer mediated communication including electronic mail (e-mail), research through Internet-based services and exploration of the WWW, delivery of course material through instructor and university WWW sites, distance learning, and in-class display of information. The Department of Family Sciences at Texas Woman's University has explored all of these uses in addition to maintaining a Department homepage on the University's web site. The Department of Family Sciences homepage includes electronic publications such as

"Roles of Grandparents" for student assignments (Bold, Hildreth, & Fannin, 1997).

These multiple approaches to learning have become possible in the very recent past. Most of the development for wide access and ease of use has occurred just in this decade, making the technologies increasingly available and affordable to the public (Palin, 1997). The entire history of the Internet can be described as less than three decades old (Hafner & Lyon, 1996) which is an important consideration in evaluating its use in education. The WWW has been available only since 1992.

Students' attitudes toward this use of technology are an important area for study. Their attitudes are intertwined with their learning. Additionally, for some students, some benefits and drawbacks of the technology affect their attitudes.

Some benefits ascribed to the technology are:

1. Technology minimizes the constraints of distance and time on education (Rohfeld & Hiemstra, 1995). For students, this may mean the ability to pursue an education regardless of distance from campus or restriction of time due to family or employment.

2. Economics of higher education in America supports the use of technology strategies to reduce costs and extend educational opportunities to a growing number of students.

3. Technology-based education can provide students more access to otherwise rarely or irregularly scheduled classes as well as overcome completion difficulties (by facilitating self-pacing, for example) (Hiltz, 1997).

4. Use of the WWW can enhance classroom teaching and permit experimenting with new pedagogies such as students collaborating in exploratory research (Schneider & Block, 1995). The WWW also can serve as an interface to scientific data, papers, and online journals.

5. When the technology is used for an asynchronous learning process, reflective thinking by students is encouraged (Hiltz, 1997).

6. When computers are used to deliver curriculum material, important information can be highlighted for students with animation, sound, blinking or reversed text, and graphics (Cates, 1991).

7. Certain functions, such as posting information about courses and distributing learning materials, can be accomplished on the WWW with relatively little difficulty (Schneider & Block, 1995).

8. The collaborative nature of the Internet promotes the utilization of teachers as facilitators instead of information transmitters (Schneider & Block, 1995).

9. Family Sciences information for student, professional, and lay audiences can be disseminated through the Internet (Andrews & Hughes, 1996; Bailey, Morris, & Dollahite, 1996; Hughes, 1996b).

10. Family Sciences students can utilize technology in their personal and family lives as well as in education.

Some drawbacks ascribed to the technology are:

1. Loss of regular and frequent face-to-face interaction may have a negative effect on the educational process.

2. Hiltz (1997) reported that, after a decade of experience with virtual classrooms at New Jersey Institute of Technology, technical and logistical problems persist although they may change in specific nature.

3. Some students are unable or resistant to spending money on equipment or services needed to participate in technology-based education (Hiltz, 1997).

Statement of the Problem

Information is limited on the evaluation of Internet-related technology in postsecondary education, the efficacy of Internet tools such as e-mail in the Family Sciences, and Family Sciences students' attitudes about using such technology. These issues have not received scrutiny by researchers.

Use of technology in education has increased; study of the use has not increased at the same pace. There is a scarcity of research especially for recent uses of Internet-related technology. While many researchers have investigated the effectiveness of individual computer programs and computer-assisted instruction (CAI), much of the work is specific to only those programs or to students younger than college age. Few findings can be generalized to account for efficacy of general uses of technology. The rapid changes in technology and the proliferation of computer-based curriculum since the inception of the WWW further widen the gap between use and evaluation.

In the Family Sciences, as in many of the social sciences, adoption of Internet technology has been slower than in other disciplines. While many factors may affect adoption of technology, an important one is the interpretive

nature of Family Sciences information. E-mail is an example of a technology which presents difficulty within the Family Sciences because it is nonverbal and not conducive to communication of highly interpretive language. Most of the literature on e-mail is limited to instructors' recollection of experiences and is not research-based. Other e-mail issues such as privacy and its treatment in the historical development of e-mail (Hafner & Lyon, 1996) are discussed even less frequently in the literature.

Student attitudes about computer technology have been studied, frequently in correlational research. Research in this area has centered on the effects of gender, prior experience with computers, and computer ownership on students' attitudes toward computers. In recent years, contradictory results have emerged from the research, suggesting that some trends in student attitudes are changing. Much of the research focuses on students in technical fields, such as computer science, or on young students in elementary and secondary schools. Little information is available concerning attitudes toward uses of technology in courses by university students in the Family Sciences.

Statement of Purpose

The purpose of this study was to explore Family Sciences students' attitudes toward using technology in coursework. Specifically, this study addressed students' attitudes toward computer components that encompassed locating Family Sciences information on the Internet and utilizing e-mail to communicate with instructors or classmates. The focus was on course requirements and not students' independent use of computer technology in education.

By surveying Family Sciences students on their experiences with technology, this study elicited students' attitudes about the experiences as well as what students perceived as benefits and drawbacks of computer components. Likert-scale survey questions and open-ended questions were utilized to explore students' concerns on these issues as well as to attempt to assess students' confidence in using computer technology and students' interest in the increasing use of such technology in coursework.

Research Questions

The research questions that guided the study were:

1. What do Family Sciences students perceive as difficulties arising from required computer components in coursework?

2. What do Family Sciences students perceive as benefits arising from required computer components in coursework?

3. Are Family Sciences students' attitudes toward using computer components positive or negative?

4. Do Family Sciences students express confidence in their use of technology?

5. Do Family Sciences students support the increasing use of technology in coursework?

6. Are attitudes toward using computer components among the students in the sample related to subject variables such as age, year of schooling, status as traditional or re-entry student, or prior experience with computers?

Appendix A relates these research questions to specific items appearing in the instrument used in this research.

Definitions

For purposes of this study the following definitions were applied:

Asynchronous learning process: Learning activities in which students may engage at any time, without regard to meeting times or simultaneous communication with an instructor or classmates.

Computer component: Use of computer technology in one or more required course assignments that encompass locating information on the Internet and utilizing e-mail to communicate with the instructor or with classmates. Examples of locating information include use of Internet research tools, accessing course-related information on WWW sites, or accessing curriculum material that the instructor has posted on the Internet or that the instructor has provided for web delivery. Examples of utilizing e-mail include submitting written assignments to the instructor, distributing written assignments to other members of the class, or communicating with class members about joint projects. For this study, all computer components reflect a course requirement and not voluntary research or informal, voluntary communication.

Computer-mediated communication: Use of telecommunication technologies with computers and computer

networks (Randall et al., 1996), which includes the specific applications of e-mail, multimedia presentation and authoring, the Internet, the World Wide Web, and online searching for scholarly material.

E-mail: Asynchronous computer-mediated communication between individuals or to a distribution list of class members (Zack, 1995).

Focus group: Small group of people in discussion to address a specific topic (Lengua et al., 1992).

HTML: Hypertext Markup Language of programming codes to produce the display of text, graphics, and special effects on an Internet site and to provide linking between Internet sites (Hill & Misic, 1996).

Instructional technology: Use of technology to achieve instructional objectives (Spotts & Bowman, 1995).

Internet: Structure comprised of networks of computer networks (Doran, 1996). The networks connect more than three million host computers in 90 countries (Hill & Misic, 1996).

Internet research: Use of online research tools such as FirstSearch and EBSCO.

Online: Use of a computer while connected to a network via telephone and modem. For this study, online includes use of a laboratory computer connected to a university server.

Student: Volunteer in the final sample who was enrolled in coursework in the Department of Family Sciences at Texas Woman's University.

Web delivery: Use of the World Wide Web to post HTML-based curriculum materials for access by students.

World Wide Web: Internet service providing access to read-only HTML-based documents (Hill & Misic, 1996).

Assumptions

The following underlying assumptions were made for this study:

1. As technology has been incorporated in coursework, it has impacted Family Sciences students.

2. Students' attitudes toward technology affect their performance in coursework.

3. Family Sciences instructors will continue to incorporate technology in course design, and students will be expected to use technology in coursework.

4. Some level of anxiety or difficulty is expected to be associated with the introduction of computer components in coursework, at least for some students; and that level influences student attitudes toward using the component.

5. Students' responses to survey questions about technology adequately reflected their attitudes for the purposes of this study.

6. A 4-point Likert scale for questions adequately distinguished between positive and negative attitudes toward using computer components.

Delimitations

The following delimitations applied to this study:

1. The study assessed only individuals in a convenience sample of students enrolled in coursework in the Department of Family Sciences at Texas Woman's University.

2. No attempt was made to survey students by quota for gender, class standing, college major, or level of experience with computers.

3. The study relied on self-reports of students' attitudes.

4. Different computer components were represented by students' completed questionnaires. Although all students completed at least one required assignment as defined in this chapter as a "computer component," their experiences may have differed in terms of length of assignment, level of difficulty, and time commitment.

Summary

The purpose of this study was to gain understanding of how Family Sciences students feel about using computer components in coursework. The study explored students' attitudes and reported on students' perceived difficulties with and benefits of the computer components. Findings from this study can assist instructors in understanding the impact of computer components on students and in planning Family Sciences curricula which include such components.

CHAPTER II

REVIEW OF LITERATURE

This study was concerned with Family Sciences students' attitudes toward using computer components as coursework requirements. The study specifically addressed whether students' attitudes were positive or negative and what students perceived to be benefits of or problems with using computer components. Understanding students' perceptions can be helpful for educators in the design and teaching of university courses.

The review of literature focused on four subtopics: (a) theoretical framework, (b) use of computer technology in higher education, (c) gender and other subject variables, and (d) computer experience and student expectation and motivation.

Theoretical Framework

The literature about computer-mediated instruction is not based on any one theory. A broad view of the subject can be considered from the framework of human ecology theory. Students' educational experience with technology can be

considered with cognitive-field interaction theory within the framework of social learning theory.

Human Ecology Theory

Human ecology theory provides numerous concepts, among them interaction, interdependence, and adaptation. Interaction is the process by which change in one part of the ecosystem induces change in another part; interdependence is the mutual dependence of one part of the ecosystem on another part (Bubolz & Sontag, 1993). According to this theory, interaction and interdependence are concepts which help to explain relationships between parts of the ecosystem. The introduction of computer technology into students' educational careers induces change on the part of students. Interaction between the technology and students may begin suddenly or slowly over time; however it begins, it proceeds with changes being made by both parts of the ecosystem. As a relationship is established between technology and student, each part becomes dependent upon the other. The resulting interdependence might be represented by students relying more and more on Internet research tools and growth of those tools depending on amount of use by students and by students' increasing demands of the technology.

Adaptation is the behavior of a living system that "changes the state or structure of the system, the environment, or both. . . . Learning is an essential part of this process" (Bubolz & Sontag, 1993, p. 433). For students using computer technology, adaptation might be represented by students as they change work habits in order to accommodate technical aspects of using the technology. For example, a student who is accustomed to preparing an assignment the day before it is due may change to preparing the assignment several days before the due date in order to provide for multiple attempts in the event that the computer technology malfunctions on that preparation day.

Adaptation may refer also to the individual's changing the environment. For example, when faced with a technology malfunction, the student may make a change in computer hardware or software. Outside of malfunctions, individuals may make many changes in the technology as a result of their learning about computers and as a result of their experiences with computers.

Social Learning Theory and Cognitive-field Interaction Theory

"Social learning theory . . . provide[s] a better pedagogical framework for online courses than classic learning theories" (Kearsley, Lynch, & Wizer, 1995, p. 40).

Social learning theory as characterized by Bandura provides for an expanded view of individuals' learning to include reciprocal determinism, whereby an individual's behavior acts on the environment just as the environment acts on the individual (Bandura, 1986; Berger, 1994; Crosbie-Burnett & Lewis, 1993; Woolfolk, 1993). Reciprocal determinism is an apt description of the relationship between a student and computer technology. Their action on each other is an integral part of the student's learning process as, for example, a student becomes adept at using Internet research tools or accustomed to processing information on a monitor rather than by editing hard copy. Further, as the student continues to use the technology, new opportunities for reciprocal determinism arise.

Cognitive-field interaction theory defines learning as an attainment of or change in cognitive structure and "emphasizes the use of experimental, scientific, and reflective processes in gaining knowledge . . . [and] students' gaining insights or understandings as they become involved in contemporaneous situations" (Bigge & Shermis, 1992, p. 271). Bigge and Shermis advised that "cognitive interactionists strive to teach on an exploratory-understanding level" (p.272). Computer technology allows students to use experimental, scientific, and reflective

processes; and it also supports an exploratory-understanding approach to material.

In using computers in education, students may gain insights as they use the technology in real-time exploration of the World Wide Web, for example. Research into a Family Studies topic such as consumer behaviors in the family might lead a student through a government web site dedicated to consumption statistics, followed by a marketing company's interactive assessment tool to identify individuals' spending patterns, and finally to an investment company's calculator-style worksheet for designing a family budget. In such an exercise, the student would have the opportunity to develop or amend insights into consumer behaviors. The student's process could be described as both contemporaneous and exploratory, and thus representative of some of the concepts of cognitive-field interaction theory.

Computer Technology in Higher Education

While research has indicated efficacy of computer-based instructional technology (Fitzelle & Trochim, 1996; Reeves, 1996), the studies have been disparate in terms of type of technology and level of application. Because of the short history of applications of e-mail and the WWW in higher

education, much of the work in these areas is preliminary. Nevertheless, four perspectives on technology in higher education can be gleaned from the literature: (a) evaluation, (b) instructors' individual efforts, (c) a whole-campus perspective, and (d) a Family Sciences perspective.

Evaluation

Evaluation has been hampered by a lack of tools available to measure new applications of technology. For example, researchers do not easily find instruments with which to evaluate web sites (Fitzelle & Trochim, 1996).

Even instrumentation for more traditional course evaluation is problematic. The majority of research studies examined for this review relied on students' self-reports as the basis for evaluation of educational technology. In her report on asynchronous learning networks at New Jersey Institute of Technology, Hiltz (1997) noted that self-report data from student questionnaires suffer from validity issues. Responses may be biased by the student's regard for the professor or by perception of risk that a response may affect a grade.

When evaluation of educational technology is attempted, it should reflect required computer assignments in regular

coursework. Kearsley and Lynch (1996) addressed this issue in their description of a distance education program:

> Indeed, it is curriculum structure that distinguishes instruction from informal learning experiences; students can acquire knowledge at the library or by browsing the Internet without any help from a teacher. However, the organization of information and learning activities in a formal course offering should make it a more valuable educational experience than random information gathering. (p. 191)

Hiltz (1997) also distinguished formal and informal use of the technology in an account of networks used at the New Jersey Institute of Technology:

> If it is not a "required" and graded, integral part of the course, the majority of the students will never use it at all; and those who start to use it, will generally decide that "nothing is going on there" and will stop using it. (p. 3)

Rohfeld and Hiemstra (1995) echoed this point in describing evaluation of computer conferencing in courses at Syracuse University: "Most reported that they learned only the techniques they actually had to use. If they did not have to upload and download, for instance, they did not try to learn those features" (p. 8). Bailey and Cotlar (1994) stated that technology-based activities, projects, and curriculum content should be incorporated into most courses.

Instructors' Individual Efforts

Much of the incorporation of technology in college coursework has resulted from individual efforts by instructors (Connell, 1996; Spotts & Bowman, 1995). These instructors have taken the lead in their colleges or departments, developing computer-based curricula on their own. Reports of these efforts frequently include mention of large amounts of faculty time devoted to the coursework (Hughes, 1996a; Kearsley, Lynch, & Wizer, 1995; Lacina-Gifford & Kher-Durlabhji, 1996; O'Donnell, 1996).

Instructors' reports on their and their students' experiences with computer-based technology are frequently positive. For example, Meacham (1994) said that students find required e-mail discussions interesting and helpful. For some students, electronic communication aided them in making their opinions public to the rest of the class, whereas speaking in class would have been a problem. Bailey and Cotlar (1994), Beadle (1996), O'Donnell (1996), and Zack (1995) reported similar advantages for some students.

In an extensive report on the International Council for Distance Education's On-Line World Conference, Paulsen (1995) catalogued a large number of pedagogical techniques which have been utilized successfully in computer-mediated communication between educators and primarily adult

students. The majority of the examples reflected projects by individual teachers. The list of techniques, which Paulsen pointed out was not exhaustive, included online databases, journals, and applications; software libraries; online interest groups; interviews; learning contracts, apprenticeships, and internships; correspondence studies; lectures and symposiums; skits, debates, simulations, role plays, and case studies; discussion groups, brainstorming, Delphi techniques, forums, and project groups. Paulsen concluded that educators can choose from a wide range of techniques that are suitable for use in computer-mediated communication.

Whole-campus perspective

Whole-campus perspectives are sparse in the literature but are important as forerunners to large scale evaluation of university use of technology. Examples of the literature in this field includes evaluation of programs at New Jersey Institute of Technology (NJIT), University of Minnesota at Crookston (UMC), and Syracuse University. Conclusions of the evaluations are included in this review.

New Jersey Institute of Technology (NJIT). Hiltz (1997) conducted a study on student response to the Asynchronous Learning Network (ALN) at NJIT. In place for a decade, ALN is available for two complete undergraduate degree programs

in Information Systems and Computer Science. Participation in ALN courses is generally asynchronous or what the Institute calls "anytime/anywhere." Courses are a mix of online, videotape, and Virtual Classroom formats. Hiltz drew the following conclusions:

1. Students who completed the courses rated them equal to or superior to traditional courses.

2. Dropout or incomplete grades were more prevalent in ALN courses.

3. Grade distribution was similar in ALN and traditional courses.

4. Students and faculty devoted more "start-up" time at the beginning of courses.

5. Some students reported that it was more difficult to build close personal relationships with other students.

6. Procrastination was sometimes a problem since classes did not meet on a regular and frequent basis; some students postponed work and fell seriously behind.

7. Most students (71%) felt that ALN courses provided better access to professors.

8. Most students (69%) considered the courses more convenient than traditional ones.

9. Collaborative learning took place and also provided motivation: 55% felt more motivated to work hard because

other students would be reading their electronically submitted assignments. Only 9% disagreed.

10. Students and faculty tended to work harder in ALN courses. In response to the statement, "I didn't have to work as hard for the online class," 67% disagreed and only 13% agreed.

11. In overall evaluation, 58% of students said they would take another ALN course. In comparing total amount learned in an ALN course, 40% felt they had learned more than in a traditional course and 21% felt they had not. When asked if the technology increased the quality of education, 58% said yes and 20% said no.

12. Faculty reported more than usual preparation time, especially for classes which were videotaped (as much as 10 hours preparation for 2 hours of taping). After initial work was completed, the amount of time spent conducting a class was about the same as for a traditional class, assuming class size was 25 or fewer students. When the number of students climbed above 30, online conferences were divided, effectively doubling the workload for the teacher.

13. Continuing issues of concern included questions of intellectual property, policies regarding use of teaching assistants for large online classes, compensation for faculty preparing course materials for distance delivery,

and support for faculty learning new skills to use the technology.

University of Minnesota at Crookston (UMC). The following conclusions are drawn from a report by UMC's chancellor (Sargeant, 1995) on mobile computing by students on that campus. Since 1993, all faculty and full-time students have been required to use laptop computers in all of their coursework. In a leasing agreement with IBM, new laptops are issued once a year; the University is responsible for providing local network, electronic library, and Internet access.

Standardized computer hardware and software helped define academic expectations and provided for cost effectiveness in planning services. Standardization and skill-building were enhanced by the requirement of an introductory computer course in students' first quarter of enrollment.

Every classroom became a computer laboratory when instructors asked students to bring their computers to class. The need for campus labs was reduced dramatically. Classrooms were reconfigured to support local area network (LAN) and Internet connections. Numerous locations on campus provided additional connections as well as free access to laser printers. All computers had internal modems

facilitating connection to the LAN system via telephone from any on- or off-campus location.

Computer technology was incorporated into all courses. Some faculty concerns were the computer fee as a detriment to recruiting students, the need for faculty development, and the time required to incorporate the technology. Training was intensified and offered weekly; two years after conversion, regularly scheduled training sessions continued.

All students, faculty, and staff communicated via e-mail, representing a major change for everyone on campus. E-mail was used for distribution of class notes, participation in instructional listservs, and other activities. As a campus-wide standard, e-mail resulted in less telephone tag, less waiting at offices, and more access to people and information.

Leasing of laptops was funded by a mandatory fee paid by all full-time students (approximately 1,000). The cost to each student was $260 per quarter. As a mandatory fee, this cost qualified as a financial aid expense. The fee included maintenance and insurance so that the greatest additional out-of-pocket expense for a student (due to loss or breakage) would be $500. Each computer was bundled with software so that assignments could be made with all students using the same programs. IBM provided new models every year

so that upgrades in hardware and software were automatic and universal.

Syracuse University. Rohfeld and Hiemstra (1995) reviewed computer conferencing used in courses at Syracuse University. The University adopted electronic conferencing after considering ways to meet needs of part-time graduate students who lived far from campus. Rohfeld and Hiemstra made the following conclusions:

1. In the computer-mediated courses, students took responsibility for their learning.

2. Efforts were made to bring students together on campus for an orientation session in order to facilitate building group rapport.

3. Technical training included face-to-face tutorials, large group orientations, and a customized manual. "The amount of support novice users are likely to need cannot be overestimated" (Rohfeld & Hiemstra, p. 3).

4. Attention was paid to establishing a tone for positive experience. Efforts included discussions about the learning environment itself and also time for extensive introductions of students and for conversation off the course topic.

5. Critical or reflective thinking was stimulated by use of journal writing, interactive reading and discussion,

reflective feedback on student-submitted products, weaving (linking various contributions), and questioning.

6. To stimulate participation and interaction, courses included small group discussion of individual students' needs, debates, polling activities, dyadic partnerships, and small group projects for distribution to other students or to the instructor.

7. Course evaluations revealed that students generally found the courses to be good learning experiences.

Family Sciences Perspective

Certain technology, such as e-mail, poses special problems in social sciences. E-mail is a completely nonverbal form of communication; it can also be described as relatively anonymous and status-levelling (Geser, 1996). Geser (1996) wrote of the language limitations of e-mail for the social sciences:

> Of course, E-communication is most adequate in cases where words have a highly standardized and consensual meaning, so that there is no need to provide additional specifying cues. Thus, it will be used widely in scientific fields characterized by high paradigmatic development and formalized codes of expression (mathematics, chemistry, etc.) and less in most social sciences or humanities, where imprecise definitions and nonconsensual terminological interpretations prevail. (p. 6)

These aspects of e-mail may be important to instructors in the Family Sciences who seek to use e-mail to communicate with students and to evaluate that use. Zack (1995) addressed the issue in his report of using e-mail with undergraduates. He found that both he and students were more likely to use e-mail when issues were relatively unambiguous and factual. As questions became complex, the need for face-to-face meetings was obvious.

Klein (1996) reported at the 1996 annual conference of the National Council on Family Relations (NCFR) that his experiences with e-mail as a pedagogical tool were highly dependent upon class size. Specifically, when the number of students exceeded 25, e-mail was less efficient and less effective.

NCFR featured nine other speakers besides Klein on the topic of technology in Family Science education at the 1996 conference in Kansas City. The introduction of technology topics to national conventions such as NCFR's indicates the importance that Internet technology is assuming nationwide and reflects some of the specific uses of the technology in Family Sciences programs in the U.S. The following examples are drawn from presentations at NCFR:

1. Statistical analysis software has been successfully introduced in undergraduate courses in research methods (Heath, 1996; MacDermid, 1996).

2. Course-specific software is also available commercially and it has been customized to serve as practice and testing modules for family relations courses (Busby, 1996).

3. Computer-driven multimedia presentations provide a rich format of images for reaching students of the MTV generation and have been created for undergraduate courses at Syracuse University (Busby, 1996).

4. Visual images representing family structure make a powerful impact on students; software applications which aid in creating such images are Fractal Design Painter, Adobe Photoshop, and Poser. These applications were used by Randal Day (1996) in creating original art to accompany lectures; the art was also installed on students' CD-ROM self-study modules.

5. Technology such as CD-ROMs and 800 numbers play an important part in the design of courses at Washington State University in order to support a requirement to export degrees in human development by 1998 (Day, 1996).

6. Ohio State University publishes its newsletter for Family Sciences professionals on the WWW in addition to

other media. Internet delivery has been given first priority, however, to promote readers' choice for electronic transmission (Andrews & Hughes, 1996).

7. In addition to professional publications, NCFR speakers recommended that Family Sciences departments publish family life education materials in electronic formats for lay audiences (Andrews & Hughes, 1996; Bailey et al., 1996; Hughes, 1996b).

Gender and Other Subject Variables

The historical view of effect of gender on computer competency has been that males perform at higher levels than females and experience lower anxiety in completing computer tasks. However, in some studies, females outperformed males on measures of computer competency or confidence (Ayersman & Reed, 1995; Parish & Necessary, 1996); or gender was found unrelated to computer anxiety and computer attitudes (Kernan & Howard, 1990; Walters & Necessary, 1996), suggesting that a trend has reversed. Ayersman and Reed suggested that increasing numbers of computers in all environments have the effect of changing stereotypes about gender and computer ability. Findings by Smith and Necessary (1996) suggested

that gender and computing literacy merely covary together and that other factors should be studied.

Other subject variables which have been researched in relation to computer use include classification of student. Klein, Knupfer, and Crooks (1993) found that re-entry students (college students who were 25 years or older and had returned to formal education after an absence of 3 or more years), when compared to traditional college students, had more positive attitudes about computers, greater confidence and higher interest in learning about computers, and less anxiety about computers. The re-entry students also outperformed the traditional students in testing. Similar reports have been made by other researchers (Smith & Necessary, 1996).

Computer Experience and Student Expectation and Motivation

Lack of computing experience has been correlated with computer anxiety or negative attitudes about computers (Ayersman & Reed, 1995; Bernt, Bugbee, & Arceo, 1990; Kernan & Howard, 1990; Parish & Necessary, 1996; Smith & Necessary, 1996; Walters & Necessary, 1996). Bernt et al. (1990), in their study of student resistance to computer testing,

questioned the relevance of computer experience, however, in light of the wide exposure of individuals to computers.

Statistics of home and school computer use by children confirm this point about wide exposure. Based on 1993 statistics from the National Center for Education Statistics, more than a quarter of children have access to computers at home; and more than half of children have access at school. Poor children are least likely to have computer access at school (Edmondson, 1997), but the access gap between lower-income children and middle- or higher-income children is considerably narrower at school than at home.

Ayersman and Reed (1995) reported in their investigation of undergraduate preservice teachers that instruction in programming significantly reduced computer anxiety, with no significant difference by type of student learning style. Results of the study did show, however, that the two learning styles least represented in the sample showed the least reduction in anxiety. The researchers concluded that perhaps learning styles possessed by the minority of students in a class are not accommodated by the instruction offered in a course.

In another study of prospective educators, Hignite and Echternacht (1992) concluded that computer literacy cannot

be used to predict computer attitudes and vice versa. A deficiency in attitude would not necessarily be corrected by increasing instruction to raise literacy.

Certain characteristics of computer technology have been related to student attitude. Some of the characteristics which appeared to predict performance were learner control of pace, inclusion of learning games, and enjoyment (Fitzelle & Trochim, 1996).

Attitude has been measured as a dependent variable in numerous investigations, some of which are cited in this review of literature. Less attention has been paid to the role of attitude in students' expectations of their participation in technology-based activities. Trochim and Hover (1997) addressed this problem in their study of undergraduates using web-based technology:

> One of the first and most important steps in evaluating any program or technology is to assess the expectations and assumptions that participants bring to the context. How people interact with a program is heavily influenced by their views about it, by what they expect it to be like and what they hope to get out of it. Assessing such amorphous and subjective psychological expectations poses significant methodological challenges for the evaluator. (p. 1)

Another aspect which has been considered is motivation. In a study of undergraduate students and computer

conferencing use, Velayo and McKeachie (1994) found that students who were highly intrinsically motivated were more accepting of novel methods of instruction than were students who were extrinsically motivated by grades, competition, and evaluation.

Summary

The review of literature for this study suggested that rapid change is occurring in higher education in regard to use of computer technology. As more universities and instructors incorporate technology in coursework, the need for evaluation of the technology also increases. Some trends may be emerging, such as the preferences of faculty and students for asynchronous e-mail discussion, just as others may be reversing, such as the apparent change in the effect of gender on computer competency and attitudes.

The literature indicated that wide exposure to computers in society results in fewer differences among students in use of technology. However, individual learning styles and student expectations may be subjective considerations which will influence students' experiences with instructional technology.

Reports from universities about their use of instructional technology indicated that institutional expectations include ongoing technical challenges and a continuing need for training and orientation for students. Some universities expect to provide computer hardware and software for students' individual use.

Universities that evaluated new technology in education found generally positive response by students. The variety of technologies makes comparison among programs and universities difficult. However, the general trends for use of technology are that entire campuses will be involved and that use will increase over time.

In the Family Sciences, various technology-based pedagogies are being used in undergraduate and graduate courses. While some technologies, such as e-mail, may pose special communication problems in Family Sciences, the number and extent of technologies being utilized are increasing nevertheless. Understanding students' attitudes toward instructional technology is beneficial information for educators and administrators who seek to evaluate and improve the use of technology in Family Sciences coursework.

CHAPTER III

METHODOLOGY

The purpose of this study was to gain an understanding of student attitudes toward use of computer technology through the use of an anonymous questionnaire. The questionnaire was completed by students after completion of a computer component in required coursework in the Family Sciences.

Sample

The population for the sample was drawn from volunteers who were enrolled in courses in the Department of Family Sciences at Texas Woman's University. At the time the study was planned, a survey of instructors revealed that 9 courses in the Department included computer components and that 13 were planned for the next semester. Students at both the undergraduate and graduate level were eligible to be included in the sample. Volunteers were sought in only those courses which included computer components as required coursework. The final sample consisted of 109 students.

Instrumentation

Using as a guide the comments of Levine and Donitsa-Schmidt (1996) that use of a specific rather than a general instrument is preferred, a custom instrument was developed for this study. The instrument was designed to reflect coursework requirements in the Department, using terminology commonly used in the Department.

The instrument (see Appendix B) was designed as a Likert-scale survey and included open-ended questions. It was designed so that students could reasonably expect to complete it in less than 20 minutes. The physical lay-out of the questionnaire reflected current standards of typesetting and readability in the U.S. The lay-out was intended to facilitate reading and marking the questionnaire and to help to minimize the number of incomplete questionnaires.

The instrument was submitted for review of content to a panel of three experts before being used. One of the experts is in the field of communications and education. The other experts are university professors who have incorporated computer technology into their courses.

The instrument also was submitted to a focus group of 5 students who had used computer technology in previous coursework. The students, representing both undergraduate

and graduate levels, were asked to complete the questionnaire in regard to earlier experience with a computer component. They were asked to note the number of minutes needed to complete the questionnaire and also to mark on the questionnaire any words or questions which were not clear to them. Using the draft questionnaire as a basis for discussion, the students shared their experiences with computer components. The comments from the discussion were considered in reviewing the questionnaire before it was printed for use in the study.

After review by the panel of experts and the focus group of students, minor modifications were made to the questionnaire. These changes concerned demographic items.

Some of the questions written for the instrument reflected choice of content in surveys previously used in research or course evaluation. Resources included Fitzelle and Trochim (1996), Kernan and Howard (1990), Klein et al. (1993), Levine and Donitsa-Schmidt (1996), Smith and Necessary (1996), Walters and Necessary (1996), and Zack (1995).

The questionnaire was designed to collect demographic information about the sample. Precise information, such as actual age, was collected although the data were reported in broad categories. Demographic information included age of

student, gender, standing (freshman, sophomore, junior, senior, graduate), full-time or part-time enrollment, major, and college history in terms of continuous attendance or status as a re-entry student.

Information on students' prior experience with computers was collected along with the demographic information. Respondents check-marked boxes to indicate whether their use of computers, e-mail, or the Internet for the current coursework was first-time use in a class or first-time use ever. These questions were not intended to elicit opinion or reflect any attitude toward technology.

Presented as statements, 27 questionnaire items addressed students' computer access, use of computer components, visiting WWW sites, asking for help, personal reactions, and overall assessments. Respondents were asked to respond to the statements according to a 4-point Likert scale. The response range was Strongly Agree, Agree, Disagree, and Strongly Disagree. Statements were written so that Strongly Agree and Agree responses reflected a positive attitude toward using computer components in coursework in Family Sciences. Disagree and Strongly Disagree responses reflected a negative attitude. An even-numbered Likert scale was selected to promote students' making a clearly positive

or negative response and not having the option of making a neutral response.

The last page of the questionnaire was devoted to eight open-ended questions about students' experience with the computer component. The physical lay-out of the questionnaire facilitated students' handwriting of answers by providing lines under these questions.

Procedures and Data Collection

A Level 1 application regarding this study was submitted to the Human Subjects Review Committee at Texas Woman's University. The Committee approved the application before research began.

Through a letter (see Appendix C), instructors in the Department of Family Sciences at Texas Woman's University were asked if questionnaires could be distributed to students in any classes which included a required computer component. Agreement by four faculty members resulted in questionnaires being distributed in six courses in the areas of parenting, family communication, research methodology, and consumer studies.

Students filled out the questionnaires after they completed a required computer component in regular

coursework. As soon as practical after completion, the questionnaires were transferred to a file cabinet where they were mixed with other respondents' questionnaires. All distributed questionnaires were returned except one.

This study employed methods similar to the New Jersey Institute of Technology's efforts in their surveys of students to assure respondents of confidentiality and delivery of data outside of instructors' influence. These issues were addressed in a cover letter to students who volunteered to participate.

The cover letter (see Appendix D) explained that participation in the study was voluntary and that all responses were confidential. The letter also specified that response on the questionnaire was intended to be anonymous and that questionnaires would not be coded or sorted in any way which would identify an individual respondent or a class. Subjects were advised that participation required a one-time commitment of less than 20 minutes to complete the questionnaire.

Questionnaires were not marked, coded, or organized in any way which could identify their source class or the individual respondent. Each questionnaire was reviewed for entries such as student's name, class number, instructor's name. None showed identifying marks.

Data Analysis

SPSS Graduate Pack 8.0 for Windows (1997) was used for all data analysis. A coding form (see Appendix E) was created to facilitate analysis and comparison with research questions. Demographic information about the sample and responses to Likert-scale questions were reported as frequencies and percentages, with measures of central tendency noted when appropriate. Analysis also reflected student responses to open-ended questions in the tradition of qualitative research. The open coding method described by Strauss and Corbin (1990) was used.

Prior to analysis, the questionnaires were reviewed for legibility. All questionnaires could be read and analyzed with confidence.

A subject number was assigned to every questionnaire. The subject numbers did not reflect sorting or other organization of the questionnaires and in no way identified the students who completed the questionnaires. The subject numbers were used solely for the entry of data into the computer program utilized in the analysis.

Responses were compared to the research questions posed in this study. Findings and demographic information were reported through frequencies and percentages. Measures of

central tendency were reported when appropriate. Answers to the open-ended questions were analyzed for similar responses, common themes that emerged, and individual comments that served to summarize the attitudes of the sample.

Additional quantitative analysis was conducted to examine responses of sub-groups within the sample. The additional analysis dealt only with the demographic information and the Likert-scale items of the questionnaire. Two-tailed *t* tests for independent groups (such as traditional-entry students vs. re-entry students) were utilized to compare mean scores. An alpha level of .05 was used in running *t* tests. To protect against Type I error which might occur in light of the large number of tests run, the Bonferroni approach was used. A *p*-value of less than .001 was required for significance. Tests for effect size were run to determine the magnitude of differences between group means.

Summary

Family Sciences students were surveyed through the use of a questionnaire that included Likert-scale and open-ended questions. The questionnaire was developed by the

researcher and reviewed for content by a panel of three experts in education and a focus group of 5 students who had used computer components in course work in Family Sciences. When distributed to the sample, the questionnaire was completed on a voluntary and anonymous basis. The anonymity and confidentiality of respondents were protected. Demographic information as well as quantitative and qualitative data were reported to reflect the sample of students using one or more computer components in Family Sciences coursework.

CHAPTER IV

RESULTS

The purpose of this study was to gain an understanding of student attitudes toward use of computer technology through the use of an anonymous questionnaire. The questionnaire was completed by students after completion of a computer component in required coursework in the Family Sciences.

Description of Sample

Questionnaires were distributed to 111 students who were enrolled in courses in the Department of Family Sciences at Texas Woman's University. The number returned was 110; however, one of the questionnaires was not completed and, therefore, was discarded. The final sample was 109.

Descriptive data about the respondents are listed in Table 1. A discussion of the results follows the table.

Table 1

Sample Demographic Description

Category	n	%
Gender		
Male	7	6.4
Female	102	93.6
Age Category		
Under 25 years	54	49.5
25 to 34 years	16	14.7
35 to 44 years	26	23.9
45 years or older	13	11.9
Standing		
Freshman	0	0.0
Sophomore	6	5.5
Junior	28	25.7
Senior	34	31.2
Graduate student	41	37.6
Enrolled (hours carried)		
Fewer than 12 hours	46	42.2
12 or more hours	63	57.8
Entry		
Traditional-entry	57	52.3
Re-entry	52	47.7

Category	n	%
Major (field of study)		
Not reported	2	1.8
Family Science	6	5.5
Family Studies	35	32.1
Child Development	25	22.9
Home Economics	7	6.4
Biology	1	.9
Counseling	13	11.9
Marriage and Family Therapy	7	6.4
Occupational Therapy	1	.9
Math	1	.9
Spanish Literature	1	.9
Sociology	2	1.8
Education	5	4.6
Psychology	1	.9
Interdisciplinary	1	.9
Mass Communications	1	.9

Table 1 (continued)

Category	n	%
Experience with technology[a]		
First use of a computer in a class	14	12.8
First use of a computer ever	1	.9
First use of e-mail in a class	37	33.9
First use of e-mail ever	22	20.2
First use of the Internet in a class	23	21.1
First use of the Internet ever	9	8.3

[a]62 respondents marked one or more items in this section

Gender

Of the total sample (N = 109), only a small proportion of respondents were men. The number (n = 7) represented 6.4% of the sample.

Age Category

Respondents' ages were grouped by category: under 25 (n = 54), 25 to 34 (n = 16), 35 to 44 (n = 26), and 45 or older (n = 13). In broader terms, the sample can be described as 49.5% (n = 54) students under 25 and 50.5% (n = 55) students who were 25 or older. The mean age was 30.28 (SD = 10.31), and the median was 25.00.

Standing

Status based on year of schooling is detailed in Table 1. In broader terms, the sample can be described as 62.4% (n = 68) undergraduate students and 37.6% (n = 41) graduate students.

Hours Enrolled

Respondents indicated their current enrollment as 42.2% (n = 46) carrying fewer than 12 hours and 57.8% (n = 63) carrying 12 or more hours. The questionnaire included the terms "full-time" and "part-time."

Entry

Respondents were classified as being either traditional-entry students (n = 57) or re-entry students (n = 52). Questionnaire responses indicating traditional-entry were "I first entered college directly after high school" or "within 3 years of my high school graduation."

Figure 1 displays further breakdown of students' entry status according to standing as undergraduate or graduate student. Of undergraduate respondents (n = 68), the majority (73.5%) indicated traditional entry to college (n = 50). A minority of 26.5% (n = 18) indicated re-entry status. Re-entry students either began college more than 3 years after high school graduation or they returned to college

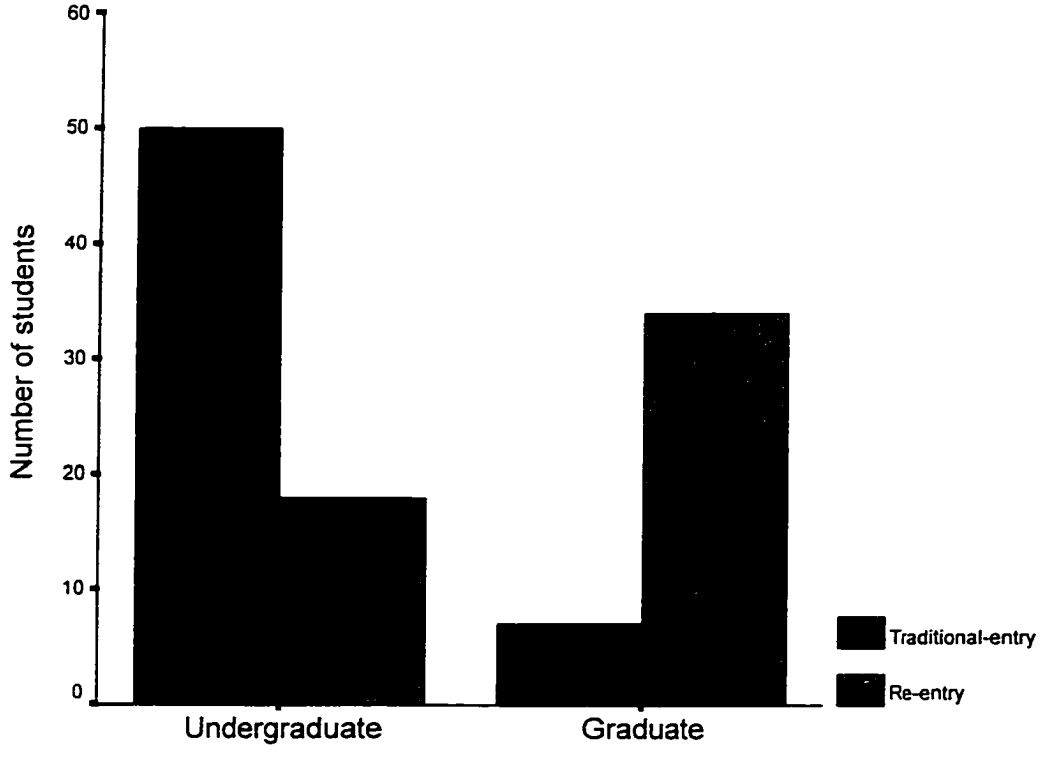

Figure 1. Number of traditional- and re-entry students after a break of more than several years. The lengths of break were reported by 16 undergraduates; the lengths ranged from 5 years to 30 years. For 14 of the students, the break was 10 or more years.

Among graduate school respondents (n = 41), the majority, or 82.9% indicated a return to school following a break (n = 34). The lengths of break were reported by 20 graduate students; the lengths ranged from 4 years to 30 years. For 13 of the students, the break was 10 or more years. A small number (n = 7), or 17.1% of graduate students, indicated that graduate schooling began within

the first year after college graduation. These students were counted as traditional-entry students to represent continuous activity in educational institutions.

Major

As shown in Table 1, college major or field of study was reported by 107 respondents. On the questionnaire, no options were offered; students wrote in responses on a line.

Most of the respondents, about 85%, indicated a major within the Family Sciences (n = 93). The most frequently occurring majors were Family Studies (n = 35) and Child Development (n = 25).

Experience with Technology

Respondents placed checks next to items that identified their use of technology for that course as being their first use in a class or their first use ever. A small number of students, 12.8% (n = 14), indicated that the computer component was their first use of a computer in a class. A single student reported first use of a computer ever.

In describing use of e-mail, 33.9% (n = 37) said it was their fist use in a class; 20.2% (n = 22) said it was their first use ever. In describing use of the Internet, 21.1% (n = 23) said it was their first use in a class; 8.3% (n = 9) said it was their first use ever.

First-time-ever use of e-mail was analyzed for sub-groups of the sample. Among undergraduates, 23.5% (n = 16) reported first-time-ever use; among graduate students, the incidence was 14.6% (n = 6). For part-time students, incidence was 19.6% (n = 9); for full-time students, incidence was 20.6% (n = 13). Among traditional-entry students, incidence was 15.8% (n = 9); for re-entry students, incidence was 25% (n = 9). By age category, 16.9% (n = 9) of students under age 25 were first-time-ever users of e-mail; for those who were 25 or older, the figure was 23.6% (n = 13).

First-time-ever use of the Internet was analyzed for sub-groups of the sample. Among undergraduates, 8.8% (n = 6) reported first-time-ever use; among graduate students, the incidence was 7.3% (n = 3). For part-time students, incidence was 10.9% (n = 5); for full-time students, incidence was 6.3% (n = 4). For traditional-entry students, incidence was 7% (n = 4); for re-entry students, incidence was 9.6% (n = 5). By age category, 7.4% (n = 4) of students under age 25 were first-time-ever users of the Internet; for those who were 25 or older, the figure was 9% (n = 5).

Results

The study was guided by six research questions. The results are described and organized around these questions.

Perceived Difficulties

The first research question asked, "What do Family Sciences students perceive as difficulties arising from required computer components in coursework?" The question was addressed by four Likert-scale items and one open-ended question. Results of Likert-scale items appear in Table 2.

Table 2

Perceived Difficulties from Required Computer Components in Coursework

Statement	n	%
I have easy access to a computer at home.		
Strongly Agree	85	78.0
Agree	9	8.3
Disagree	7	6.4
Strongly Disagree	8	7.3

Table 2 (continued)

Statement	n	%
I have easy access to a computer at TWU.[a]		
Strongly Agree	42	39.3
Agree	51	47.7
Disagree	10	9.3
Strongly Disagree	4	3.7
I have easy access to a computer at work.[b]		
Strongly Agree	32	33.3
Agree	21	21.9
Disagree	16	16.7
Strongly Disagree	27	28.1
I found reading from the computer monitor comfortable.[c]		
Strongly Agree	31	28.7
Agree	49	45.4
Disagree	24	22.2
Strongly Disagree	4	3.7

[a] n = 107. [b] n = 96. [c] n = 108.

About 86.3% (n = 94) of respondents reported easy access to a computer at home. A smaller proportion, 13.7%

(n = 15), disagreed, indicating limited or no access at home. The mean was 3.57 (SD = .91), positive.

About 86.9% (n = 93) of respondents reported easy access to a computer on the TWU campus. A smaller proportion, 13.0% (n = 14), disagreed, indicating limited or no access on campus. The item was not answered by 2 respondents. The mean was 3.22 (SD = .77), positive.

About 55.2% (n = 53) of respondents reported easy access to a computer at work. A smaller proportion, 44.8% (n = 43), disagreed with the statement, indicating limited or no access at work. The item was not marked by 13 respondents. The mean was 2.60 (SD = 1.22), positive.

About 74.1% (n = 80) of respondents reported that reading from the computer monitor was comfortable. A smaller proportion, 25.9% (n = 28), disagreed with the statement, indicating that reading from a monitor was a difficulty. The item was not marked by 1 respondent. The mean was 2.99 (SD = .81), positive.

Responses to the open-ended question "What are the drawbacks of computer components in Family Sciences coursework?" indicated that some students considered computer access a potential difficulty. Comments by 36 respondents expressed sympathy for students who might not have home access to a computer or who are inexperienced

with computers. Among the authors of these comments, 86.1% (n = 31) reported that they had easy access to computers at home. Of the remaining 13.8% (n = 5), all said they had easy access to computers on campus.

Drawbacks were described by 100 respondents; the write-in line was left blank by 9 respondents. Comments fell into six categories: concern for others (as detailed above), no drawbacks, specific technical concerns, time, interaction, and miscellaneous.

"No drawbacks" or "none" was indicated by 23% of respondents (n = 23). An additional 7 students specified no drawbacks under certain conditions. For example, typical comments were "none, if adequate support is available" and "none unless server is down." Adding these comments to the general category of no drawbacks, 30% of respondents saw no drawbacks.

Specific technical concerns were listed by 15% (n = 15). Comments related to the potential of computer viruses, worry about non-delivery of e-mail, the need for a better University server, and so forth. Typically, a respondent in this category stated a single technical concern.

Time was cited by 7.0% (n = 7). All comments stated that computer components were time-consuming.

Interaction was addressed by 8.0% (n = 8). All comments spoke of a loss of personal interaction, or the potential of a loss, resulting from use of computer components.

Miscellaneous comments by 6.0% (n = 6) included responses such as "don't know" and "more stress."

Perceived Benefits

The second research question asked, "What do Family Sciences students perceive as benefits arising from required computer components in coursework?" The question was addressed by one Likert-scale item and one open-ended question. Results of the Likert-scale item appear in Table 3.

Table 3

Perceived Benefits of Computer Components in Coursework

Statement	n	%
I may state an opinion through e-mail that I am unlikely to state orally in regular class.[a]		
Strongly Agree	18	16.7
Agree	26	24.1
Disagree	51	47.2
Strongly Disagree	13	12.0

[a]n = 108.

About 40.7% (n = 44) of respondents reported that they might express an opinion through e-mail that they would be unlikely to express in regular class. The majority of respondents, 59.3% (n = 64), disagreed with the statement. The item was not marked by 1 respondent. The mean was 2.45 (SD = .91), negative.

Responses to the open-ended question "Describe the benefits of having computer components in Family Sciences coursework" fell into six categories: resource, proficiency, convenience, professional preparation, educational process, and conservation. Incidence is reported below in terms of the number of times cited. Percentages are not included because about one fifth of respondents listed multiple benefits. The number of respondents who answered the question was 102. The comment "no benefits" or "none" was made by 4 respondents.

Resource was cited by the largest number of respondents (n = 32) as the benefit of having computer components. Most of the comments included "information" or "research" in describing benefits of the Internet or "communication" in describing benefits of e-mail. Several respondents were specific in referring to research or information "in my field" or "in my major."

Proficiency was cited 23 times. A typical comment was "keeping up with technology."

Convenience was cited 21 times. Common phrases were "from home" and "anytime." Several students said that having Internet access reduced the number of trips to the library.

Professional preparation was cited 16 times. Preparing "for the workplace" and "for the real world" were common statements.

Educational process was indicated in 18 comments. Most comments referred to improvement in learning processes and in homework submissions. Several respondents mentioned being able to turn in work immediately upon completion and without worry of printer problems. Other comments suggested the possibility of immediate grades, a new way to approach class projects, and use of materials other than textbooks. Benefits for instructors were mentioned by 2 respondents.

Conservation was mentioned by 4 respondents. Their comments were "saves trees" and "saves paper."

Student Attitudes

The third research question asked, "Are Family Sciences students' attitudes toward using computer components positive or negative?" The question was addressed by five Likert-scale items and four open-ended questions. Results of the Likert-scale items appear in Table 4.

Table 4

Student Attitudes Toward Using Computer Components in Coursework

Statement	n	%
I liked using e-mail for assignments.[a]		
Strongly Agree	34	31.5
Agree	47	43.5
Disagree	17	15.7
Strongly Disagree	10	9.3
I liked using the Internet to access course materials.		
Strongly Agree	53	48.6
Agree	35	32.1
Disagree	14	12.8
Strongly Disagree	7	6.4
I feel little or no anxiety about completing computer assignments.[b]		
Strongly Agree	27	25.0
Agree	37	34.3
Disagree	38	35.2
Strongly Disagree	6	5.6

Table 4 (continued)

Statement	n	%
Computers are fun.[c]		
Strongly Agree	40	37.0
Agree	54	50.0
Disagree	10	9.3
Strongly Disagree	4	3.7
The assignment(s) caused me to gain (or maintain) a positive attitude toward computers in coursework.		
Strongly Agree	32	29.4
Agree	59	54.1
Disagree	16	14.7
Strongly Disagree	2	1.8

[a]n = 108. [b]n = 108. [c]n = 108.

The majority of respondents, 75% (n = 81), reported that they liked using e-mail as required in the computer component. The remaining 25% (n = 27) disagreed, indicating a dislike for the use of e-mail in the assignment. The item was not marked by 1 respondent. The mean for the item was 2.97 (SD = .92), positive.

A larger majority of respondents, 80.7% (n = 88), reported that they liked using the Internet as required in the computer component. The remaining 19.3% (n = 21) disagreed, indicating that they disliked using the Internet. The mean was 3.23 (SD = .91), positive.

The proportion of respondents reporting little or no anxiety about completing computer assignments was 59.3% (n = 64). The remaining 40.7% (n = 44) disagreed, indicating that they did experience anxiety. The item was not marked by 1 respondent. The mean was 2.79 (SD = .89), positive.

The large majority of respondents, 87% (n = 94), agreed with the statement that computers are fun. The remaining 13% (n = 14) disagreed. The item was not marked by 1 respondent. The mean was 3.20 (SD = .76), positive.

The majority of respondents, 83.5% (n = 91), agreed that the assignment caused them to gain or maintain a positive attitude toward computers in coursework. The remaining 16.5% (n = 18) disagreed. The mean was 3.11 (SD = .71), positive.

The first open-ended question which addressed attitudes asked respondents to report their initial reactions when they learned of a required computer component. Comments were made by 108 respondents; 1 person did not complete the item. The comments were categorized into five responses: positive,

acceptable, neutral or none, anxious, and negative. Positive reactions included remarks such as "intriguing," "excited," and "optimistic." These comments were made by 36.1% (n = 39). Acceptable reactions were milder in tone, using phrases such as "no problem" and "OK because I knew how." The category of acceptable represented 13% (n = 14) of respondents. A small proportion, 3.7% (n = 4) reported "neutral" or "no" initial reaction. Anxious reactions were reported by 27.8% (n = 30). Their comments included phrases such as "a little uneasy," "slightly apprehensive," "not familiar with it," and "ambivalent." Negative reactions were reported by 19.5% (n = 21). Comments included "waste of time" and "dread."

The second open-ended question about attitudes asked respondents to identify their expectation of completing the component as difficult, easy, or something else. The comments fell into four responses: easy, easy but a concern, not sure, and difficult. The general response of easy was made by 69.7% (n = 76). Of these respondents, 51 (46.8% of the total sample) wrote in "easy" and 25 (22.9% of the total sample) wrote in "easy but" with a qualification. Some of the qualifications were that the assignment would take some time, that e-mail might not be received, and that the University server was often down. A small proportion, 3.7%

(n = 4), answered that they were not sure of what to expect. "Difficult" was reported by 26.6% (n = 29).

The third open-ended question concerning attitudes asked respondents to evaluate how their experiences matched their expectations. Comments were made by 103 respondents; 3 did not complete the item, and 3 entered other remarks. The comments were categorized into four responses: as easy as expected, as difficult as expected, easier than expected, and more difficult than expected. More than half of the respondents, 52.8% (n = 56), said completing the component was as easy as expected. A small proportion, 6.6% (n = 7) described it as being as difficult as expected. The second largest response was from the 32.1% (n = 34) who said it was easier than expected. "More difficult" than expected was reported by 5.7% (n = 6).

The fourth open-ended question about attitudes asked respondents to comment on any anxiety they experienced in completing the assignment. Comments were made by 103 respondents; 6 did not complete the item. In two broad categories of response, 23.3% (n = 24) reported no anxiety and 76.7% (n = 79) reported some type of anxiety.

Responses in the anxious category were of four types. The first type, concerned with e-mail delivery, was reported by 30.1% of all respondents (n = 31). The second type,

concerned with technical matters, was reported by 19.4% of all respondents (n = 20). Some of these comments were very specific, naming EBSCO and Venus, for example, as sources of anxiety. The third type of anxious response related to students' unfamiliarity with the Internet or e-mail. This type was reported by 13.6% of all respondents (n = 14). The fourth type was comprised of students' non-technical concerns about the assignment. For example, several students commented on procrastination. These and similar comments were reported by 13.6% of all respondents (n = 14).

Student Confidence in Technology Use

The fourth research question asked, "Do Family Sciences students express confidence in their use of technology?" The question was addressed by nine Likert-scale items and two open-ended questions. Results of the Likert-scale items appear in Table 5.

The majority of respondents, 64.2% (n = 70), said they felt confident that e-mail submissions would be delivered properly. The remaining 35.8% (n = 39) disagreed, indicating low confidence. The mean was 2.78 (SD = .93), positive.

The proportion of respondents reporting high confidence in their writing format being suitable for e-mail was 78% (n = 85). The remaining 22% (n = 24) indicated low confidence. The mean was 2.99 (SD = .83), positive.

Table 5

Confidence in Technology Use

Statement	n	%
I felt confident that my e-mail submissions would be delivered properly.		
Strongly Agree	26	23.9
Agree	44	40.4
Disagree	28	25.7
Strongly Disagree	11	10.1
I felt confident that the format of my writing was suitable for delivery via e-mail.		
Strongly Agree	30	27.5
Agree	55	50.5
Disagree	17	15.6
Strongly Disagree	7	6.4
I have a good idea of what is on the World Wide Web.		
Strongly Agree	37	33.9
Agree	45	41.3
Disagree	22	20.2
Strongly Disagree	5	4.6

Table 5 (continued)

Statement	n	%
It is easy to ask for help with computers.[a]		
Strongly Agree	29	26.9
Agree	54	50.0
Disagree	23	21.3
Strongly Disagree	2	1.9
I am comfortable asking peers for computer help.		
Strongly Agree	41	37.6
Agree	51	46.8
Disagree	16	14.7
Strongly Disagree	1	.9
I am comfortable asking instructors for computer help.		
Strongly Agree	31	28.4
Agree	54	49.5
Disagree	21	19.3
Strongly Disagree	3	2.8

Table 5 (continued)

Statement	n	%
I like to figure out computers on my own.[b]		
Strongly Agree	14	13.0
Agree	43	39.8
Disagree	28	25.9
Strongly Disagree	23	21.3
I need little training for computer assignments.		
Strongly Agree	23	21.1
Agree	45	41.3
Disagree	33	30.3
Strongly Disagree	8	7.3
I learn new computer skills quickly and easily.		
Strongly Agree	33	30.3
Agree	49	45.0
Disagree	24	22.0
Strongly Disagree	3	2.8

[a] n = 108. [b] n = 108.

The majority of respondents, 75.2% (n = 82), reported that they had a good idea of what is on the WWW. The remaining 24.8% (n = 27) disagreed. The mean was 3.05 (SD = .85), positive.

The proportion of respondents reporting ease in asking for computer help was 76.9% (n = 83). The remaining 23.1% (n = 25) disagreed that is was easy. The item was not marked by 1 respondent. The mean was 3.02 (SD = .75), positive.

The proportion of respondents reporting ease in asking peers for computer help was 84.4% (n = 92). The remaining 15.6% (n = 17) disagreed. The mean was 3.21 (SD = .72), positive.

The majority of respondents, 78% (n = 85), agreed that they were comfortable asking instructors for computer help. The remaining 22% (n = 24) disagreed. The mean was 3.04 (SD = .77), positive.

Regarding the statement "I like to figure out computers on my own," 52.8% (n = 57) agreed. The remaining 47.2% (n = 51) disagreed with the statement. The item was not marked by 1 respondent. The mean was 2.44 (SD = .97), positive.

A majority of 62.4% (n = 68) said that they needed little training for computer assignments. The remaining

37.6% (n = 41) disagreed, indicating a need for training. The mean was 2.76 (SD = .87), positive.

High confidence about learning new computer skills was indicated by 75.2% (n = 82) of respondents. The remaining 24.8% (n = 27) said they did not learn new computer skills quickly and easily. The mean was 3.03 (SD = .80), positive.

The first of two open-ended questions concerning students' confidence asked respondents to describe what computer skills they learned or improved as a result of their assignment. The question was not answered by 5 respondents. The answer of "none" was cited by 16.3% (n = 17) of those who responded.

Answers which specified skills fell into five categories: Internet searches, word-processing, e-mail, general online skills, and other technical skills. Internet searches was specified by 26.0% (n = 27). Typical comments included mention of EBSCO, search engines, choice of search words, and accessing full text of research articles. Word-processing skills were cited by 10.6% of respondents (n = 11). Specific skills were cut-and-paste and conversion to text files. E-mail skills were indicated by 26.0% (n = 27). General online skills were typically described simply as "improved Internet and e-mail." Such comments were made by 15.4% (n = 16) of the respondents. Other technical

skills, such as improved typing of "long web addresses," were stated by 5.8% (n = 6).

The second question relating to confidence asked students to detail whether they needed help with the assignment and, if so, how much and from whom. Similar-sized responses emerged: 51.9% (n = 55) reported having received help and 48.1% (n = 51) said they did not have help. The question was unanswered by 3 students.

Of those students who received no help, most did not elaborate. A few commented that they simply worked on the assignment through trial and error until it was accomplished. Clarifying discussions with classmates were mentioned by 2 students, but both clearly indicated that they did not consider the discussions as help with the assignment. "For relief" was one student's explanation of discussion with peers.

Of those students who did receive help, 8 specified having received "a lot" of assistance and 16 specified "a little." The remainder of these respondents did not comment on the amount of help.

A total of 48 respondents identified who helped them. Main sources of help were peer or classmate (n = 10), husband (n = 8), friend (n = 7), graduate student (n = 6), and library staff (n = 4). The following sources were each

mentioned two times: computer lab staff, TWU student in computer lab, father, sister, brother, co-worker. The following sources were each mentioned once: daughter, book, secretary, instructor, and hired computer tutor.

Student Support of Technology Use

The fifth research question asked, "Do Family Sciences students support the increasing use of technology in coursework?" The question was addressed by six Likert-scale items. Results appear in Table 6.

The majority of respondents, 70.4% (n = 76), agreed with the statement that more course assignments should be paperless. The remaining 29.6% (n = 32) disagreed. The item was not marked by 1 respondent. The mean was 2.93 (SD = .94), positive.

Regarding the statement that regular class time should be devoted to visiting WWW sites, 66.7% (n = 72) agreed. The remaining 33.3% (n = 36) disagreed. The item was not marked by 1 respondent. The mean was 2.84 (SD = .78), positive.

The majority of respondents, 71.6% (n = 78), said they would like to see more computer assignments in their course-work. The remaining 28.4% (n = 31) disagreed. The mean was 2.87 (SD = .85), positive.

Table 6

Support of Technology Use

Statement	n	%
More course assignments should be paperless (using electronic communication).[a]		
Strongly Agree	34	31.5
Agree	42	38.9
Disagree	22	20.4
Strongly Disagree	10	9.3
Regular class time should be devoted to visiting sites on the WWW either in a computer lab or using a projection display in a regular classroom.[b]		
Strongly Agree	22	20.4
Agree	50	46.3
Disagree	33	30.6
Strongly Disagree	3	2.8

Table 6 (continued)

Statement	n	%
I would like to see more computer assignments in my coursework.		
Strongly Agree	25	22.9
Agree	53	48.6
Disagree	23	21.1
Strongly Disagree	8	7.3
I hope to learn a lot about using computers while I am in college.[c]		
Strongly Agree	39	36.8
Agree	56	52.8
Disagree	9	8.5
Strongly Disagree	2	1.9
The benefits of computer components in coursework outweigh the drawbacks.[d]		
Strongly Agree	29	26.9
Agree	63	58.3
Disagree	13	12.0
Strongly Disagree	3	2.8

Table 6 (continued)

Statement	n	%
More Family Sciences courses should include computer components.[e]		
Strongly Agree	22	20.6
Agree	55	51.4
Disagree	23	21.5
Strongly Disagree	7	6.5

[a]n = 108. [b]n = 108. [c]n = 106. [d]n = 108. [e]n = 107.

The proportion of respondents who agreed that they hoped to learn a lot about using computers while in college was 89.6% (n = 95). The remaining 10.4% (n = 11) disagreed. The item was not marked by 3 respondents. The mean was 3.25 (SD = .69), positive.

The majority of respondents, 85.2% (n = 92), agreed that the benefits of computer components in coursework outweigh the drawbacks. The remaining 14.8% (n = 16) disagreed. The item was not marked by 1 respondent. The mean was 3.09 (SD = .70), positive.

The proportion of respondents who agreed that more Family Sciences courses should include required computer components was 72% (n = 77). The remaining 28% (n = 30)

disagreed. The item was not marked by 2 respondents. The mean was 2.86 (SD = .82), positive.

Differences by Subject Variables

The sixth research question asked, "Are attitudes toward using computer components related to subject variables?" Two-tailed t tests were run on all quantitative questionnaire items for five different groupings. The total number of t tests was 125. The Levene's test for equal variances was utilized. To protect against Type I error, the Bonferroni approach was used; a p-value of less than .001 was required for significance.

Effect size was computed for differences between group means using a formula reproduced in Appendix F. The formula is based on pooled standard deviations of the groups. This test was chosen because several of the t tests utilized pooled variances as specified by the Levene's test for unequal sample sizes. Effect size results were compared with traditional standards. Values of .2, .5, and .8 represented small, medium, and large effect sizes, respectively. In discussion here, values between .4 and .7 are referred to as medium or moderate.

Results of tests appear in Tables 7 - 11, organized according to grouping variables. Explanation of results, including effect size, and a brief description of grouping

follow each table. An overview of the effect size tests appears in Table 12.

Table 7

Differences between Group Means of Respondents under Age 25 and Respondents Age 25 or Older

	Under 25		25 or Older				
Item	M	SD	M	SD	t	df	p
Access to a computer at work							
	2.21	1.11	3.00	1.20	3.35	94	.001
Use of e-mail to state an opinion							
	2.72	.94	2.19	.80	3.19	103	.002

The grouping variable for these items refers to two broad age categories: under age 25 and age 25 or older. Older students (n = 48) were shown to have more access to computers at work than younger students (n = 48). The effect size of the difference was moderate, with a value of .68.

Younger students (n = 54) were more likely than older students (n = 54) to think they might state an opinion through e-mail as a preference to stating it orally in class. The effect size was .61, which is a medium measure.

Table 8

Differences between Group Means of Undergraduate Respondents and Graduate Student Respondents

	Undergraduate		Graduate				
Item	M	SD	M	SD	t	df	p
Access to a computer at work							
	2.29	1.19	3.11	1.10	-3.38	94	.001
Use of e-mail to state an opinion							
	2.69	.95	2.05	.68	4.08	102	.000

The grouping variable for these items refers to two categories: undergraduate and graduate. Graduate students (n = 37) were shown to have more access to computers at work than undergraduates (n = 59). The effect size was .71.

Undergraduate students (n = 68) were more likely than graduate students (n = 40) to think they might state an opinion through e-mail as a preference to stating it orally in class. This difference between group means was significant. The effect size was .75, a large value.

Table 9

Differences between Group Means of

Part-time Students and Full-time Students

	Part-time		Full-time				
Item	M	SD	M	SD	t	df	p
Access to a computer at TWU							
	3.02	.82	3.37	.70	-2.31	105	.023
Access to a computer at work							
	2.95	1.17	2.32	1.19	2.61	94	.011
Use of e-mail to state an opinion							
	2.09	.63	2.71	.99	-3.996	105	.000
Low anxiety about computer assignments							
	2.59	.83	2.94	.90	-2.050	106	.043

The grouping variable for these items refers to two categories: part-time enrollment and full-time enrollment. Full-time students (n = 63) were shown to have more access to computers at TWU than part-time students (n = 44). The effect size was .45, medium.

Part-time students (n = 43) were shown to have more access to computers at work than full-time students (n = 53). The effect size was medium at .54.

Full-time students (n = 63) were significantly more likely than part-time students (n = 45) to think they might state an opinion through e-mail as a preference to stating it orally in class. The effect size was .73, large.

Full-time students (n = 62) were more likely than part-time students (n = 46) to report low anxiety about completing computer assignments. The effect size was .40, medium.

Table 10

Differences between Group Means of Traditional-entry Students and Re-entry Students

	Traditional-entry		Re-entry				
Item	M	SD	M	SD	t	df	p
Access to a computer at work							
	2.26	1.12	2.98	1.22	-3.01	94	.003
Use of e-mail to state an opinion							
	2.70	.96	2.18	.77	3.15	105	.002

The grouping variable for these items refers to two categories: traditional-entry students (entering college within 3 years of high school) and re-entry students (entering college or graduate school after a break of more than 3 years). Re-entry students (n = 46) were shown to have more access to computers at work than traditional-entry students (n = 50). The effect size was .61, medium.

Traditional-entry students (n = 57) were more likely than re-entry students (n = 51) to think they might state an opinion through e-mail as a preference to stating it orally in class. The effect size was .60, medium.

Table 11

Differences between Group Means of Experienced E-mailers and Novice E-mailers

	Experienced		Novice				
Item	M	SD	M	SD	t	df	p
Liked using e-mail for assignment							
	3.09	.89	2.50	.91	2.78	106	.007
Low anxiety about computer assignments							
	3.00	.89	2.33	.73	2.69	106	.008

Table 11 (continued)

	Experienced		Novice				
Item	M	SD	M	SD	t	df	p
Good idea of what is on WWW							
	3.14	.84	2.68	.84	2.28	107	.025
Easy to ask for computer help							
	3.09	.69	2.71	.90	2.11	106	.037
Like to figure out computers on my own							
	2.62	.95	1.77	.75	3.87	106	.000
Need little training for assignments							
	2.90	.84	2.23	.81	3.374	107	.001
Learn new computer skills quickly and easily							
	3.15	.79	2.55	.67	3.311	107	.001
More assignments should be paperless							
	3.06	.90	2.41	.96	2.98	106	.004
More computer assignments in my coursework							
	3.00	.84	2.36	.73	3.27	107	.001

Table 11 (continued)

	Experienced		Novice				
Item	M	SD	M	SD	t	df	p
More required components in Family Sciences courses							
	2.95	.79	2.50	.86	2.37	105	.020

The grouping variable for these items refers to two categories: experienced e-mailers and novice e-mailers. Respondents were categorized based on the questionnaire item "This was my first use of e-mail ever."

Experienced e-mailers (n = 86) were more likely than novice e-mailers (n = 22) to say they liked using e-mail for assignments. The effect size was medium at .66.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 21) to report low anxiety about completing computer assignments. The effect size was medium at .65.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 22) to say that they had a good idea of what is on the WWW. The effect size was .54, a medium size.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 21) to find it easy to ask for help with computers. The effect size was .51, a medium size.

Experienced e-mailers (n = 86) were more likely than novice e-mailers (n = 22) to say they liked to figure out computers on their own. This difference between group means was significant. The effect size was .92, a large measure.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 22) to need little training for computer assignments. The effect size was .81, a large size.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 22) to report that they learn new computer skills quickly and easily. The effect size was .79, a large size.

Experienced e-mailers (n = 86) were more likely than novice e-mailers (n = 22) to think that more course assignments should be paperless (using electronic communication). The effect size was .71, large.

Experienced e-mailers (n = 87) were more likely than novice e-mailers (n = 22) to say they would like to see more computer assignments in their coursework. The effect size was .78, large.

Experienced e-mailers (n = 85) were more likely than novice e-mailers (n = 22) to say that more Family Sciences

courses should include required computer components. The effect size was .57, a medium size.

Table 12 shows effect size values for differences of group means. A medium or large effect size was found on 13 items, with at least two results for each grouping.

As Table 12 indicates, the most important grouping variable was based on respondents' prior experience with e-mail. On the Table, this grouping is called Experienced/ Novice. The differences for this grouping were more numerous than for any other grouping, and effect size results were higher. Effect size values for differences between Experienced and Novice e-mail users ranged from .51 to .92, the highest value on the table.

Differences concerning computer access reflected common sense assumptions. Full-time students had better access to TWU computers than did part-time students. Full-time students spend more hours on campus and are more likely to visit facilities other than classrooms. Part-time students, who are frequently commuters, are more likely to center their activity around one or two classroom buildings.

Computer access at work also followed usual patterns. Greater access was reported by older students, by graduate students, by part-time students, and by re-entry students. The largest effect size (.71) was the difference between

Table 12

Effect Sizes of Differences between Group Means Based on Five Grouping Variables of Respondents

Item	Age Category	Undergrad/ Grad	Part-/ Full-time	Traditional/ Re-entry	Experienced/ Novice
Access at TWU			.45		
Access at work	.68	.71	.54	.61	
E-mail to state opinion	.61	.75	.73	.60	
Liked e-mail					.66
Low anxiety			.40		.65
What's on WWW					.54
Easy to ask for help					.51
Figure out on own					.92
Need little training					.81
Learn new skills					.79
More paperless					.71
More in my coursework					.78
More in FS courses					.57

undergraduates and graduate students. Graduate students are more likely to hold jobs than undergraduates and more likely to be in positions which include ready access to computer hardware.

Students' use of e-mail as a facilitating form of communication may be related to year of schooling and age. On the item, "I may state an opinion through e-mail that I am unlikely to state orally in regular class," younger students were more likely to agree than older students, and traditional-entry students were more likely than re-entry students. The effect size was medium for these groupings' differences.

On the same item, large effect sizes were obtained for the differences between undergraduates and graduates (.75) and between full- and part-time students (.73). In keeping with the results above, it was the undergraduates more likely than the graduates to use e-mail this way, and full-time students more than part-time students.

Full-time students also showed greater likelihood to feel low anxiety, compared to part-time students. However, the difference between the two groups showed an effect size of .40, a low-medium value and the lowest value found among all the tests.

The highest effect size results revolved around the grouping variable of prior experience. Experience with e-mail was important in two of the five measures of attitudes. It was a factor in five of the nine items regarding confidence in using technology. It was a factor in three of six items on support for increasing use of technology.

Experienced e-mailers were more likely than novice e-mailers to like using e-mail. The experienced users also said that they want more computer-based assignments and that they are willing to figure out the computer assignments on their own. Large effect sizes were found for the pertinent items: figure out computers on own (.92), need little training (.81), learn new computer skills easily (.79), want more assignments in my coursework (.78).

This analysis identified prior use only by the item which asked if respondents were using e-mail for the first time. The range of experience, therefore, may be very broad. If the range is broad, then the large effect sizes may be very important: they may indicate that any level of experience produces high confidence in one's own computer ability and high support for more computer-based assignments.

Summary

Data for the study were collected from 109 completed questionnaires. Students enrolled in Family Sciences courses were asked to rate their attitudes on items according to a 4-point Likert scale. For analysis, a score of 4 (Strongly Agree) or 3 (Agree) reflected a positive response. A score of 2 (Disagree) or 1 (Strongly Disagree) reflected a negative response. A coding form was developed to assist in computer analysis.

Results of responses from the whole sample were grouped according to which of the study's first five research questions they addressed. Results on all positive/negative measures were positive overall; on all but one item, a majority of respondents made a positive response. Open-ended questions addressed four of the research questions. Respondents' comments were analyzed and categorized. Of the open-ended questions, four permitted categorization of answers as positive or negative. Positive response was made by a majority of respondents on three of the questions. Negative response was made by a majority of respondents on one of the questions.

The sixth research question asked if student attitudes were related to subject variables. Demographic information

obtained through the questionnaire permitted analysis of responses according to five grouping variables. The purpose was to determine what differences existed between group means of, for example, traditional-entry students and re-entry students. T tests numbered 125; significant differences (below the .001 level) were found in 3 tests.

Medium and large effect sizes of differences between group means were found on 13 items. The range of effect sizes was from .40 to .92.

CHAPTER V

SUMMARY, DISCUSSION AND CONCLUSIONS

This study surveyed students enrolled in Family Sciences courses to gain an understanding of their attitudes toward use of computer technology in their coursework. Quantitative and qualitative data were analyzed. Demographic data were utilized to compare responses of students according to five grouping variables.

Chapter V first presents a summary of the study. Next, a discussion of findings is organized around the six research questions which guided the study. This discussion includes comparisons with published literature. The chapter then considers conclusions, limitations of the study, implications, and recommendations for future research.

Summary of the Study

Questionnaires were completed by 109 students who were enrolled in courses which included required computer components. The study was designed to assess students' attitudes about the computer components and to elicit students' opinions about the use of technology. Research

questions addressed students' perceived difficulties with computer assignments, students' perceived benefits of computer components, whether students' attitudes were positive or negative, what level of confidence students expressed in their use of technology, whether students supported the increasing use of technology in coursework, and how attitudes were related to subject variables.

The instrument for the study consisted of Likert-scale items and open-ended questions. The Likert scale consisted of four response options: Strongly Agree, Agree, Disagree, and Strongly Disagree. Responses were scored so that mean scores above 2.5 represented positive attitude and mean scores below 2.5 represented negative attitude.

The sample was comprised of both undergraduate and graduate students and was primarily female. The range of ages of respondents was 20 to 58. The median age was 25; the mean was 30. About 85% of the respondents identified themselves by majors within the Department of Family Sciences. Only 1 respondent reported that the assignment was first-time use of a computer. Less than 10% of respondents were using the Internet for the first time; about 20% were using e-mail for the first time.

Positive mean scores were recorded for the large majority of Likert-scale questionnaire items. Responses to open-ended questions were essentially positive.

Discussion of Findings

Overall, the students surveyed in this study were positive toward computer components, confident in their use of the technology, and supportive of the increasing use of technology in coursework. Exceptions to these general statements are noted in the discussion of individual research questions below.

Perceived Difficulties

What do Family Sciences students perceive as difficulties arising from required computer components in coursework? The research question was addressed by items about access to computers, an item about reading from monitors, and an open-ended question asking for "drawbacks."

The large majority of the respondents said they had easy access to computers at home or on campus. More than half reported easy access at work. A three-fourths majority said reading from a computer monitor was comfortable.

The figures present a picture of students who can readily access computers for assignments. Cross-tabulations on those respondents with negative scores on accessibility

showed that only 1 student reported difficult access at all locations.

The results of this study confirm the increase of computer technology and university students' exposure to it, as mentioned in published literature (Ayersman & Reed, 1995; Bernt et al., 1990). Several respondents' written answers included references to computer assignments in other classes, in prior years of college work, and in high school. An undergraduate said that computer components were nothing new for her, having first used a computer on the first day of first grade, 15 years previous.

More than a third of the respondents wrote sympathetic remarks about students without access to computers or with little computer knowledge. Cross-tabulations of these respondents revealed that all of them had easy access themselves, and about 86% had that access at home. These sympathetic commenters were not making reference to themselves. By all indicators, more than one third of the sample is concerned about a minority of students. In terms of access, their concern is for a single student. This showing of concern may be related to these students' field of study; most of those who sympathised identified themselves as being in the Family Sciences. In other words, "concern for others" might not be a voluntary written

comment by students in another department, at least not to the extent that it was here.

If an assumption is made that these sympathetic students do not see a drawback for themselves (and they did not write of any), then we may sum their numbers with those respondents who wrote that there were no drawbacks or that there were no drawbacks as long as technical problems were taken care of. This assumption would take the "no drawbacks" proportion of the sample to more than 60%.

The next largest proportion was 15%, those with specific technical concerns. The picture, then, is of a majority of students whose primary concerns are either in the technical aspects or in potential hardship for others.

Only a small proportion of respondents mentioned the loss, or potential loss, of personal interaction. This concern may be related to the field of study of the respondents, or perhaps it reflects a perspective found to some degree in all fields.

Perceived Benefits

What do Family Sciences students perceive as benefits arising from required computer components in coursework? The question was addressed by an item about using e-mail to state an opinion not likely to be made orally in class

and an open-ended question asking respondents to specify benefits.

About 41% of the respondents agreed that they would use e-mail to make a comment not made in class. The proportion was even higher for sub-samples of undergraduates, traditional-entry students, full-time students, and students under age 25. The literature does not offer a gauge for comparison, but studies do note the importance of this use of e-mail for those who utilize it (Bailey & Cotlar, 1994; Beadle, 1996; Meacham, 1994; O'Donnell, 1996; Zack, 1995). Instructors' accounts of it suggest that such e-mail comments from especially quiet students are the only feedback they receive from the students. In this regard, then, e-mail would appear to be a crucial addition to an instructor's tools to communicate with all students.

A striking result from the open-ended question about benefits is that only 4 respondents specified "none." (An additional 7 left the line blank.) Clearly, the majority of respondents did not take the opportunity to make negative comments on this question.

The actual benefits respondents listed are those typically discussed in the literature, such as convenience and access to information (Hiltz, 1997; Sargeant, 1995), and also in lay materials on the subject of technology. For

example, many of the comments were very general. Finding up-to-date information and keeping up with technology were common themes.

The fact that resource (n = 32) was cited more than convenience (n = 21) may reflect the type of assignments accomplished by this sample. Most of the computer components in the six courses involved locating information and communicating just once or twice via e-mail. Of the six courses, two offered forum or e-mail access which replaced some in-class discussion time. Comments regarding convenience related mostly to the convenience of conducting library research from a home computer. Only a few students commented on the known or potential convenience of online courses. Had more of the respondents been enrolled in classes with high e-mail activity, the responses may have differed.

Student Attitudes

Are Family Sciences students' attitudes toward using computer components positive or negative? The question was addressed by five Likert-scale items and four open-ended questions.

On four of the quantitative items, positive attitudes were evidenced by large majorities. On the remaining item, concerning anxiety, the majority response was also positive,

but at a lower proportion. Mean scores for the items ranged from 2.79 to 3.23, all higher than a neutral score of 2.5.

The most positive scores, 3.23 and 3.20, were associated with liking use of the Internet and considering computers fun, respectively. The two may be related, as many people equate the novelty of the Internet with a fun experience. (The relatively short history of the WWW and broad public access to the Internet may extend this a sense of novelty for several more years.) The positive tone of the result concerning e-mail (mean score of 2.97) matches the findings of other research (Meacham, 1994).

With a mean of 3.11, the sample indicated that the assignments created or confirmed students' positive attitude toward computers in coursework. The students who disagreed may have referred to a general feeling of disapproval of the use of computers or to a specific dissatisfaction with the computer component particular to that course.

Student Confidence in Technology Use

Do Family Sciences students express confidence in their use of technology? Results from nine Likert-scale items and two open-ended questions suggest that, overall, the students felt confident in their use of technology and their knowledge of "what is on the WWW." They are comfortable

asking for help, especially from peers. On these issues, mean scores were above 3.0.

The students were slightly less confident about whether their e-mail assignments would be delivered properly by the technology. However, the mean score of 2.78 on this issue is a positive measure, being above 2.5.

The only negative mean score, indicating low confidence, was on the item, "I like to figure out computers on my own." At 2.44 mean, this measure is about .06 below a neutral score. Since the majority made a positive response on this item, the negative mean score reflects strong disagreement by those who answered no. Positive scores about learning new skills (mean of 3.03) and needing little training (mean of 2.76) indicate that students anticipated being able to learn computer skills with ease. These attitudes may reflect students' overall confidence in learning since they are in educational programs and routinely face new material in their studies.

New skills were also the focus of an open-ended question. The level of specificity in answers indicated a broad range of new skills: from cut-and-paste word processing commands to selection of words for Boolean searches.

About half of the students needed help in completing their assignments. Only 8 specified that they received "a lot" of assistance, but the fact that any level of help was needed by such a large proportion of the sample does indicate that the components presented students with unfamiliar requirements.

Student Support of Technology Use

Do Family Sciences students support the increasing use of technology in coursework? Mean scores on six Likert-scale items were positive. The overall picture of students in this sample is one of support for the assignment of computer components.

The highest score, 3.25, was in response to the statement, "I hope to learn a lot about using computers while I am in college." A cross-tabulation of individual respondents' scores showed a theme confirmed by the overall trend in mean scores: moderate approval of increased assignments and strong approval of this item. Students seemed to be saying that computer-based assignments were a good thing that sometimes caused them frustration, and that the ideal (at graduation) would be proficiency at computers.

Differences by Subject Variables

T tests were run on all quantitative questionnaire items for five different groupings. The tests revealed

20 mean differences of at least medium effect size. Of these, 3 were significant below the .001 level.

The most important grouping variable was based on respondents' prior experience with e-mail. Respondents were identified as being Experienced e-mail users or Novice e-mail users. The differences for this grouping were more numerous than for any other grouping; and effect size results were higher, ranging from .51 to .92. A significant difference between the two groups was that Experienced users were more likely to say they liked to figure out computers on their own.

Differences concerning computer access reflected common sense assumptions. Full-time students had better access to TWU computers, while access to computers at work was higher for older students, graduate students, part-time students, and re-entry students.

E-mail as a facilitating form of communication may be related to year of schooling and age. Medium effect sizes were obtained for the differences between younger and older students and between traditional-entry and re-entry students. Large effect sizes and statistical significance were shown for the differences between undergraduates and graduates and between full- and part-time students. In summary, undergraduates, full-time students, younger

students, and traditional-entry students were more likely to agree with the statement, "I may state an opinion through e-mail that I am unlikely to state orally in regular class."

This study's results concerning subject variables agreed with several findings in the published literature. The positive scores by re-entry students appear to reflect the successful use of technology by re-entry students in studies by Klein et al. (1993) and Smith and Necessary (1996). The preponderance of women in this study's sample did not permit comparison of attitudes in relation to gender. However, the general positive tone of the sample may speak to the conclusion by Ayersman and Reed (1995) that the overall increase in exposure to computers today negates old stereotypes which tied computer literacy to gender.

Along the same line, the positive tone may support the Bernt et al. (1990) questioning of the relevance of computer experience. Wide exposure to computers may make prior experience a less important factor in how individuals accept or resist computer use. The relative negative attitudes by some respondents who reported prior experience and low anxiety may support the conclusion of Hignite and Echternacht (1992) that computer literacy cannot be used to predict computer attitudes and vice versa.

For the small group of students who struggled with using e-mail for the first time, Rohfeld and Hiemstra's (1995) conclusion about support for beginners is relevant. The Syracuse University researchers found that instructors cannot overestimate the amount of support required for students new to the technology. Some respondents in this study indicated a need for a high level of assistance.

Again, effect size results indicated that prior experience was the most imporant grouping for this sample. Simply put, experienced e-mailers were more likely than novice e-mailers to like what they're doing, to want more of the same, and to figure out the computer assignments on their own.

Conclusions

1. Students in this sample had ample access to computers and the Internet to complete their assigned computer components. While access was not perceived as a difficulty, respondents did comment on technical concerns and the possibility that access or lack of knowledge might be a hardship for students other than themselves.

2. For about 41% of the sample, e-mail communication may offer an attractive alternative to speaking in class.

Respondents' comments about benefits of using technology centered on keeping abreast of technology, utilizing the Internet as a source of information, and enjoying the convenience of working from home.

3. For this sample, attitudes toward technology in coursework were positive, overall. The Internet and the fun aspects of computing were highly valued. Even when queried about anxiety, respondents reported positive attitudes toward using computer components.

4. Respondents reported confidence in their use of technology and indicated that they expect to be able to learn new skills as they are presented. The majority said they like to figure out computers on their own but those who did not, disagreed strongly.

5. The overall picture of students in this sample was one of support for the assignment of computer components. A high mean score on one issue suggested that students hope to increase computer proficiency during their college studies.

6. Comparison of group means suggested that prior experience was an important factor in the respondents' attitudes toward computer components, confidence in using technology, and support for increased use of technology in coursework. The large majority of tests to compare group means showed that undergraduates and graduate students were

very similar in their attitudes toward computer components. The same can be said when comparing traditional-entry students with re-entry students, part-time students with full-time students, and younger students with older students.

Limitations

1. This study relied on a purposeful sample. Results are not generalizable beyond the sample.

2. For purposes of statistical analysis, measures of attitude were treated as interval data (Glass & Hopkins, 1996).

3. This study relied on self-report data, which may suffer from validity issues (Hiltz, 1997).

4. In reporting their status as full-time or part-time students, some respondents indicated disagreement with 12 credit hours being identified as full-time enrollment. Results reflect differing interpretations of what constitutes full-time enrollment.

Implications

Family Sciences students are cognizant of the benefits of computer technology in their field. From a classroom

perspective, instructors can make technology-related assignments with confidence that students have access to computers, the Internet, and e-mail. Instructors can also assume that most students are confident in their use of the technology. Most students require little training or explanation from instructors, although a sizable proportion of them may continue to seek help from peers and family members in accomplishing their assignments.

In light of the negative attitudes of some respondents, consideration must be made for the small number of students who are resistant to or fearful of the technology. As researchers at Syracuse University found, the needs of novices could not be accommodated too much (Rohfeld & Hiemstra, 1995). The level of support needed is high. In spite of statistics of widespread exposure to computers, the challenge of helping a small number of novices may remain for some time.

Recommendations for Future Research

Several directions are recommended for future research. First, a measure could be developed to assess level of computer experience of students and then incorporated into a survey similar to the one used in this study. Such a measure

could assist educators in determining what minimal level of experience is necessary for students to have high positive attitudes and high confidence in using technology in course-work. The knowledge might also help instructors identify students who would benefit from specialized training in use of technology, such as online research tools or e-mail.

Second, a needs assessment of Family Sciences students could identify what students consider their needs in using or learning to use technology. This knowledge could assist instructors in planning computer components for curricula.

Third, there is a need for qualitative research of students who are dissatisfied with using technology in coursework. Research using focus groups could identify students' concerns and explore what students see as possible remedy, if any.

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APPENDICES

Appendix A

Questionnaire Items Related to Research Questions

Questionnaire Items Related to Research Questions

Research Question	Questionnaire Item
1. What do Family Sciences students perceive as difficulties arising from required computer components in coursework?	B101, B102, B103, C103, Open-ended #8
2. What do Family Sciences students perceive as benefits arising from required computer components in coursework?	F105, Open-ended #7
3. Are Family Sciences students' attitudes toward using computer components positive or negative?	C101, C102, F101, F106, F108, Open-ended #1, #2, #3, #5
4. Do Family Sciences students express confidence in their use of technology?	C107, C108, D101, E101,E102, E103, E104, F104,F107, Open-ended #4, #6
5. Do Family Sciences students support the increasing use of technology in coursework?	C104, D102, F102, F103, G101, G102
6. Are attitudes toward using computer components among the students in the sample related to subject variables such as age, year of schooling, status as traditional-entry or re-entry student, or prior experience with computers?	demographic data from first page, C105, C106

Appendix B

Instrument

Student Questionnaire

Thank you for your help in this research. Please do not write your name on this form. Your responses will be completely anonymous and treated as confidential information.

☐ I understand that the return of my completed questionnaire constitutes my informed consent to act as a subject in this research.

Demographic Information

Gender ☐ Female ☐Male

Age _____ years

Current standing
☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior ☐ Graduate student

Current enrollment
☐ full-time (12 or more hours) ☐ part-time (fewer than 12 hours)

College history (Check all that apply.)
☐ I first entered college directly after high school.
☐ I first entered college within 3 years of my high school graduation.
☐ I first entered college more than 3 years after completing high school.
How many years between high school and college: ___
☐ I have attended college continuously since entering.
☐ I returned to college after _____ years out of college.

Major field of study, if declared _____

Computer Component for this Course (Check all that apply.)
This was my first use of a computer..... ☐in a class. ☐ever.
This was my first use of e-mail..... ☐in a class. ☐ever.
This was my first use of the Internet..... ☐in a class. ☐ever.

COMPUTER ACCESS		Strongly Agree	Agree	Disagree	Strongly Disagree
B101	I have easy access to a computer at home.	☐	☐	☐	☐
B102	I have easy access to a computer at TWU.	☐	☐	☐	☐
B103	I have easy access to a computer at work.	☐	☐	☐	☐

COMPUTER COMPONENT		Strongly Agree	Agree	Disagree	Strongly Disagree
C101	I liked using e-mail for assignment(s).	☐	☐	☐	☐
C102	I liked using the Internet to access course material.	☐	☐	☐	☐
C103	I found reading from the computer monitor comfortable.	☐	☐	☐	☐
C104	More course assignments should be paperless (using electronic communication).	☐	☐	☐	☐
C105	I prefer using school computers for assignments.	☐	☐	☐	☐
C106	I prefer using my own computer for assignments.	☐	☐	☐	☐
C107	I felt confident that my e-mail submissions would be delivered properly.	☐	☐	☐	☐
C108	I felt confident that the format of my writing was suitable for delivery via e-mail.	☐	☐	☐	☐

VISITING WEB SITES		Strongly Agree	Agree	Disagree	Strongly Disagree
D101	I have a good idea of what is on the World Wide Web (WWW).	☐	☐	☐	☐
D102	Regular class time should be devoted to visiting sites on the WWW either in a computer lab or using a projection display in a regular classroom.	☐	☐	☐	☐

Asking for Help		Strongly Agree	Agree	Disagree	Strongly Disagree
E101	It is easy to ask for help with computers.	☐	☐	☐	☐
E102	I am comfortable asking peers for computer help.	☐	☐	☐	☐
E103	I am comfortable asking instructors for computer help.	☐	☐	☐	☐
E104	I like to figure out computers on my own.	☐	☐	☐	☐

Personal Reactions		Strongly Agree	Agree	Disagree	Strongly Disagree
F101	I feel little or no anxiety about completing computer assignments.	☐	☐	☐	☐
F102	I would like to see more computer assignments in my coursework.	☐	☐	☐	☐
F103	I hope to learn a lot about using computers while I am in college.	☐	☐	☐	☐
F104	I need little training for computer assignments.	☐	☐	☐	☐
F105	I may state an opinion through e-mail that I am unlikely to state orally in regular class.	☐	☐	☐	☐
F106	Computers are fun.	☐	☐	☐	☐
F107	I learn new computer skills quickly and easily.	☐	☐	☐	☐
F108	The assignment(s) caused me to gain (or maintain) a positive attitude toward computers in coursework.	☐	☐	☐	☐

Overall Assessment		Strongly Agree	Agree	Disagree	Strongly Disagree
G101	The benefits of computer components in coursework outweigh the drawbacks.	☐	☐	☐	☐
G102	More Family Sciences courses should include required computer components.	☐	☐	☐	☐

turn over for last page...

SHORT ANSWER SECTION — Attach an extra page of comments, if you like.

1) What was your initial reaction when you learned this course included a required computer component?

2) Did you expect this component to be difficult to complete? easy? something else?

3) How did your experience match your expectation?

4) What computer skills did you learn or improve upon as a result of this requirement?

5) Describe any anxiety you experienced in completing the component.

6) Did you need help completing the component? How much? From whom?

7) Describe the benefits of having computer components in Family Sciences coursework.

8) What are the drawbacks of computer components in Family Sciences coursework?

Thank you for your particpation!

Appendix C

Letter of Explanation to Instructors

To: Instructors in the Department of Family Sciences

From: Mary Bold

Date: 24 November 1997

In conducting research for my Master's Thesis entitled "Student Attitudes toward Using Computer Components in Family Sciences Coursework," I am seeking student volunteers to complete a questionnaire regarding computer technology in their coursework. If any of your classes include a computer component as defined below, would you permit me to distribute questionnaires to your students? Student participation will be voluntary and anonymous.

I will be collecting data starting December 1, 1997. For the next semester, I will be able to collect data through mid-February, 1998.

Results of student questionnaires will be analyzed and reported in my thesis. They will be put to no other use. This means that they will not be available to instructors as course evaluations and, in fact, the questionnaires will not be organized to reflect source classes.

Please contact me if you think a class is well-suited to my research or if you would like to discuss the questionnaire further. I appreciate your consideration of this request.

> **Computer Component:** Use of computer technology in one or more required course assignments that encompass locating information on the Internet and utilizing e-mail to communicate with the instructor or with classmates.
>
> Examples of locating information include use of Internet research tools, accessing course-related information on WWW sites, or accessing curriculum material that the instructor has posted on the Internet or that the instructor has provided for web delivery.
>
> Examples of utilizing e-mail include submitting written assignments to the instructor, distributing written assignments to other members of the class, or communicating with class members about joint projects.

Ways to contact Mary Bold:

Telephone: (817) 468-9924
FAX: (817) 468-1172
Mail: P.O. Box 152281, Arlington, Texas 76015
e-mail: mbold@startext.net

Appendix D

Cover Letter to Subjects

Texas Woman's University
Subject Consent to Participate in Research

Title of Study:
Student Attitudes toward Using Computer Components in Family Sciences Coursework

Researcher:
Mary Bold (817) 468-9924

Research Advisor:
Dr. Gladys J. Hildreth (940) 898-2694

Dear Family Sciences Student:

The purpose of this study is to explore student attitudes toward using computer components in required coursework in the field of Family Sciences. The attached survey asks questions about your experience with Internet and e-mail assignments for the course you are currently enrolled in.

If you decide to participate in this survey, your responses will be kept completely anonymous and confidential. You will be making a one-time commitment to complete the attached questionnaire. No names will be requested in this study. The data obtained from this study will be stored in a locked file cabinet until May 1999. At that time, the data will be destroyed by shredding.

Results will be used solely for this study, which may benefit educators in designing curriculum that includes student use of computer technology. Results from more than one Family Sciences class will be pooled without recording which questionnaires came from which class. Instructors will not receive any data reflecting responses from a particular class or student.

If you have any questions about the research or your rights as a subject, we want you to ask us. Our phone numbers are at the top of this page. If you have questions later, or if you wish to report a problem, please call the Office of Research & Grants Administration at (940) 898-3377.

We will try to prevent any problem that could occur because of this research. Please let us know if there is a problem and we will help you. You should understand, however, that TWU does not provide medical services or financial assistance for injuries that might occur because you are taking part in this research.

Your participation in this study is voluntary and you may withdraw from the study at any time. Please note that refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled.

Thank you for your participation.

Sincerely,
Mary Bold

Appendix E

Coding Form

Coding Form

Variable and Label	Categories (Values)	Coding Category
Subject Variables		
gender	1 = male	Male
Gender	2 = female	Female
agecat	1 = under 25	Under 25 years old
Age category	2 = 25 to 34	25 years or older
	3 = 35 to 44	
	4 = 45 or older	
standing	1 = undergraduate	Undergraduate
Undergrad/Grad	2 = graduate	Graduate
enrolled	1 = fewer than 12 hours	Part-time
Hours carried	2 = 12 or more hours	Full-time
entry	1 = traditional-entry	Traditional student
Traditional/ Re-entry	2 = re-entry	Re-entry student
major	1 = Not reported	[same as categories]
Field of study	2 = Family Science	
	3 = Family Studies	
	4 = Child Development	
	5 = Home Economics	
	6 = Biology	
	7 = Counseling	
	8 = Therapy	
	9 = Occupational Therapy	
	10 = Math	
	11 = Spanish Lit	
	12 = Sociology	
	13 = Education	
	14 = Psychology	
	15 = Interdisciplinary	
	16 = Mass Communications	

Variable and Label	Categories (Values)	Coding Category
Subject Variables, cont.		
compute Use of a computer	1 = first use in a class 2 = first use ever	[same as categories]
mail Use of e-mail	1 = first use in a class 2 = first use ever	[same as categories]
internet Use of the Internet	1 = first use in a class 2 = first use ever	[same as categories]
Variable: Perceived Difficulties		
b101axhm I have easy access to a computer at	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agreehome	Negative Positive
b102axtw I have easy access to a computer at TWU	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
b103axwk I have easy access to a computer at work	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive

Variable and Label	Categories (Values)	Coding Category
Variable: Perceived Difficulties, cont.		
c103rmon I found reading from the computer monitor comfortable	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
o8drwbck What are the drawbacks of computer components in FS coursework?	Example: ovwhlmi4some (overwhelming for some)	No drawbacks No, if train/support Concern for others Specific technical Time Interaction Miscellaneous
Variable: Perceived Benefits		
f105opin I may state an opinion through email that I am unlikely to state orally in regular class	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
o7bnfts Describe the benefits of having computer components in FS coursework	Example: i as res tool (use of Internet as research tool)	Proficiency Convenience Resource Prof. preparation Educational process Conservation None Miscellaneous

Variable and Label	Categories (Values)	Coding Category
Variable: Attitudes		
c101lkem I liked using email for assignment(s)	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
c102lkin I liked using the Internet to access course material	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f101nanx I feel little or no anxiety about completing computer assignments	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f106fun Computers are fun	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f108gain The assignment caused me to gain (or maintain) a positive attitude toward computers in coursework	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive

Variable and Label	Categories (Values)	Coding Category
Variable: Attitudes, cont.		
o1initre What was initial your reaction when you learned this course included a required computer component?	Example: glad reqrmnt (glad to see it as a requirement)	Positive Acceptable Neutral Anxious Negative
o2expect Did you expect this component to be difficult to complete? easy? something else?	Example: easy	Easy Easy, but a concern Not sure Difficult
o3match How did your experience match your expectation?	Example: matched	As easy as expected As difficult as expected Easier than expected More difficult than expected Other comment
o5desanx Describe any anxiety you experienced in completing the component	Example: e wdnt trnsmit (e-mail wouldn't be transmitted properly)	No anxiety Anxious about email delivery Anxious about other technical concern Anxious because unfamiliar with Internet/email Non-technical concern about the assignment

Variable and Label	Categories (Values)	Coding Category
Variable: Confidence		
c107dlvr I felt confident that my email submissions would be delivered properly	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
c108frmt I felt confident that the format of my writing was suitable for delivery via email	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
d101www I have a good idea of what is on the World Wide Web	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
e101ask It is easy to ask for help with computers	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
e102peer I am comfortable asking peers for computer help	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive

Variable and Label	Categories (Values)	Coding Category
Variable: Confidence, cont.		
e103inst I am comfortable asking instructors for computer help	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
e104figu I like to figure out computers on my own	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f104ltra I need little training for computer assignments	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f107skil I learn new computer skills quickly and easily	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
o41rnimp What computer skills did you learn or improve upon as a result of this assignment?	Example: e + i (better at both e-mail and accessing Internet)	None Internet searches Word processing Email General online skills Other technical skills

Variable and Label	Categories (Values)	Coding Category
Variable: Confidence, cont.		
o6help Did you need help completing the component? How much? From whom?	Example: yes, lit/husb (yes, a little from my husband)	No help Received help
Variable: Support for Increasing Technology		
cc104ppls More course assignments should be paperless (using electronic communication)	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
d102site Regular class time should be devoted to visiting sites on the WWW either in a computer lab or using a projection display in a regular classroom	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
f102mras I would like to see more computer assignments in my coursework	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive

Variable and Label	Categories (Values)	Coding Category
Variable: Support for Increasing Technology, cont.		
f103lot I hope to learn a lot about using computers while I am in college	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
g101outw The benefits of computer components in coursework outweigh the drawbacks	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
g102mrfs More FS courses should include required computer components	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Negative Positive
Subject Variables, detailed		
c105pscc I prefer using school computers for assignments	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Do not prefer school Prefer school
c106powc I prefer using my own computer for assignments	1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree	Do not prefer own Prefer own

Variable and Label	Categories (Values)	Coding Category
Subject Variables, detailed, cont.		
age Actual age	Example: 26	
year Actual standing	1 = freshman 2 = sophomore 3 = junior 4 = senior 5 = graduate student	[same as categories]

Appendix F

Statistical Formula for Effect Size

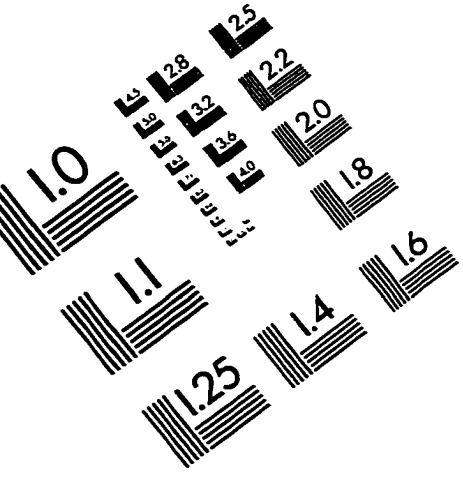
Effect Size Statistic for Independent Samples T Test

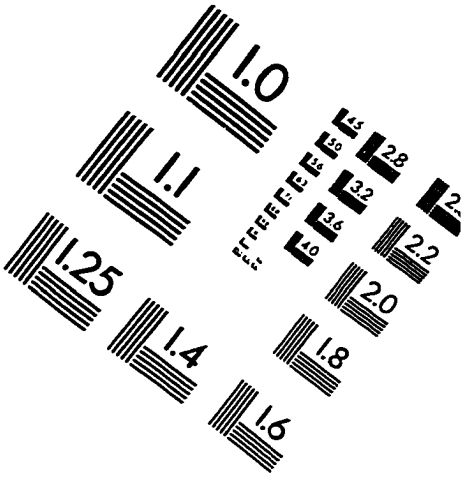
$$d = \frac{\text{Mean Difference}}{SD_{pooled}}$$

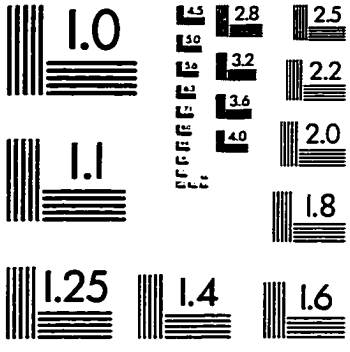
Formula for SD_{pooled}

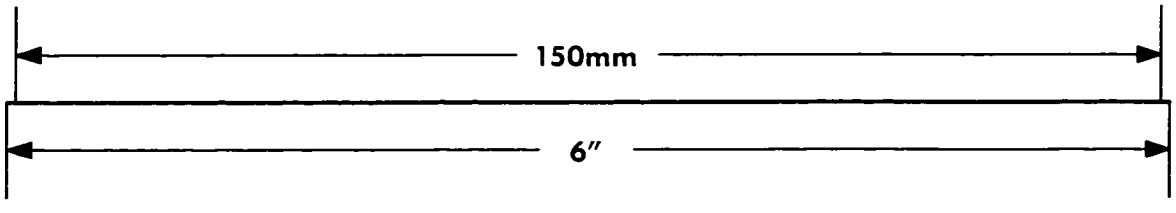
$$SD_{pooled} = \sqrt{\frac{(N_1 - 1)SD^2_1 + (N_2 - 1)SD^2_2}{N_1 + N_2 - 2}}$$

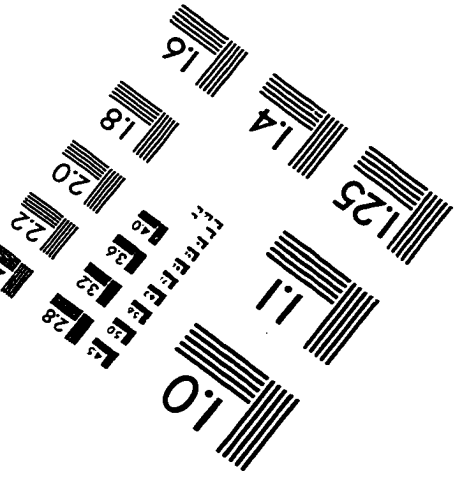
IMAGE EVALUATION
TEST TARGET (QA-3)

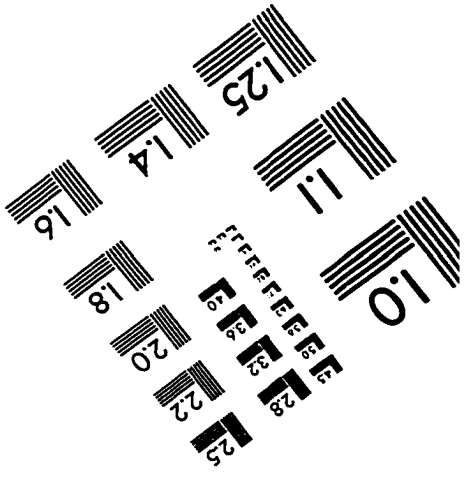












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