Computer Literacy, Access, and Use of Technology in the Family and Consumer Sciences Classroom

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The purpose of this study was to determine if a relationship exists between computer literacy and use of technology as well as if a relationship exists between teachers' access to technology and their use of technology in Family and Consumer Sciences Education classrooms in the state of Kentucky. Teachers were presented with statements regarding computer literacy, access to technology, and use of technology. It was concluded that, when compared to Davis's (1971) Conventions for Correlation Coefficient, computer literacy and use of technology had a substantial relationship while access to technology and use of technology had a moderate relationship.

For years, schools across the nation have joined the technology revolution. By 2000, students had at least some form of technology available to them in school (Croxall & Cummings, 2000, Roblyer, Castine, & King, 1993). This trend is not likely to change. There is an increasing need for teachers who are literate in the use of various types of technology. In contemporary classrooms, teachers and students have access to a wide variety of technology. Various types of technology, including computers, projectors, hand-held devices, televisions, and digital cameras, are more accessible now than ever before. This type of technology, also called instructional technology, has helped move the classroom from a teacher-centered environment to a more student-centered one (Trotter, 1998). Additionally, Lu and Miller (2002) stated that instructional technology encompasses a wide variety of technologies as well as systems used to deliver information. Many Family and Consumer Sciences (FCS) classrooms are integrating technology to help students better understand the concepts that are being taught (Croxall & Cummings, 2000).

While teachers are trying to implement new types of instructional technology into their classrooms, many of them face barriers that hinder their attempts to advance. Beyond mere awareness and competence; anxieties, lack of training, and outdated equipment are barriers that teachers face on a daily basis (Budin, 1999; Croxall & Cummings, 2000; Keane, 2002; McFadden, Croxall, & Wright, 2001; Redmann & Kotrlik, 2004; U.S Department of Education, 2005). Teachers will be able to fully integrate more technology into the classroom when barriers to the use of technology are addressed, thus providing students with a variety of learning opportunities to help them become more "technologically prepared for the future" (Manley, Sweaney, & Valente, 2000, p.27).

Purpose of the Study

While research (Alston, Miller, & Williams 2003; Croxall & Cummings, 2000; Lu & Miller, 2002) has been conducted in several states (North Carolina, Virginia, New Mexico, and Ohio) regarding the use of technology in FCS, there is no known published information on

Kentucky. The purpose of this study was to determine if a relationship exists between computer literacy and use of technology, and between teachers' access to technology and their use of technology in FCS classrooms in the state of Kentucky.

The objectives for this study were to: a) describe the selected demographic characteristics (age, gender, number of teachers in the FCS program, years of teaching experience, highest education level attained, classes taught, institution where degree was received); b) determine computer literacy of FCS teachers in Kentucky; c) determine the access FCS teachers have to various types of technology; d) determine the use of technology in FCS classrooms in Kentucky; e) determine the relationship between FCS teachers' computer literacy and their use of technology in the classroom; and f) determine the relationship between FCS teachers' access to technology and their use of technology in the classroom.

Theoretical Framework

The theoretical framework for this study lies within the diffusion of innovations theory. The diffusion process can be defined as "the spread of a new idea from its source of invention or creation to its ultimate users or adopters" (Rogers, 1962, p. 13). According to Rogers and Shoemaker (1971), there are five categories into which adopters fall based upon their innovativeness: laggards, late majority, early majority, early adopters, and innovators. The placements of the five areas of innovativeness are arranged on a bell curve. The adoption process of the diffusion of innovations theory is considered to be a type of decision-making. According to Rogers (1962), the adoption of an innovation requires a decision by an individual. Individuals must begin using a new idea and allow it to replace the previous idea they were using.

The diffusion of innovations theory can be linked back to teachers' computer literacy, access to and use of technology. By analyzing prior research related to technology, certain indicators are present that indicate shifts between the five categories of adoption: laggards, late majority, early majority, early adopters, and innovators (Rogers & Shoemaker, 1971). Daulton (1997) found that FCS teachers' adoption rates for technology increased from 5% in 1983 to 83% in 1993. This increase shows that as technology became more common in the school setting, teachers moved from the late majority category to the early adopter category. According to a report published by the National Association of State Boards of Education [NASBE] (2003), 63% of schools surveyed reported that the majority of teachers used the Internet and computers for instruction, but almost one quarter of those schools classified their teachers as "beginners" when using technology. This shows that teachers have the desire to incorporate technology into the classroom (early adopter) but face challenges in acquiring knowledge to do so.

Related Literature

Computer Literacy

When trying to determine computer literacy, access to technology, and use of technology in classrooms, it is important to look at relative advantage and compatibility of adoptions. Rogers (1995) identifies relative advantage to be a good determinant of innovation adoption because when an innovation is adopted the physical benefits (gains in social status or savings in time, money, or effort) are easily acknowledged (Tornatsky & Klein, 1982). Rogers also indicates the persons' past experiences and beliefs should fit their needs or purposes for the innovation in order to have them become adopters. If the innovation is not compatible with the needs, values, or beliefs of the adopter, then they will not see its relative advantage.

Mason and McMorrow (2006) suggested there are two distinct components to computer literacy: *awareness* and *competence*. Awareness requires that a person have understanding of how computers impact their day-to-day life as well as the larger society. Competence expects a person be able to exhibit a hands-on expertise with a software application. Both of these components should be evaluated when looking at computer literacy within the classroom setting.

Some of the most basic computer literacy skills include using word processor, email, mailing lists, and the World Wide Web (Evans, 1999; Manley, et al., 2000). Computer literacy is even thought to be as important as writing, reading, and math in the school setting; as children in today's society have never experienced schools without computers (Croxall & Cummings, 2000; Robyler et al., 1993). These skills are essential in today's school systems as more tasks are completed using computer technologies.

After conducting a study related to technology integration in Career and Technical Education classrooms, Redmann and Kotrlik (2004) had several recommendations as to how teachers can be proactive in their quest to become more computer literate. These included attending workshops and conferences, taking college classes that deal with technology, and by engaging "in self-directed learning to stay current with the use of technology in the teaching-learning process" (p. 21). Self-directed learning might include experimenting with equipment, planning lessons using the computer, and exploring various types of software available on the computer and on the Internet (Croxall & Cummings, 2000).

Eisenberg and Johnson (1996) state that computer literacy needs to include more than just the "how" of using computers; it also needs to focus on the "when" and "why." Through their research, Eisenberg and Johnson developed some suggestions as to what computer literacy should cover. Some of their basic suggestions included being able to identify parts of the computer, creating drafts/final projects using a word processor, and using the internet to search for information. The more advanced suggestions included knowing computer terminology, being able to operate and maintain a computer, having the knowledge to use instructional technology, having the skills to do various programming activities, and having a working knowledge of the impact of technology on society and all that society encompasses.

Acquiring the skills to use instructional technology in the classroom is a necessity in today's society (Robyler et al., 1993). Further, computer literacy is an important component in having the ability to successfully and confidently use technology (Croxall & Cummings, 2000; Eisenberg & Johnson, 1996) within the FCS classroom. Russell's (1995) six-stage process can be used to help teachers develop a better understanding of technological applications, as can attending workshops or taking classes that deal with using technology in the classroom (Redmann & Kotrlik, 2004). Russell's six stages are: awareness, learning the process, understanding and application of the process, familiarity and confidence, adaptation to other contexts, and creative application to new contexts.

Access

For teachers to effectively integrate technology into the classroom, they must have easy access to various types of technology. Alston et al. (2003) found that in North Carolina schools certain types of technology were widely available for teachers' use, meaning the various types of technology were located in the classroom or were easily accessible within the building. These include videotape, television, desktop computer with CD-ROM, internet, email, laser printer, and video camera. Alston et al. also found that certain types of technology were not easily accessible for teacher use. LCD panel, computer projector, laptop computer, and digital camera were

technologies that teachers in North Carolina did not have within their classroom or even within the school.

The Internet has become an important resource for classroom activities. For Family and Consumer Sciences Education teachers to be able to use the Internet, they must have access to not only a computer but also a phone line, modem, an Internet Service Provider, and training in how to use these types of technology (Cohen, Negrini, Cluff, Laus, Volpe, Dun, & Sternheim, 1999). The teacher would also need to have classroom access to the Internet and an idea as to how to guide students in their search for information and use of activities related to Family and Consumer Sciences Education. Recent findings indicate that almost all schools (99%) in the United States have internet access and within those schools 87% of the individual classrooms have access (U.S. Department of Education, 2005). With easier access to the Internet, teachers are better able to implement its use into classroom instruction.

Eisenberg and Berkowitz' Big Six Skills Approach (Eisenberg & Johnson, 1996) was used by Eisenberg and Johnson to develop criteria for computer skills. The Big Six focuses on task definition, information seeking strategies, location and access, use of information, synthesis, and evaluation. Location and access are important factors when implementing technology into the classroom.

Technology Use in the Classroom

Instructional technology is a vital part of Career and Technical Education and includes computers and all the related technologies as well as the systems and processes for implementing technology use in the classroom (Lu & Miller, 2002). In recent years, there has been an increased emphasis on the integration of technology into curriculum especially at the high school level (Peake, Briers, & Murphy, 2005). Lu and Miller described the technology used in the classroom in various forms including computers, DVD/VCR players, digital and video cameras, televisions, cooking equipment, and welding equipment. They also describe how classroom technology can help the teacher to use, assess, alter, and present information in a variety of ways.

Research indicates that FCS teachers' attitudes toward the use of technology in the classroom are positive (Croxall & Cummings, 2000; Martin & Lundstrom, 1988; Rogers, Thompson, Cotton, & Thompson, 1993). These positive attitudes about computer/technology use have led teachers to more readily incorporate technology into the classroom in order to enhance student interest and involvement (Croxall & Cummings, 2000; Schofield, 1995; Way & Montgomery, 1995).

Methodology

Research Design

The research design of this quantitative study was descriptive-correlational. The purpose of this study was to examine two or more variables and determine if there was a relationship and the extent of that relationship (Ary, Jacobs, & Razavieh, 2002). When using this type of research, there are three main applications that are used: determining relationships, assessing consistency, and prediction. This study focused on determining relationships.

Population and Sample

The target population for this descriptive-correlational study consisted of middle and high school FCS teachers in the state of Kentucky [$N = 389$] (Kentucky Department of Education, 2006). A purposive sample was used consisting of all FCS teachers attending the Kentucky

Career and Technical Education Summer Teachers Conference held in July 2007. Because this is a purposive sample, findings can only be applied to this specific sample.

Instrumentation

To determine computer literacy, access to technology, and the use of technology within FCS classrooms in Kentucky, it was determined that a questionnaire was the most appropriate and feasible method. The questionnaire contained four sections. The first section was designed based on existing research (Alston et al., 2003; Croxall & Cummings, 2000; Kentucky Department of Education, 2006; Mason & McMorrow, 2006; Peake et al., 2005) and inquired into the use of various types of technology in the classroom. The second section included questions that were designed to determine the teachers level of computer literacy (Lokken, Cheek, & Hastings, 2003; Mason & McMorrow, 2006). The third section included questions that were designed to determine what types of technology teachers had access to in their classroom or within the school. (Alston et al., 2003; Croxall & Cummings, 2000; Peake et al., 2005; Redmann & Kotrlik, 2004)

A six-point Likert scale was used to rank the responses with the ranking as follows: 6=strongly agree; 5=moderately agree; 4=slightly agree; 3=slightly disagree; 2=moderately disagree; 1=strongly disagree.

The fourth section included demographic information such as age, gender, number of teachers in the program, years of teaching experience, highest education level attained, classes taught, and institution where degree was received.

For this study, face and content validity was determined by using a panel of experts. Seven experts from the FCS education profession, including state staff and teacher educators, were asked to review the questionnaire and provide feedback as to what they liked and what they thought should be changed. Once the panel of experts finished with the questionnaire, validity was established.

For this study, reliability was determined using a pilot group. The pilot group (n = 30) consisted of FCS teachers from Missouri. Using Cronbach's alpha, a reliable coefficient of 0.80 was established for Section I, which was use of technology; a reliable coefficient of 0.77 was found for Section II, which was computer literacy; and a reliable coefficient of 0.88 was found for Section III, which was access to technology.

Data Collection and Analysis

The questionnaire was distributed at the Kentucky Career and Technical Education Teachers Conference. Once the questionnaire was received by the researcher, the data was entered into the SPSS program and analyzed.

Demographic characteristics of the Family and Consumer Sciences Education teachers selected for the study were the first objective for the study. These characteristics included age, gender, number of teachers in the FCS program, years of teaching experience, the highest education level attained, courses taught during the 2007-08 school year, and institution where initial certification was received. Mean scores and standard deviations, frequencies, and percents were reported as appropriate.

For Objective Two through Four, means and standard deviations were reported. In addition, for each individual item, the frequency and percentage was reported. A grand mean was calculated from the individual items to create construct scores for "computer literacy," "access," and "use of technology."

Objectives Five and Six sought to determine the relationships between FCS teachers' computer literacy and their use of technology in the classroom, in addition to FCS teachers' access to technology and their use of technology in the classroom. The Pearson Product Moment Correlation was calculated for each and an alpha of .05 was established at a priori. To interpret correlation coefficients, Davis' (1971) conventions were adopted.

Findings and Discussion

Objective One

Demographic characteristics for this study included age, gender, highest education level attained, and classes taught. These demographics were compared to those of previous studies in relation to FCS education teachers and technology. Several studies indicated that the highest number of respondents were female (Bradley & Russell, 1997; Taylor, Torrie, Hausafus, & Strasser, 1999), as was the case with this study. This is a common trend in FCS education, as women are typically the ones who choose this field of education. The average number of years of teaching experience for participants in this study was 13.39 years and the average number of teachers in a program was 2.53.

Of the 94 participants who responded to the question regarding age, 36.2% (n = 34) were between the ages of 50-59 with an additional 4.3% (n = 4) who were 60 and over. A total of 31% were between 31-49 years of age and 29% were between the ages of 20-30. A total of 78.5% (n = 73) had a masters degree or higher. In the study by Taylor, et al. (1999) several similarities were found among the other demographics. In both Taylor's study and this one, the largest percentage of teachers were over the age of 31 and held degrees higher than a bachelors.

Participants in this study were asked to list all classes they would be teaching during the 2007-08 school year. Since teachers provided this information with the names they use for the courses they teach and were not given a selection from list on the survey, not all course titles were the same. A total of 53 different course titles were listed by the respondents. There were 22 approved courses in the Kentucky Family and Consumer Sciences Curriculum. The most commonly listed courses were FACS Life Skills (n = 65), followed by Foods and Nutrition (n = 57), Child/Human Development (n = 42), and Parenting (n = 33). Two of the most commonly taught classes for both this study and Taylor, et al. (1999) were Foods and Nutrition and Child/Family Development.

Objective Two

Upon completion of the research, it was found that Kentucky FCS teachers slightly agreed that they had knowledge related to computer literacy (Table 1).

A grand mean of 4.82 (SD = .69) was then calculated for the construct Computer Literacy. Computer literacy is an important component in having the ability to successfully and confidently use technology (Croxall & Cummings, 2000; Eisenberg & Johnson, 1996). To help instill this confidence and ability, teachers need to be provided the opportunity to participate in workshops and conferences that deal with using technology (Redman & Kotrlik, 2004). The teachers need to be proactive in their quest to learn about technology. They need to explore what is available on the internet for their use, plan lessons using the computer, and experiment with various types of technologies to become more comfortable with the use of technology. FCS teachers, both at the high school and college level, need to incorporate technology into their classroom lessons and teach their students how to understand the terminology.

Table 1
Computer Literacy as Perceived by FCS Education Teachers in the Study

Statement	*N*	*%*	*M* [a]	*SD*
I have a basic knowledge of computers.	94	100	5.38	.88
I have avoided computers because they are unfamiliar to me.	94	100	5.04	1.48
I have a working knowledge of computer terminology.	93	98.9	4.74	.94
I understand the technical aspects of computers.	94	100	3.93	1.30
I feel secure about my ability to interpret a computer manual.	94	100	3.99	1.20
I feel confident about using computers.	94	100	4.95	.93
I know there are different internet research tools (Google, Yahoo, etc.) available to use.	94	100	5.77	.53
Grand Mean			4.82	.69

[a] Scale (1=strongly disagree; 2=moderately disagree; 3=slightly disagree; 4=slightly agree; 5=moderately agree; 6=strongly agree).

Objective Three

It was found that Kentucky FCS teachers moderately agreed with statements regarding their access to technology. This shows that the technology most commonly used in classrooms is easily accessible for the teachers. Most teachers had access to a TV, DVD/VCR, projector, desktop computer, printer, and the Internet (Table 2).

A grand mean of 5.29 (*SD* = .57) was then calculated for the construct Access to Technology. Research conducted by Alston et al., (2003) also found these types of technology to be readily accessible to teachers in North Carolina. By having access to various types of technology within the classroom or school, teachers will be more apt to try to implement it into their daily classroom lessons. More research is needed to determine how schools allocate money for technology purchases and what type of training is provided to help teachers become more familiar with the new technology.

Objective Four

Upon completion of the research, it was found that Kentucky FCS teachers in this study indicated they occasionally used certain types of technology that they had available within their classroom or school. The majority of the teachers who participated in the study indicated that they used word processing programs, email, and grading programs on their computers. While these were the three highest areas mentioned, they also used a wide variety of technologies within their classrooms, yet ranked them lower (Table 3). A grand mean of 4.72 (*SD* = .69) was then calculated for the construct Technology Use.

Table 2

Teachers Access to Various Types of Technology as Reported by FCS Education Teachers in the Study

Statement	*N*	*%*	*M* [a]	*SD*
I have access to a television.	94	100	5.99	.10
I have access to DVD/VCR.	94	100	5.97	.23
I have access to a projector.	94	100	5.59	1.09
I have access to a digital camera.	94	100	5.62	1.01
I have access to a full page scanner.	92	97.8	4.40	2.00
I have access to a laser printer.	92	97.8	5.08	1.64
I have access to a desktop computer.	94	100	5.87	.73
I have access to a laptop computer.	94	100	4.96	1.73
I have access to presentation software.	94	100	5.46	1.11
I have access to the internet in my school.	92	97.8	5.96	.20
The internet is reliable at my school.	90	95.7	5.41	.93
I have adequate amount of technology for the number of students in my classes.	93	98.9	3.81	1.83
I have access to effective instructional software for the courses I teach.	92	97.8	4.58	1.26
Grand Mean			5.29	.57

[a] Scale (1=strongly disagree; 2=moderately disagree; 3=slightly disagree; 4=slightly agree; 5=moderately agree; 6=strongly agree)

Table 3

FCS Education Teachers Use of Various Types of Technology

Statement	*n*	*%*	*M* [a]	*SD*
I use email on a regular basis.	94	100	5.66	.52
I utilize word processing to develop materials for class.	92	97.8	5.46	.73
I use presentation software (Microsoft Word, PowerPoint, etc.) to develop lessons/units.	92	97.8	4.96	1.02
I use presentation hardware (Projector, Smart Board, etc.) to present lessons and units.	92	97.8	4.16	1.52
I keep track of grades using computers.	92	97.8	5.90	.33
I utilize various internet research tools.	91	96.8	5.15	.94
I create multimedia presentations using a scanner.	93	98.9	2.90	1.39
I create multimedia presentations using a digital camera.	91	96.8	3.29	1.47
I create multimedia presentations using a video camera.	93	98.9	2.69	1.32
I use the computer for word processing.	93	98.9	5.66	.71
I use the computer to create databases.	91	96.8	3.68	1.70
I use the computer to create spreadsheets.	91	96.8	3.63	1.65
I use the computer to access email.	92	97.8	5.90	.29
I use the computer to access the Internet.	93	98.9	5.84	.42
I use the computer to create presentations.	93	98.9	4.86	1.37
I use various technologies to support classroom instruction.	93	98.9	4.97	.85
Grand Mean			4.72	.69

[a] Scale (1=never; 2=not very frequently; 3=rarely; 4=occasionally; 5=very frequently; 6=always)

Culture has become very technologically-oriented, meaning that students are using technology on a regular basis (Manley et al., 2000). By utilizing various types of technologies within the classroom, teachers are better able to meet the learning needs of more students as well as keep them engaged in the lesson. Teacher education programs should require technology courses for students, so that when they enter the classroom they are competent in the uses of various technologies. It is also important to look at the access and use of technology that students are exposed to both in school and at home.

Objectives Five and Six

From the findings, we can see that there is a substantial relationship between computer literacy and the use of technology, while there was a moderate relationship between access to technology and use of technology. The relationship between computer literacy and use of technology had a positive correlation of .60 (Table 4). When compared to Davis's (1971) Conventions for Correlation Coefficient, the relationship between the two areas is substantial. The relationship between access to technology and use of technology had a positive correlation of .45. According to Davis, this relationship is moderate in nature.

Table 4
Correlations among Computer Literacy, Technology Use, and Access

	Computer Literacy	Technology Access	Technology Use
Computer Literacy	1	.14	.60
Technology Access		1	.45
Technology Use			1

These relationships tell us several things about FCS Education. First, teachers have a basic understanding of computer logistics, such as terminology and navigation of programs. This knowledge helps teachers have more confidence when they actually decide to use technologies in their classrooms. Second, teacher preparation programs need to require that students take a technology class if one is not already required. Technology classes will help the students gain a better understanding, not only of how to use technology, but also in how to interpret the more technical aspects of the technology (i.e., manual, programs). By properly teaching the new FCS Education teachers how to use and understand technology, they will be better able to utilize various technologies when teaching their students. The students can then take what they have learned about technology in the FCS classes and apply it to their other classes and assignments. Finally, access to technology is not always adequate. Many teachers reported that they did not have adequate technology for the number of students in their classes. This limits what they can have their students do, so they may be more apt not to use technology to teach their lessons. By providing technology grants to teachers, this problem will hopefully be a thing of the past.

Implications and Recommendations for Future Research

One of the issues encountered during the course of the research was the naming of courses as reported by the teachers who participated in the study. Often times the identity of FCS is unclear and "not branded" because of the inconsistency by which teachers label or identify the courses they teach. When the course names were first evaluated for this study there were 53 different course titles. These were then condensed into 22 categories, based on the Kentucky

Valid Course List, which was retrieved from the Kentucky Department of Education (2006). Further research is needed to determine how Kentucky FCS teachers determine what their class names will be, why they chose names that are not on the Valid Course List, and how they determine what curriculum will be taught.

Another issue that was encountered dealt with the questionnaire itself. After the pilot group returned questionnaires, each section was evaluated for reliability using Cronbach's alpha. The reliability rates were lower than anticipated with use at .80, computer literacy at .77, and access at .88. It is recommended that the instrument needs to be reevaluated and tightened for the purpose of replication.

Further research is also needed to compare the computer literacy, use, and access to technology of FCS teachers in Kentucky and with other Career and Technical Education (CTE) teachers and academic core teachers nationally. This could help to assist schools in equalizing resources and access to technology between teachers and school buildings. Schools would also have a better understanding as to what types of trainings that could be offered as professional development to help improve teachers' competencies in relation to technology.

Based on the research, the following recommendations for future research can be made:

1. Further research is needed to determine how Kentucky FCS teachers determine what their course title will be, why they chose names that are not on the Valid Course List, and how they determine what curriculum will be taught.
2. A study of how other state FCS teachers name their courses and select their curriculum would be useful to address the "branding" issue that continues to plague the FCS profession.
3. A comparison of technology literacy, use, and access of FCS teachers in Kentucky and with other CTE teachers and academic core teachers nationally may assist schools in equalizing resources and access to technology.
4. As technology continues to develop at a fast pace, research on systems of resource allocation in schools for purchasing technology tools and professional development on literacy of those tools may provide information on how to better serve teachers in the use of new and innovative technologies.
5. Research on teacher education programs for FCS and CTE, concerning what technology competencies are taught across states and nationally, may assist in determining where the advances are and where the pre-service teachers are already proficient**.**
6. Research on the level of literacy, use, and access secondary students have in their home and school may assist teacher education programs in developing high levels of these skills in future teachers to keep up with their students.
7. Reevaluate and tighten the instrument for replication.

As can be seen, there are a lot of areas for further research that can be applied to both FCS education, CTE, and academic core areas. By promoting technology through teacher preparation programs and through professional development, teachers will be better able to use various types of technology to promote learning within their classrooms.

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Prospective Teachers' Financial Knowledge and Teaching Self-Efficacy

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This study explored the financial knowledge and self-efficacy of prospective teachers toward teaching basic concepts in personal finance. The financial knowledge level of 99 prospective teachers was found to be that of the average U.S. consumer. Older prospective teachers (≥ 26 years) were significantly more knowledgeable about savings than younger ones (≤ 25 years). Also, prospective teachers who had never married were less knowledgeable about savings than those who were married, divorced or widowed ($\bar{x} = 67.50$, $\bar{x} = 80.77$, respectively; $f = 6.63$, $p \leq .05$). Prospective teachers were least knowledgeable about credit, yet felt most efficacious towards teaching credit; similarly, they felt least capable of teaching about mortgages, yet their knowledge scores for mortgages were among the highest.

As spending increases among school-aged individuals, so does the need for individuals, teachers, and programs that will provide students with the knowledge, skills, and abilities needed to make rational consumer decisions. Improving students' understanding of personal finance is not just a goal of educators; it has become a major issue of parents, community groups, businesses, government agencies, organizations, and policy makers. Inasmuch as the average score of high school seniors on basic financial facts being a mere 52% (Gandel, 2006) and billions of dollars are spent yearly by children under the age of 18 (Schor, 2004), it is no surprise that the financial education of students has become a national issue.

The increased interest in the financial education of school-aged individuals has prompted schools nationwide to start preparing students to become well-informed, financially literate individuals who are capable of making rational consumer decisions. In response to this, programs and curriculums such as *Planet Orange* (ING.Direct, 2007), *NEFE High School Financial Planning Program* (National Endowment for Foundation of Education, 2007), *Jump$tart Personal Finance* (JumpStart, 2007), and others have been developed.

Most importantly, increased financial knowledge is seen as benefiting students in helping them identify, plan, and achieve financial goals now and in the future. While improving the financial knowledge of students tends to dominate much of today's thinking, enhancing teachers' financial knowledge and skills is very essential in helping to increase students' financial knowledge. Teachers of all grade levels have an important role to play in equipping students with the knowledge, skills, and abilities needed to increase their economic security and well-being.

However, in order for any teacher to perform this role, he or she must have the financial knowledge, skills, and abilities required. Teachers competent in the area of personal finance are the agents that will provoke significant change or action in accomplishing this national as well as state and local goal. With children having such a large impact on the marketplace, it is essential that all teachers are prepared academically to take on the challenge of preparing all students to make informed, intelligent decisions regarding finances.

The premise of this study is that prospective teachers' ability to effectively facilitate the increase in students' financial knowledge depends, to a great extent, on their level of financial knowledge. Because financial knowledge and self-efficacy can be increased, assessing prospective teachers' financial knowledge and self-efficacy towards teaching basic principles of

finance is important. Data from such assessments can be used to create intervention measures that can assist in changing teachers' attitudes, knowledge, and skills for working with students in financial management.

In addition, an awareness of prospective teachers' financial knowledge together with their teaching self-efficacy could make important contributions to improving teacher education programs. Improvements made in teacher education programs relative to personal finance also suggest improving the educational status of all students, which could as well lead to an increase in national financial literacy.

Background

Financial Knowledge of College Students

Financial literacy, as defined by Garmen (2006) is ones' "knowledge of facts, concepts, principles, and technological tools that are fundamental to being smart about money" (pg. 3). According to Hogarth, Beverly, and Hilgert (2003), a sudden interest in financial education has come about due to a) the increased complexity of the 21st century financial marketplace, b) a shift in responsibility for financial security or long-term well-being away from the institution to the individual, c) and a shift in demographics.

Although the interest in financial literacy or financial education has continuously increased in the past few decades, a 2007 survey of college students and parents indicated that both students and parents felt that college students are not prepared to deal with future financial challenges (Hartford Financial Services Groups Inc., 2007).

In a nationwide study commissioned by KeyBank and conducted by Harris Interactive, nearly one-third (32%) of the 1,003 college students surveyed indicated that they were "not at all" or "not very well prepared" for managing their money on campus during their freshman year (KeyBank & Harris Interactive, 2006).

Teaching Financial Concepts

Schools and colleges are important institutions for teaching financial concepts. Several states have developed financial standards for middle schools and high schools (National Council on Economic Education, 2007). In a study conducted by Bernheim, Garrett, and Maki (2001) to assess the effects of state mandated financial courses on students' financial behavior, a positive effect on the rates at which individuals save and accrue wealth during their adult life was found. Mandell (2004) also noted that students who had taken a personal finance course in high school performed better on a national financial literacy examination than students who had not taken such a course. Studies pertaining to colleges and universities offering courses in financial concepts have also documented positive relationships between students' performance. Having coursework in business was found by Chen and Volpe (1998) to be a significant factor for higher levels of knowledge in personal finance and for significantly reducing students' chances of making incorrect decisions. Peng, Bartholomae, Fox, and Cravener (2007) also found a relationship between financial courses taken in college and students' knowledge of investment.

Although many of the studies indicate positive associations between teaching financial concepts in schools, some studies have found no association. For example, Tennyson and Nguyen (2001) did not find a significant difference between the scores of students from states that required general curriculum mandates for financial literacy and those students from states not requiring general curriculum mandates. They did, however, find a significant difference between the financial knowledge test scores of those students attending schools in states with

specific mandated courses and those students attending schools with general or no mandates. Students having specific mandated coursework scored higher.

Teacher Self-Efficacy

Self-efficacy, an important construct in psychology and education, is defined as ones' judgments of his or her capabilities to accomplish a given task (Bandura, 1997). It is recognized, according to Barkley and Burns (2000), as a tool used to help bring about behavioral change. According to Bandura's (1994) social cognitive theory, a person with a low level of perceived self-efficacy is less likely to accomplish a given task than a person with a higher level of perceived self-efficacy. Bandura (1977) further suggests that ones' self-efficacy is developed or constructed from four major sources: mastery experience (perceptions of being successful at a task), vicarious experiences (observing a task being performed), social or verbal persuasion (feedback from others), and physiological and emotional arousal (physical feedback or feelings involved with performing a task).

In the education arena, much research has been conducted on teachers' self-efficacy. Hoy (2004) describes teachers' sense of efficacy as a "judgment about capabilities to influence student engagement and learning, even among those students who may be difficult or unmotivated" (p.1).

A number of studies have explored the possible relationship between teachers' self-efficacy and student outcomes (Ashton & Webb, 1986; Ross, 1992; Pajares & Graham, 1999; Zeldin & Pajares, 2000). Teaching efficacy has been linked to math and reading achievement (Ashton & Webb, 1986; Rosenholtz, 1989; Moore & Esselman, 1992) and motivation (Ashton & Webb, 1986; Roeser, Arbreton, & Anderman, 1993). In addition, Ross (1994) reviewed 88 studies that investigated teacher efficacy and concluded that "higher efficacy is associated with the use of teaching techniques which are more challenging and difficult with teachers' willingness to implement innovative programs and with humanistic classroom management practices" (p. 23).

Purpose and Objectives

The overall purpose of this study was to examine prospective teachers' financial knowledge, use of financial products, and their perceived self-efficacy towards teaching the basic principles of personal finance. Specifically, the research objectives were:

1. Identify prospective teachers' level of financial knowledge, use of financial products, and perceived self-efficacy towards teaching basic principles of personal finance;
2. Determine if differences exist among prospective teachers' financial knowledge relative to demographics; and
3. Determine if differences exist among prospective teachers' financial knowledge relative to use of financial products and perceived self-efficacy towards teaching basic principles of personal finance.

Method

Sample

A non-probability sampling technique was employed in selecting the sample. A convenience sample of prospective teachers was drawn from a public Historically Black College or University (HBCU). The sample size of 98 consisted of 78 seniors and 20 graduate students who were participating in a student-teacher orientation meeting in southern Alabama. As shown in Table 1, a little more than half (58.6%) of the respondents were between 20 to 25 years of age.

The majority of the respondents were African-American (72.7%) and female (61.6%). Seventy-three percent of the respondents were single and only 17.2% were married. Due to missing responses, the sample size varied from 98 to 89.

Table 1
Demographic Data on Prospective Teachers

Demographic Variables	*f*	%
Age		
21 – 25	58	58.6
26 – 30	16	16.2
Over 30	25	25.3
Gender		
Male	38	38.4
Female	61	61.6
American Citizen		
Yes	92	92.6
No	6	6.1
Ethnicity		
African American	72	72.7
White American	19	19.2
Asian American	1	1.0
Hispanic American	2	2.0
Native American	1	1.0
Other	3	3.0
Marital Status		
Never Married	72	72.7
Married,	17	17.2
Divorced	7	7.1
Widowed	2	2.0
Classification		
Senior	78	78.7
Graduate	20	20.2

Instrumentation

The Surveys of Consumers Finance (SCF), developed by the Federal Reserve (2001) and a researcher, developed a teaching efficacy scale utilized in gathering data to assess prospective teachers' level of financial knowledge and their self-efficacy towards teaching basic principles of personal finance. Five aspects of personal finance created the overall financial knowledge scale. The aspects were general financial management, which was labeled GFM, credit, savings, investments, and mortgage. Using the correct responses from each respondent, a mean percentage was calculated for each aspect of the scale and for the overall scale. The teaching

efficacy scale was assessed for reliability. Reliability was assessed by a pilot group of education students from an HBCU in the southern region of the United States. Twenty-five prospective teachers from the same HBCU, but one semester prior to conducting the study, were chosen to pilot test the instrument. The instrument's overall internal reliability of .88 was assessed using Cronbach's alpha.

The questionnaire was distributed to and collected from 98 students who had completed all coursework and were participating in a two-day orientation meeting for student-teachers. The prospective teachers were asked to answer six demographic questions, six questions pertaining to whether or not they owned various financial products, twenty-eight true and false questions about basic personal finance, and eight statements pertaining to their perceived ability to teach basic concepts in personal finance (efficacy). A four-point scale, with 4 representing "very sure" to 1 representing "very unsure," was utilized in assessing the efficacy score. Higher scores on the efficacy scale indicated higher efficacy.

Findings

Objective One: Identify prospective teachers' level of financial knowledge, use of financial products, and perceived efficacy towards teaching basic principles of personal finance

The overall results of the financial scale are presented in Table 2. The prospective teachers correctly answered, on average, 67.86% of the 28 questions on the financial knowledge scale. Findings of Hogarth et al., (2003) indicated that consumers taking the same test scored approximately the same score (67%). Prospective teachers, however, were most knowledgeable about savings (80.0%) and mortgage (76.01%). They were least knowledgeable about investments (59.09%) and credit (61.62%).

Table 2
Percentage of Correct Responses and Overall Means of Prospective Teachers' Financial Knowledge Subscales (N=99)

	Statement	% of correct responses
Q1.	Making payments late on your bills can make it more difficult to take out a loan.	96.0
Q2.	The finance charge on your credit card statement is what you pay to use credit.	62.6
Q3.	If you expect to carry a balance on your credit card, the APR is the most important thing to look at when comparing credit card offers.	91.9
Q4.	Your credit rating is not affected by how much you charge on your credit cards.	74.7
Q5.	Using extra money in a bank savings account to pay off high interest rate credit card debt is a good idea.	72.7
Q6.	If you are behind on debt payments and go to a credit counseling service, they can get the federal government to apply your income tax refund to pay off your debts.	36.4
Q7.	If your credit card is stolen and someone uses it before you report it missing, you are only responsible for $50, no matter how much they charge on it.	25.3
Q8.	Creditors are required to tell you the APR that you will pay when you get a loan.	80.8

	Statement	% of correct responses
Q9.	Your credit report includes employment data, your payment history, any inquiries made by creditors, and any public record information.	76.8
Q10.	If you have any negative information on your credit report, a credit repair agency can help you remove that information.	33.3
Q11.	With compound interest, you earn interest on your interest, as well as on your principal.	72.7
Q12.	All investment products bought at your bank are covered by FDIC insurance.	42.4
Q13.	Mutual funds pay a guaranteed rate of return.	39.4
Q14.	A stock mutual fund combines the money of many investors to buy a variety of stocks.	68.7
Q15.	Over the long-term, stocks have the highest rate of return on money invested.	61.6
Q16.	If you buy certificates of deposit, savings bonds, or treasury bills, you can earn higher returns than on a savings account, with little or no added risk.	79.8
Q17.	The earlier you start saving for retirement, the more money you will have because the effects of compounding interest increase over time.	81.8
Q18.	Whole life insurance has a savings feature while term life insurance does not.	64.6
Q19.	If you have a savings account at a bank, you may have to pay taxes on the interest you earn.	48.5
Q20.	If the interest rate on an adjustable rate mortgage loan goes up, your monthly mortgage payments will also go up.	68.7
Q21.	You could save thousands of dollars in interest costs by choosing a 15-year rather than a 30-year mortgage.	85.9
Q22.	Repeatedly refinancing your home mortgage over a short period of time results in added fees and points that further increase your debt.	72.7
Q23.	When you use your home as collateral for a loan, there is no chance of losing your home.	76.8
Q24.	You should have an emergency fund that covers two to six months of your expenses.	88.9
Q25.	Your bank will usually call to warn you if you write a check that would overdraw your account.	73.7
Q26.	Employers are responsible for providing the majority of funds that you will need for retirement.	60.6
Q27.	The cash value of a life insurance policy is the amount available if you surrender your life insurance policy while you’re still alive.	65.7
Q28.	After signing a contract to buy a new car, you have three days to change your mind.	39.4

Statement	% of correct responses
Overall Mean Score	**65.80**
Credit (*q2-q10)*	**61.62**
Savings *(q11, q16, q18 ,q19, q24)*	**70.91**
Investments *(q12-q15, q17, q26)*	**59.09**
Mortgage *(q20 –q23)*	**76.01**
GFM *(q1, q25, q27, q28)*	**68.69**

Prospective teachers reported on six financial products. A little more than half of the prospective teachers (52.0%) had at least three of the six financial products (median = 3). As indicated in Table 3, only 10% of the respondents had all of the financial products. A large percentage (92.9%) of the respondents had a checking account, yet only about two-thirds (66.7%) of them had a savings account. Approximately 63.6% had at least one credit card, 36.4% used a spending plan, and only 31.3% had financial goals.

Table 3
Percentage of Financial Products Owned or Used by Prospective Teaching (N=98)

Financial Products	f	%	Median
Number Owned			3
Zero	1	1.0	
One	5	5.1	
Two	18	18.2	
Three	27	27.3	
Four	16	16.2	
Five	21	21.2	
Six	10	10.1	
Type Owned			% of respondents
Checking account			92.9
Credit card			63.6
Spending plan or budget			36.4
Savings account			66.7
Emergency fund			31.3
Financial goals			63.6

Table 4 shows the mean and standard deviation for each of the eight items in the efficacy scale. Prospective teachers' overall efficacy mean score was 2.70 (sd =.60). Respondents perceived themselves as being most capable of teaching general money management ($\bar{x}$ =3.01,

sd =.66), savings ($\bar{x}$ = 2.86, sd = .70), and credit management ($\bar{x}$ = 2.82, sd = .82). They felt least capable of teaching investments ($\bar{x}$ = 2.32, sd = .86) and mortgage ($\bar{x}$ = 2.36, sd = .96).

Although findings from Table 2 indicated that prospective teachers were least knowledgeable about credit, they perceived themselves as being most capable of teaching credit management. Surprisingly, they felt least capable of teaching about mortgage, yet their knowledge score for mortgage was among their highest scores. Also shown, prospective teachers were least knowledgeable about investments and they also felt less capable of teaching investments.

Table 4

Perceived Teaching Efficacy of Prospective Teachers Regarding Personal Finance Concepts

I have the capability to teach students to make informed decisions about …	*f*	*%*	$\bar{x}$	*sd*
Credit management			2.82	.82
not at all true (1)	10	10.9		
hardly true (2)	9	9.1		
moderately true (3)	57	57.6		
exactly true (4)	13	13.1		
Saving			2.86	.70
not at all true (1)	6	6.1		
hardly true (2)	10	10.1		
moderately true (3)	62	62.6		
exactly true (4)	10	10.1		
Spending			2.75	.75
not at all true (1)	8	8.1		
hardly true (2)	14	14.1		
moderately true (3)	58	58.6		
exactly true (4)	8	8.1		
Investment			2.32	.86
not at all true (1)	17	17.2		
hardly true (2)	30	30.2		
moderately true (3)	35	35.4		
exactly true (4)	5	5.1		
Mortgage			2.36	.96
not at all true (1)	22	22.2		
hardly true (2)	18	18.2		
moderately true (3)	39	39.4		
exactly true (4)	7	7.1		
General money management			3.01	.66
not at all true (1)	4	4.0		
hardly true (2)	7	7.1		
moderately true (3)	62	62.6		
exactly true (4)	16	16.2		
Insurance			2.74	.81
not at all true (1)	9	9.1		
hardly true (2)	15	15.2		
moderately true (3)	52	52.5		
exactly true (4)	11	11.1		

Consumer protection			2.67	.85
not at all true (1)	11	11.1		
hardly true (2)	18	18.2		
moderately true (3)	49	49.5		
exactly true (4)	11	11.1		
Overall			**2.70**	**.60**

Note: Data were coded 4 = Exactly True, 3 = Moderately True, 2 = Hardly True, and 1 = Not at All True

Objective Two: Determine if differences exist among prospective teachers' financial knowledge relative to demographics.

The difference between the financial knowledge of prospective teachers relative to age, gender, ethnicity, marital status, and classification were examined. Table 5 displays the mean percentage of correct responses for overall financial knowledge and the five aspects of financial knowledge (credit, savings, investments, mortgage, and GFM). Analysis of variance (ANOVA) was used to identify the differences in knowledge levels. Regarding overall financial knowledge, prospective teachers at the graduate level were significantly more knowledgeable about all aspects of personal finance than those at the senior level ($f = 7.94$, $p \leq .01$). On average, the graduate level respondents answered 72.14% of the questions correctly, whereas the senior respondents answered only 64.19% correctly. No significant difference was found between prospective teachers' overall financial knowledge and age, gender, ethnicity, and marital status.

Prospective teachers' knowledge on the various subscales differed only on savings and investments. The findings suggest that on the savings subscale, prospective teachers differed in knowledge based on age, marital status, and classification. The percentage of correct answers for prospective teachers on the savings subscale was 64.48% for those between 21 to 25 years, 75.00% for those between 26 to 30 years, and 83.20% for those over 30 years of age. The value of the F-statistics ($f = 6.75$, $p \leq .01$) indicated a significant difference existed. The significant difference was further examined using a post hoc test. Prospective teachers 26 years of age and over were significantly more knowledgeable about savings than those 25 years and younger. Also, prospective teachers who had never married were less knowledgeable about savings than those who were married, divorced, or widowed ($\bar{x} = 67.50$, $\bar{x} = 80.77$, respectively; $f = 6.63$, $p \leq .05$). This finding supports that of Danes and Hira (1987) in which they found that married students are more knowledgeable about personal finance. Similarly, data indicated that graduate level respondents scored significantly higher ($\bar{x} = 80.00$) than senior level respondents ($\bar{x} = 68.72$) on savings ($f = 3.88$, $p \leq .05$).

Relative to ethnicity, African American respondents scored significantly lower ($\bar{x} = 56.71$) than non-African Americans ($\bar{x} = 65.91$) only on investments ($f = 4.13$, $p \leq .05$). The findings from the ANOVA support the findings of Chen and Volpe (1998) that African Americans' knowledge of investments was lower than that of other college students.

Table 5

Mean Percentage of Correct Responses to Each Category of Financial Knowledge by Characteristics of Sample and Results of ANOVA

	Credit	Saving	Investment	Mortgage	GFM	Overall
Age						
21 – 25	59.58	64.48	56.03	68.53	65.52	61.82
26 – 30	59.72	75.00	63.54	84.38	76.56	69.20
Over 30	67.55	83.20	63.33	88.00	71.00	72.86
F statistics	(2.89)	(6.75)**	(1.83)	(6.29)	(2.12)	(10.41)

Gender						
Male	60.82	71.58	61.40	76.97	67.11	66.07
Female	62.11	70.49	57.65	75.41	69.67	65.63
F statistics	(.183)	(.051)	(.904)	(.081)	(.372)	(.033)
Ethnicity						
African American	61.27	68.61	56.71	74.31	68.06	64.43
Non African American	60.87	78.26	65.94	82.61	70.65	69.57
F statistics	(.013)	(3.11)	(4.13)*	(1.77)	(.283)	(3.55)
Marital Status						
Never Married	60.49	67.50	58.80	75.35	67.71	64.53
Married, Divorced, Widowed	63.67	80.77	60.26	78.85	72.12	69.37
F statistics	(.934)	(6.63)*	(.110)	(.331)	(.897)	(3.37)
Classification						
Senior	60.40	68.72	57.69	74.04	66.99	64.19
Graduate	65.00	80.00	65.00	85.00	76.25	72.14
F statistics	(1.64)	(3.88)*	(2.35)	(2.78)	(3.39)	(7.94)**

*Notes: * significant at the 0.05 level; ** significant at the 0.01 level or greater.*

Objective Three: Determine if differences exist among prospective teachers' financial knowledge relative to use of financial products and efficacy towards teaching basic principles of personal finance.

Table 6 shows the results of an ANOVA used in examining differences in prospective teachers' financial knowledge with regards to their perceived teaching efficacy and the number of financial products owned. The respondents' responses to the number of financial tools owned were aggregated into two groups based on the groups median score of three. Respondents having zero to three financial products formed group one (N=51) and those having four to six financial products formed group two (N=47). F-statistics indicated no significant difference on any of the financial knowledge subscales as well as overall financial knowledge (credit: $f = .168$, $p = .32$; savings: $f = 1.70$, $p = .20$; investments: $f = .72$, $p = .40$; mortgage: $f = .59$, $p = .44$; GFM: $f = .43$, $p = .52$; and overall financial knowledge: $f = 1.00$, $p = .32$). In other words, prospective teachers' financial knowledge did not differ in regards to the number of financial products they had.

Prospective teachers' perceived efficacy scores were also combined into two groups based on the mean score of the entire group ($\bar{x} = 2.70$). Those with efficacy scores equal to or less than the group mean created group one (low efficacy; N=38) and those with efficacy scores greater than the overall mean formed group two (high efficacy; N=51). No significant difference ($f = 1.89$, $p = .17$) was found between the overall financial knowledge of prospective teachers with low teaching efficacy ($\bar{x} = 64.10$) and those with high teaching self-efficacy ($\bar{x} = 67.51$). Also, there was no significant difference between the knowledge of prospective teachers with low teaching efficacy and those with high teaching efficacy relative to their knowledge of credit ($f = .74$, $p = .39$), savings ($f = 2.70$, $p = .10$), investments ($f = .544$, $p = .46$), mortgage ($f = .004$, $p = .95$), and GFM ($f = .638$, $p = .43$). The financial knowledge of prospective teachers who perceived themselves as being most capable of teaching the basic principles of personal finance was no different than those that were less efficacious.

Table 6
Mean Percentage of Correct Responses to Each Category of Financial Knowledge by Number of Financial Products Used, Teaching Efficacy, and Results of ANOVA

	Credit	Saving	Investment	Mortgage	GFM	Overall
Number of Financial Product						
0 to 3	62.22	68.00	57.33	74.00	67.50	64.64
4 to 6	60.99	74.04	60.64	78.19	70.12	67.02
F statistics	(.168)	(1.70)	(.723)	(.593)	(.425)	(1.00)
Efficacy						
Low	59.14	67.37	57.02	78.29	67.11	64.10
High	62.09	75.29	60.13	77.94	70.59	67.51
F statistics	(.741)	(2.70)	(.544)	(.004)	(.638)	(1.89)

*Notes: * significant at the 0.05 level; ** significant at the 0.01 level or greater*

Conclusion and Recommendations

Conclusion

Results suggest that on average, participants answered only 68% of the questions correctly indicating that the prospective teachers' financial knowledge was fairly low. As confirmed in other studies, college students' financial knowledge level needs improvement (Chen & Volpe, 1998; Volpe, Chen & Parlicko, 1996; Danes & Hira, 1987), especially college students who will be going into the classroom to teach high school and elementary students the basic principles of personal finance. This finding supports the need to not only examine state mandates for financial literacy in middle and high schools, but to also examine financial literacy in teacher education programs. This finding should be motivation for all teacher education programs to incorporate personal finance into their course offerings.

It seems somewhat contradictory that many state mandates require students to have a certain competency level in finance, yet teachers are not required to have such levels. Family and Consumer Sciences teachers, specifically, must improve their financial knowledge because personal finance, money management, or economic issues is and has been an essential component of all areas of Family and Consumer Sciences since its beginning. For example, Family and Consumer Sciences teachers are expected to teach the many topics similar to the following: a) getting the most for one's food dollars while considering healthful diets, b) assessing the cost of consumer durables while also viewing them as an investment, c) purchasing a home while considering the tax benefits home ownership as well as a long-term investment, etc.

Although no difference was found in the overall financial knowledge of respondents based on age, gender, ethnicity, and marital status; prospective teachers obtaining a master's degree scored significantly higher than those obtaining a Bachelor of Science degree. When looking at each of the five aspects separately, differences in respondents' knowledge of savings were found between different age groups, different marital statuses, and different classifications. Older, married, and graduate level respondents were significantly more knowledgeable about savings than those who were younger, single, and senior-level college students. There may be a number of reasons why older, married students might be more knowledgeable. For example, one might expect that older, married students have had more out of the classroom experience with saving than younger, single students. With this in mind, experiential teaching methods that

provide authentic learning experiences, as well as problem-based teaching methods, should be used in promoting higher financial literacy among prospective teachers. Not only should these methods be used in teaching prospective teachers financial concepts, they should also be used by teachers, especially Family and Consumer Sciences teachers, when teaching financial management or consumer economics to students in middle and high schools.

Although there were no differences in prospective teachers' overall financial knowledge; when looking at ethnicity and financial knowledge, African American prospective teachers were less knowledgeable of investments than non-African Americans. This finding is consistent with those of Chen & Volpe (1998) in which they reported that African American students' knowledge of investments was significantly lower than that of other college students. Due to the fact that a large majority of African American teachers graduate from an HBCU, one would expect an HBCU to play a major role in helping to increase African American teachers' overall financial knowledge with greater emphasis on investments.

Although a large number of the prospective teachers had a checking account or credit card, only a small percentage of them used a spending plan or even had financial goals. Having more financial products, however, did not make a difference in prospective teachers' knowledge of personal finance.

Results tend to suggest that even though some teachers perceived themselves as being more capable of teaching the basic principles of personal finance than others, their knowledge scores, on average, were the same as all other prospective teachers. In other words, the more efficacious prospective teachers' knowledge of personal finance was statistically the same as that of less efficacious prospective teachers.

Recommendations

Based on the findings of this study that prospective teachers' financial knowledge is low, teacher preparation programs need to integrate basic personal finance into the overall training of teachers. Further investigation of prospective teachers' financial knowledge is recommended. Because the efficacy of the prospective teachers towards teaching basic concepts relating to investments and mortgages, on the whole was fairly low, more opportunities or activities that will assist in developing their efficacy towards teaching such concepts are warranted.

Implications

The results of this study have important implications for teacher education programs. Research indicates that the higher ones' self-efficacy towards successfully completing a task, the more likely he or she will successfully complete it (Bandura, 1994). Therefore, findings of teachers' self-efficacy towards teaching personal finance or money management have the potential for essential information to be used in developing and implementing intervention activities that will increase prospective teachers' overall efficacy towards teaching personal finance in schools. These findings also suggest that intervention activities geared toward increasing ones' self-efficacy may also increase teachers' overall knowledge of personal finance, which could lead to an increase in the knowledge of the students they teach.

This study focused on prospective teachers regardless of their majors. Further study might examine the financial knowledge of Family and Consumer Sciences teachers only to assess their efficacy in teaching financial concepts in the classrooms. Comparisons, between the financial knowledge and teaching efficacy of Family and Consumer Sciences teachers and Family and Consumer Sciences students, are needed to contribute to understanding why so many

students (family and consumer sciences students specifically) have low financial knowledge scores.

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Family and Consumer Sciences Teachers' Adoption of Technology for Use in Secondary Classrooms

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This study determined whether Louisiana family and consumer sciences teachers integrate technology in instruction. Over half use college courses as a technology training source while most are self-taught or utilize workshops/conferences and colleagues. Teachers have adopted technology for use in instruction at a moderate level and experience moderate barriers and some anxiety as they attempt to incorporate technology. Age, technology anxiety, availability, and integration barriers are individually related to technology adoption. Regression analysis was used to assess the variance explained by the variables that are individually related to technology adoption. Technology anxiety explains a large proportion of the variance in technology adoption. Age, barriers to technology integration, and technology availability do not explain significant variance beyond the variance explained by technology anxiety.

Advances in technology have afforded students a new way of experiencing learning. To tap into the benefits that technology provides, teachers need to utilize technology to enhance instruction by applying course content to realistic career and life challenges. This is especially important in career and technical education programs, such as family and consumer sciences education (FACS). In fact, the importance of the use of technology in instruction was stated in Standard 6 of the 2004 *National Standards for Teachers of Family and Consumer Sciences*:

> ***6. Instructional Strategies and Resources.*** Facilitate students' critical thinking and problem solving in family and consumer sciences through varied instructional strategies and technologies and through responsible management of resources in schools, communities, and the workplace (National Association of Teacher Educators for Family and Consumer Sciences, 2004, paragraph 4).

Even before approval of the 2004 FACS standards, Keane (2002) reported that "Some states had decided to take the national standards for FCS one step further and specifically tailor them to their needs in the areas of technology" (p. 42). Keane further supported the need to integrate technology in FACS when she stated, "As technology use continues to rise, it is essential that FCS professionals grasp the latest concepts for use in their classrooms" (p. 43). Arnett and Freeburg (2008) studied the early field experiences of FACS pre-service teachers and found that the skill area that the pre-service teachers felt they needed to develop was the knowledge and use of technology in the classroom.

Reichelt and Pickard (2008) discussed how technology such as the Internet could be used in FACS classrooms. In discussing Internet learning activities for FACS, they stated, "Perhaps the simplest and most straight forward way of integrating technology into family and consumer sciences classrooms is the potential of the Internet as a source of information. . . . This is one place where the evaluation of information and critical thinking skills can be taught" (p. 52).

Technology Adoption Research

Studies have shown historically that FACS teachers have embraced or adopted technology at various levels of usage. Keane (2002) reported that FACS classrooms in the 1980s were equipped with the latest appliances, including those with computer programming, with some classrooms having computers. Even though computers were not available on a large scale in the 1980s, FACS teachers educated their students about their significance and used a wide variety of software. By the early 1990s, FACS teachers were regular users of computers (Keane).

Keane's conclusions were supported by Daulton's (1997) survey of vocational home economics teachers that reported that the computer adoption progress began slowly in 1982-1983 with a 5% adoption rate and had increased to 83% by 1992-1993. Technology usage varied from 1 to 6 hours per week with the greatest category of use (34%) being 2-3 hours per week. Daulton indicated that the rate of technology usage followed Everett Rogers' (1983) classic adoption-diffusion of innovations paradigm. It should be noted that Daulton's study addressed computer usage only and did not address the broader concept of technology use in instruction, which includes multiple types of instructional technologies. By the late 1990s, Harrison, Redmann, and Kotrlik's (2000) FACS study revealed that teachers place a high value on information technology for use in the classroom including computers in general and other instructional technologies such as the Internet and laser disc players. Although FACS teachers valued information technology, they perceived that information technology was moderately useful in program and instructional management. A low positive relationship existed between how teachers value information technology and the availability of computer technology at home and school (Harrison, Redmann, & Kotrlik).

Williams (2000) reported that Texas FACS teachers' were in the advanced stages of adoption for each of the five innovations studied (email, Internet, multimedia, computers for professional productivity, and computers for classroom use). Conversely, in a study reported the same year, Croxall and Cummings (2000) found that New Mexico FACS teachers did not regularly incorporate computers into their curricula.

Studies related to technology adoption in career and technical education clearly indicate that career and technical education teachers should adopt technology for use in instruction (Chapman, 2006; Redmann & Kotrlik, 2004; Thomas, Adams, Meghani, & Smith, 2002; Womble, Adams, & Stitt-Gohdes, 2000). Redmann and Kotrlik also found that agriscience, business, and marketing teachers were actively exploring the potential uses of technology in teaching and learning and were adopting technology for regular use in instruction, but were not actively experimenting with technology.

In a national study conducted in nine states that involved 1,666 schools, Abbot and Fouts (2001) found that over half of the teachers did not routinely use technology in teaching and learning. Cuban, Kirkpatrick, and Peck (2001) found in a study of high school teachers, administrators, and students that access to technology by itself ". . . seldom led to widespread teacher and student use" (p. 813). The lack of technology use in teaching and learning may be related to the adoption of innovations. How quickly individuals adopt change is related to whether they value the new approach when compared to their existing approach (Rogers, 2003). Fullan (2001) indicated that teachers need time to merge their improved knowledge into their instructional practice as a basis for the acceptance of innovations.

Variables Related to Technology Adoption

Technology Integration Barriers. Barriers are defined as any factor that discourages or prevents teachers from using technology (The British Educational Communications and

Technology Agency [BECTA], 2003). Teacher-level barriers include lack of self-confidence in using technology, lack of necessary knowledge, and lack of time while a restriction on access to resources such as technical and institutional support, equipment, and state of the art software is a major administrative barrier (BECTA). Lack of administrative and institutional support, lack of training and experience, and limitations resulting from personality or attitudinal factors often result in teachers falling short when attempting to incorporate technology (Brinkerhoff, 2006). Other studies also reported that technology unavailability was also reported as an important factor inhibiting the use of technology by teachers (BECTA, 2003; Mumtaz, 2000; Redmann & Kotrlik, 2004). Park & Ertmer (2008) expanded on the barriers identified above by stating ". . . a lack of a clear, shared vision was the primary barrier. Additional barriers included lack of knowledge and skills, unclear expectations and insufficient feedback" (p. 631). Specifically in FACS, Croxall and Cummings (2000) and Williams (2000) found that a lack of software, hardware, and time were major barriers to teachers' use of technology in the classroom.

Technology Anxiety. Equipping teachers with technology and then failing to provide adequate training or failing to consider curricular issues has lead to technology anxiety (Budin, 1999). In a 3 year study of Mississippi FACS teachers using a pre/post-test design, Lokken, Cheek, and Hastings (2003) reported that no computer anxiety existed after training, even though teachers' anxiety was inversely related to the frequency of computer use prior to the initiation of the study. Redmann and Kotrlik (2004) also reported that technology adoption increased as technology anxiety decreased for career and technical education teachers.

Technology Training and Availability. A key predictor of technology use found by Vannatta and Fordham (2004) is the amount of technology training. Training is typically focused on basic skills instead of targeting the integration of technology in instruction (BECTA 2003). Mumtaz (2000) and BECTA (2003) reported that a lack of technology availability was a key factor in preventing teachers from using technology in their instruction. Croxall and Cummings (2000) established that hours of training and availability of technology are significantly related to FACS teachers' classroom usage of technology; use of technology in teaching increased as hours of training increased. Williams (2000) found that Texas FACS teachers had received basic computer literacy training that included technology integration and Internet applications. Over half of the teachers were self-taught, but a larger proportion had used school system technology training. Croxall and Cummings (2000) concluded that hours of training and availability of technology was significantly related to FACS teachers' classroom usage of technology.

Age and Teaching Experience. In Lokken, Cheek, and Hastings' (2003) three year study of FACS teachers, the researchers concluded that older teachers had less confidence in technology and in their ability to use technology. Waugh (2004) concluded that technology adoption decreased as age increased; however, previous studies of FACS teachers found that no relationship existed between age or teaching experience and the incorporation of technology into the classroom (Croxall & Cummings, 2000; Williams, 2000), which was also supported by Redmann and Kotrlik (2004) in their study of career and technical education teachers. A lack of experience with incorporating technology in instruction was a factor that resulted in teachers avoiding the use of technology (Mumtaz, 2000) and an NCES study reported that more experienced teachers were less likely to utilize technology than less experienced teachers (Smerdon et al., 2000).

Need for the Study

Strong professional, political and organizational support for technology-based instruction (Bower, 1998; *No Child Left Behind Act*, 2001) points to the need to continue investigating the incorporation of technology in instruction. Johnson (2007) cited scholarly work that was needed in the next decade in her review of previous FACS research and scholarly work. Included in the recommendations were several research questions related to technology integration in instruction, namely "What technology is being used in classrooms? How are teachers being prepared to use technology as a teaching method and management tool? How has this changed the classroom environment and the effectiveness of instruction?" (p. 35). The need for this study, as supported by the research cited, targets FACS teachers' incorporation of technology in instruction. The study's results should contribute to efforts to ensure that technology is used to attain maximum impact.

Purpose and Research Questions

The purpose of this research was to determine secondary FACS teachers' adoption of technology for use in instruction. Five questions guided the study:

1. What are the FACS teachers' demographic and personal characteristics?
2. To what extent have teachers adopted technology in their instruction?
3. Do barriers exist that prevent teachers from using technology in their teaching?
4. Do teachers experience technology anxiety when seeking to use technology in instruction?
5. Do teachers' demographic and personal variables explain any variance in teachers' technology adoption? Potential explanatory variables used in the forward regression analysis included teachers' age, years teaching experience, technology anxiety, perceived barriers to technology integration, training sources, and technology available. Gender was originally considered as a potential explanatory variable, but was not included because the random sample only included one male teacher.

Method

The target and accessible population included all secondary FACS teachers in Louisiana. The required sample size was calculated using Cochran's (Snedecor & Cochran, 1989) formula. Data collection was conducted according to the procedures recommended by Dillman (2000). After three data collection efforts (two mailings and a phone follow-up of a random sample of non-respondents), 91 out of 182 teachers returned their surveys for a 50% response rate.

Inferential *t*-tests compared the scale means of the technology adoption, barriers to technology integration, and technology anxiety scales for those responses received during the phone follow-up to those received by mail as recommended by Gall, Gall, and Borg (2002). This analysis was used to establish whether the responses were representative of the population and to control for non-response error. The three scales described in the instrumentation section were utilized for this analysis because they represented the study's key variables. Since no significant difference existed by response mode (Table 1), it was concluded that the data were representative of the population and the mail and phone responses were combined for use in this study.

Table 1
Comparison of FACS Teachers' Mail versus Phone Follow-up Responses

Scale	Mail Responses	Phone Responses	Levene's Test for Equality of Variances				
	m (n/sd)	*m (n/sd)*	*F*	*P*	*t*	*Df*	*p*
Technology Adoption[ab]	3.47 (72/.84)	3.36 (18/.89)	.14	.71	.53	88	.60
Barriers to Technology Integration[c]	2.67 (69/.67)	2.74 (22/.67)	.16	.69	-.38	85	.71
Technology Anxiety[d]	2.34 (72/1.03)	2.15 (19/.90)	.19	.67	-.71	89	.48

[a]Equal variances assumed for *t*-tests since Levene's Test for Equality of Variances did not detect any statistically significant variance. [b]*Technology Adoption Scale*: 1 = Not Like Me, 2 = Very Little Like Me, 3 = Some Like Me, 4 = Very Much Like Me, 5 = Just Like Me. [c]*Barriers to Technology Integration Scale*: 1 = Not a Barrier, 2 = Minor Barrier, 3 = Moderate Barrier, 4 = Major Barrier. [d]*Technology Anxiety Scale*: 1 = No Anxiety, 2 = Some Anxiety, 3 = Moderate Anxiety, 4 = High Anxiety, 5 = Very High Anxiety.

Instrumentation

The scales in the instrument included technology adoption for use in instruction, barriers to technology integration in instruction, and technology anxiety experienced while attempting to use technology in instruction (15, 7, and 9 items, respectively). The research instrument was developed by the authors after a research literature review. Instrument validity was evaluated by an expert panel of university faculty and secondary teachers. The instruments were pilot tested with teachers enrolled in a comprehensive graduate program in career and technical education. The Cronbach's alpha reliability coefficients for the scales were exemplary according to Robinson, Shaver and Wrightsman (1991): technology adoption – $\forall$ = .96, barriers – $\forall$ = .81, and technology anxiety - $\forall$ = .97.

Data Analyses

Descriptive statistics were calculated for research questions 1-4. The data for research question 5 was analyzed using forward multiple regression. Cohen's (1988) guidelines were used to interpret the effect sizes for the correlations and multiple regression.

Results

Demographic and Personal Characteristics

The FACS teachers' ages ranged from 26 to 60 years (M = 46.12, SD = 10.09) and almost all were female (91 or 98.9%). Teachers' years teaching experience ranged from 0 to 34 with the average teacher having 17 years experience (M=16.69, SD=10.20). The main technology training used by the teachers was "workshops/conferences" which was used by 88 or 94.6% of the teachers, followed by "self-taught," which was used by 85 or 91.4% of the teachers (Table 2).

Table 2
Sources of Technology Training Used by FACS Teachers

Source	#	%
Workshops/conferences	88	94.6
Self-taught	85	91.4
Colleagues	80	86.0
College courses	53	57.0

Note. The teachers were asked to check (Y) each type of technology training they had used.

Almost all FACS teachers had an email account at school (89 or 95.70%) and a computer with Internet connection both at school (90 or 96.8%) and at home (86 or 92.5%). Just over one-third had a digital video camera (32 or 34.4%). Approximately one-fourth of the teachers reported their students had school email accounts (24 or 25.8%) while few had a personal digital assistant (PDA, 5 or 5.4%) or a Global Positioning System (GPS, 4 or 4.3%) (Table 3).

Technology Adoption

The *Technology Adoption Scale* was utilized to measure teachers' adoption of technology for use in instruction. The instrument contained 15 items with responses recorded on a 5 point scale (Table 4): 1 = Not Like Me at All, 2 = Very Little Like Me, 3 = Some Like Me, 4 = Very Much Like Me, and 5 = Just Like Me.

The top rated scale item was "I have made physical changes to accommodate technology in my classroom or laboratory," which teachers indicated was "Very Much Like Me" (M = 3.93, SD = .88), with the second highest rated item being "I emphasize the use of technology as a learning tool in my classroom or laboratory," which they also indicated was "Very Much Like Me" (M = 3.87, SD = .89). The lowest rated item was "I incorporate technology in my teaching to such an extent that my students use technology to collaborate with other students in my class during the learning process," which they indicted was "Some Like Me" (M = 2.73, SD = 1.19). The scale mean was 3.45 (SD = .85) which indicates that the teachers perceived the items in the scale, as a whole, were "Some Like Me." The scale mean also indicates that FACS teachers had not adopted technology for use in instruction at either of the highest levels, "Just Like Me" or "Very Much Like Me."

Table 3

Technology Available to FACS Teachers for Use in Instruction

Technology Available for Use in Instruction	#	%
Teacher has computer with Internet connection at school[a]	90	96.8
Teacher has a school email account[a]	89	95.7
Teacher has computer with Internet connection at home[a]	86	92.5
Video Cassette, CD or DVD Recorder[a]	66	71.7
Laser disc or standalone DVD or CD players[a]	63	67.7
Interactive DVDs or CDs[a]	60	64.5
Teacher has access to enough computers in a classroom or lab for all students to work by themselves or with one other student	47	50.5
Digital video camera[a]	32	34.4
Students have a school email account	24	25.8
Personal Digital Assistant (e.g., Palm, IPAQ, Blackberry)[a]	5	5.4
GPS (Global Positioning System) [a]	4	4.3

Note. Teachers checked (Y) each technology type available for their use in instruction.

[a]The number of technologies available to each teacher ranged from 0 to 9 and was summed to create an available technology score for use in the regression analysis for research question 5.

Table 4
FACS Teachers' Responses to the Technology Adoption Scale Items

Item	*N*	*M*	SD
1. I have made physical changes to accommodate technology in my classroom or laboratory.	92	3.93	.88
2. I emphasize the use of technology as a learning tool in my classroom or laboratory.	92	3.87	.89
3. I discuss with students how they can use technology as a learning tool.	92	3.66	.84
4. I expect students to use technology to such an extent that they develop projects that are of a higher quality level than would be possible without them using technology.	92	3.60	1.16
5. I regularly pursue innovative ways to incorporate technology into the learning process for my students.	92	3.58	1.15
6. I expect my students to fully understand the unique role that technology plays in their education.	91	3.58	.98
7. I assign students to use the computer to do content related activities on a regular basis.	92	3.54	1.11
8. I expect my students to use technology so they can take on new challenges beyond traditional assignments and activities.	92	3.53	1.05
9. I expect my students to use technology to enable them to be self-directed learners.	91	3.44	1.02
10. I use technology to encourage students to share the responsibility for their own learning.	92	3.41	1.05
11. I design learning activities that result in my students being comfortable using technology in their learning.	92	3.37	1.06
12. I am more of a facilitator of learning than the source of all information because my students use technology.	92	3.26	1.04
13. I incorporate technology in my teaching to such an extent that it has become a standard learning tool for my students.	92	3.12	1.22
14. I use technology based games or simulations on a regular basis in my classroom or laboratory.	92	2.84	1.15
15. I incorporate technology in my teaching to such an extent that my students use technology to collaborate with other students in my class during the learning process.	92	2.73	1.19

Note. For items in the *Technology Adoption Scale* and for the total scale (scale interpretation ranges in parentheses): 1 = Not Like Me at All (1.00-1.49), 2 = Very Little Like Me (1.50-2.49), 3 = Some Like Me (2.50-3.49), 4 = Very Much Like Me (3.50-4.49), and 5 = Just Like Me (4.50-5.00). Scale *M* = 3.45 (*SD* = .85).

Technology Integration Barriers

The *Barriers to Integrating Technology in Instruction Scale* was used to measure the barriers that may prevent FACS teachers from integrating technology in instruction. The teachers responded to seven items using an anchored scale (Table 5): 1 = Not a Barrier, 2 = Minor Barrier, 3 = Moderate Barrier, and 4 = Major Barrier.

Table 5
Responses to Items in the Barriers to Integrating Technology in Instruction Scale

Item	*N*	*M*	*SD*
1. Availability of technology for the number of students in my classes.	92	3.16	1.03
2. Scheduling enough time for students to use the Internet, computers, or other technology in the teaching/learning process.	90	3.07	.92
3. Enough time to develop lessons that use technology.	92	2.96	.94
4. Availability of effective instructional software for the courses I teach.	91	2.76	.98
5. Availability of technical support to effectively use instructional technology in the teaching/learning process.	91	2.74	1.01
6. My ability to integrate technology in the teaching/learning process.	92	2.16	.96
7. Administrative support for integration of technology in the teaching/learning process.	90	2.06	1.04

Note. For items in the *Barriers to Technology Integration Scale* and for the total scale (scale interpretation ranges in parentheses): 1 = Not a Barrier (1.00-1.49), 2 = Minor Barrier (1.50-2.49), 3 = Moderate Barrier (2.50-3.49), 4 = Major Barrier (3.50-4.00). Scale *M* = 2.68 (*SD* = .67).

Teachers experienced moderate barriers when attempting to integrate technology in instruction (Scale *M* = 2.68, *SD* = .67). Moderate barriers were encountered with "Availability of technology for the number of students in my classes" (*M* = 3.16, *SD* = 1.03), and with "Scheduling enough time for students to use the Internet, computers, or other technology in the teaching/learning process" (*M* = 3.07, *SD* = .92). The barrier that was rated the lowest was a minor barrier - "Administrative support for integration of technology in the teaching/learning process" (*M* = 2.06, *SD* = 1.04).

Technology Anxiety

The anxiety FACS teachers feel when they think about using technology in their instruction was assessed using the *Technology Anxiety Scale*. The teachers recorded their responses to 12 items using an anchored scale (Table 6): 1 = No Anxiety, 2 = Some Anxiety, 3 = Moderate Anxiety, and 4 = High Anxiety, and 5 = Very High Anxiety.

Table 6
FACS Teachers' Technology Anxiety Scale Responses

Item	*N*	*M*	*SD*
1. How anxious do you feel when you cannot keep up with important technological advances?	92	2.51	1.14
2. How anxious do you feel when you are faced with using new technology?	91	2.49	1.12
3. How anxious do you feel when you are not certain what the options on various technologies will do?	92	2.45	1.10
4. How anxious do you feel when you try to understand new technology?	91	2.33	1.17
5. How anxious do you feel when you try to learn technology related skills?	92	2.29	1.13
6. How anxious do you feel when you try to use technology?	92	2.26	1.15

Item	*N*	*M*	*SD*
7. How anxious do you feel when someone uses a technology term that you do not understand?	92	2.25	1.16
8. How anxious do you feel when you hesitate to use technology for fear of making mistakes you cannot correct?	92	2.24	1.13
9. How anxious do you feel when you think about your technology skills compared to the skills of other teachers?	92	2.22	1.17
10. How anxious do you feel when you fear you may break or damage the technology you are using?	92	2.20	1.25
11. How anxious do you feel when you avoid using unfamiliar technology?	92	2.20	1.13
12. How anxious do you feel when you think about using technology in instruction?	92	2.18	1.16

Note. For items in the *Technology Anxiety Scale* and for the total scale (scale interpretation ranges in parentheses): 1 = No Anxiety (1.00-1.49), 2 = Some Anxiety (1.50-2.49), 3 = Moderate Anxiety (2.50-3.49), 4 = High Anxiety (3.50-4.00), 5 = Very High Anxiety (4.50-5.00). Scale *M* = 2.30 (*SD* = 1.00).

FACS teachers experienced some anxiety as they integrated technology in their instruction. The scale mean (Scale *M* = 2.30, *SD* = 1.00) and all item means except one were in the "Some Anxiety" range. The highest level of anxiety was recorded for the item, "How anxious do you feel when you cannot keep up with important technological advances?" (*M* = 2.51, *SD* = 1.14). Their lowest anxiety level was reported for the item, "How anxious do you feel when you think about using technology in instruction?" (*M* = 2.18, *SD* = 1.16).

Variance in Technology Adoption

To determine if selected variables explained the variance in technology adoption for use in instruction, forward regression analysis was used, with the *Technology Adoption Scale* mean as the dependent variable. Six teacher demographic or personal variables were identified as potential explanatory variables based on a review of the research literature: age, years teaching experience, perceived barriers to technology integration, technology anxiety, training sources, and technology availability. The training sources used by FACS teachers are presented in Table 2. A training sources score was calculated by assigning one point for each of the four training sources. The technology types available for use in instruction are shown in Table 3. The technology availability score was computed by assigning one point for each of nine technology types.

It was determined *a priori* that only variables that were significantly correlated with the adoption scale score would be utilized in the forward regression due to the minimum observations per variable required for forward regression analysis. The correlations of the seven demographic and personal variables with the *Technology Adoption Scale* score are presented in Table 7.

Table 7

Correlations of Selected Variables with FACS Teachers' Technology Adoption Scores

Variable	*r*	*P*	*N*
Age	-.25[b]	.021	88
Years Teaching Experience	-.18[a]	.100	90
Barriers to Technology Integration	-.33[c]	.002	87
Technology Anxiety	-.55[d]	<.001	90
Technology Available	.30[c]	.004	89
Training Sources:			
Self –taught	-.13[a]	.210	90
Workshops/conferences	-.09[a]	.381	90
College courses	.18[a]	.100	90
Colleagues	-.13[a]	.226	90

Note. For ease of reading, the specific notes are ordered by effect size as indicated in the specific notes.
[a]Trivial association (Cohen, 1988). This descriptor has been assigned to all correlations less than .10 and to those over .10 that are not statistically significant. [b]Small association (Cohen, 1988). [c]Moderate association (Cohen, 1988). [d]Large association (Cohen, 1988).

The *Technology Adoption Scale* score was moderately correlated with 4 of the 10 variables, namely, age (*r* = .25), barriers to technology integration (*r* = -.33), technology anxiety (*r* = -.55), and technology availability (*r* = .30). These correlations indicate that technology adoption increased as age, technology anxiety, and barriers to technology integration decreased. Technology adoption increased as technology availability increased. These four statistically significant variables were utilized as potential explanatory variables in the forward regression. According to Hair, Anderson, Tatham and Black (2006), at least 5 observations per variable were required, but 15-20 observations for each potential explanatory variable were desirable in a forward regression analysis. Based on these guidelines, the sample size was adequate for this analysis.

Regarding multicollinearity. Hair et al. (2006) stated, "The presence of high correlations (generally, .90 and above) is the first indication of substantial collinearity" (p. 227). None of the potential explanatory variables had a high correlation with any other independent variable. Hair et al. (2006) also stated that "The two most common measures for assessing both pairwise and multiple variable collinearity are tolerance and its inverse, the variance inflation factor [VIF]. . . . Moreover, a multiple correlation of .90 between one independent variable and all others . . . would result in a tolerance value of .19. Thus, any variables with tolerance values below .19 (or above a VIF of 5.3) would have a correlation of more than .90" (Hair et al., 2006, pp. 227, 230). None of the tolerance values observed was lower than .19 and none of the VIF values exceeded 5.3. Therefore, multicollinearity did not exist in the regression analysis (Table 8).

Table 8
Regression Analysis Model Explaining Variance in Technology Adoption in Instruction Scale Mean

	S	*DF*	*MS*	*F*	*P*
Regression	19.07	1	19.07	37.66	<.001
Residual	41.53	82	.51		
Total	60.60	83			

					Change Statistics		
Explanatory Variable in Model	*R*	R^2	Adjusted R^2	*SE*	R^2 Change	*F* Change	*P* of *F* Change
Technology anxiety	.56	.32	.31	.71	.32	37.66	<.001

Variables Excluded From Model

Variable	Beta In	*t*	*P*	Partial *r*
Age	-.09	-1.00	.323	-.11
Barriers to technology integration	-.18	-1.96	.053	-.21
Technology availability	.17	1.86	.067	.20

Note. *N* = 83. Dependent variable: technology adoption. *Technology Adoption Scale*: 1 = Not Like Me at All, 2 = Very Little Like Me, 3 = Somewhat Like Me, 4 = Very Much Like Me, and 5 = Just Like Me. *Technology Anxiety Scale*: 1 = No Anxiety, 2 = Some Anxiety, 3 = Moderate Anxiety, 4 = High Anxiety, 5 = Very High Anxiety. Technology Available variable ranged from 0 to 9 points. *Barriers to Integration Scale*: 1 = Not a Barrier, 2 = Minor Barrier, 3 = Moderate Barrier, 4 = Major Barrier. The single variable included in the multiple regression model represents a large effect size according to Cohen (1988): R^2 > .0196 - small effect size, R^2 > .13 - moderate effect size, and R^2 > .26 - large effect size.

"Technology anxiety," by itself, explained 32% of the variance (R^2) in technology adoption in instruction. Technology adoption increased as technology anxiety decreased (Standardized *b*= -.56). A regression model that explains 32% of the variance represents a large effect size (Cohen, 1988). The other three variables examined in the regression analysis, "Age," "Barriers to technology integration," and "Technology Available," did not explain additional variance in technology adoption (Table 8).

Conclusions, Recommendations and Discussion

Most teachers have a computer with Internet connection at school, a school e-mail account, and a computer with Internet connection at home. Over half have a VCR, CD, or DVD Recorder; laser disc play or standalone DVD or CD players; interactive DVD or CD players, and access to enough computers in a classroom or lab for all students to work by themselves or with another student. Over one-third of the teachers have a digital video camera for instructional use. One-fourth of the teachers work in schools where students have school e-mail accounts. Few have a personal digital assistant (PDA) or a global positioning system (GPS).

Most FACS teachers are self-taught or utilize workshops/conferences and colleagues as technology training sources, while slightly over half use college courses. These conclusions are similar to those by Redmann and Kotrlik (2004), with one exception -- FACS teachers utilize

colleagues as a training source at a much higher level than the level reported for other secondary career and technical education teachers in the 2004 study.

FACS teachers have adopted technology for use in instruction at a moderate level. Keane (2002) stated the FACS curriculum will continue to be revised because it will not be valid unless it reflects societal trends. As the use of technology in instruction continues to increase, Keane stated that FACS professionals should ". . . grasp the latest concepts for use in their classrooms" (p. 43). The FACS teachers' level of technology adoption in instruction may relate to the concerns voiced by Budin (1999) when he indicated that teachers should debate how technology should be incorporated into the curriculum, what teachers should know about the use of technology in teaching, and how the impact of technology should be assessed.

Moderate barriers to technology integration and some technology anxiety are experienced by FACS teachers as they integrate technology in their instruction. This conclusion partially or completely supports the conclusions reported in several studies (BECTA, 2003; Croxhall & Cummings, 2000; Mumtaz, 2000; Redmann & Kotrlik, 2004; Williams, 2000) and also agrees with the conclusions of a National Center for Education Statistics study in which it was concluded that teachers were encountering barriers as they attempted to integrate technology in instruction (Smerdon et al., 2000).

Teachers' technology anxiety, by itself, explains a large proportion of the variance in FACS teachers' technology adoption. Age, barriers to technology integration, and technology availability were significantly correlated to technology adoption but do not explain significant variance in teachers' use of technology in instruction beyond the variance explained by technology anxiety. In addition, years teaching experience and technology training sources (self-taught, workshops/conferences, college courses, colleagues) were not significantly correlated to technology adoption. These conclusions partially support the research reported by Redmann and Kotrlik (2004) in which technology adoption was related to technology anxiety.

The conclusions above indicate that FACS teachers have room for improvement when it comes to integrating technology in instruction. Dexter, Doering and Riedel (2006) stated that teachers must be able to effectively unite technology with instruction. Technology should not be incorporated in instructional activities simply for the sake of using technology – it should contribute to FACS instructional content objectives. Unfortunately, it is often used more for administrative purposes rather than for the purpose of enhancing instruction. Dexter et al. concluded by stating that our understanding of best practices will change as new technology tools emerge. FACS professionals should continue research on teaching and learning, and the appropriate role of technology in this process.

FACS teachers, other teachers, administrators, and students must develop a shared vision (Park & Ertmer, 2008) of the uses and advantages of technology integration in instruction. Administrators need to take a proactive approach in their encouragement and support of all teachers as they integrate technology in the teaching/learning process. All stakeholders -- local school districts, state departments of education, college faculty, and others -- should provide leadership to the integration of technology in instruction.

FACS teachers must be proactive in their approach to technology integration in instruction. Teachers' continuous effort to learn is a key component. They must continue to use well-informed colleagues, conferences, workshops, college courses, and self-directed learning to stay on the cutting edge. Proactive efforts on the part of FACS teachers should result in increased technology adoption.

Researchers should seek to identify pre-service and in-service opportunities for enhancing FACS teachers' ability to integrate technology in instruction, which will also involve researchers asking several key questions. Which technology has the greatest potential to positively impact student learning? What should the structure of FACS teacher education look like in a technology enhanced environment, with special emphasis on the newer and more educationally productive technology on the horizon? What funding, support, and other factors will impact the educational effectiveness of any attempt to enhance the integration of technology in FACS curricula? The answers to these questions should lead to the creation of a productive future for FACS, and ultimately, the preparation of students prepared for the modern technological world.

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Integrating Service-Learning in an Undergraduate Family and Consumer Sciences Adolescent Development Course

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Service-learning is an instructional method in which students learn course content by actively participating in thoughtfully organized service experiences related to the content. Effectively linking service-learning to course content not only maximizes students' academic learning, but also promotes their personal growth and instills a commitment to lifelong, civic engagement. Service-learning was integrated into a Family and Consumer Sciences Adolescent Development course. In addition to completing the traditional course work, students completed a service-learning experience at a community agency that served adolescents. When surveyed at the end of the semester, all students agreed they had learned more about course concepts as a result of their service-learning, and most felt their service-learning activity provided a needed service to the community.

Educators have increasingly embraced opportunities to prepare college students for future leadership roles by integrating service-learning into their courses (Ash, 2003; Batchelder & Root, 1994; Boss, 1995; MacDonald, 1994; Smith, 2002; Truesdell, 2001). Service-learning is an instructional method in which students learn course content by actively participating in thoughtfully organized service experiences related to that content. Research has shown that service-learning helps students retain more of the concepts learned in class and that students have greater satisfaction with the course (Eyler, 2002; Hamner, 2002; Payne, 2000). In addition, service-learning helps students develop more community awareness, changes students' stereotypical beliefs, and increases their understanding of diversity (Eyler & Giles, 1999; Hamner, 2002; Jones & Abes, 2004).

Service-learning is distinguished from other approaches to experiential education by its intent to benefit both the provider and recipient of the service, giving equal focus to the service being provided, and the learning that is occurring (Furco, 1996). The service must be linked to course learning objectives; it is not simply volunteering. Experiences that enable students to think, write, and/or discuss what they are doing during the service activity are integrated into the course. Effectively linking service-learning to course content not only offers students a powerful opportunity to maximize academic learning, but also promotes their personal growth and instills a commitment to lifelong, civic engagement.

Service-learning does, of course, involve challenges. Depending on the course and its content, educators may need to invest considerable time in locating appropriate service-learning sites and preparing effective service activities. The reflective experiences, which are necessary in helping students create connections between course content and their service-learning, require time and may mean a reduction in the amount of class time available for content coverage. Also, educators may occasionally need to assume the role of mediator between students and their service-learning sites if miscommunication occurs.

A public university in the southeast integrated service-learning into an upper level undergraduate course, Adolescent Development, to enable students to connect research and

theory with active practice. The purpose of this study was to evaluate the service-learning component of the course.

Methodology

In the original Adolescent Development course, students examined the basic changes, contexts, and developmental tasks of adolescence through textbook readings, lectures, discussions, videos, and guest speakers. The course outline indicating the content is provided below:

- Basic changes of adolescence
    - Biological transitions
    - Cognitive transitions
    - Social transitions
- Contexts of adolescence
    - Families
    - Peer groups
    - Schools
- Psychosocial development during adolescence
    - Identity
    - Autonomy
    - Intimacy
    - Sexuality
    - Achievement
- Psychosocial problems in adolescence
    - Substance abuse
    - Externalizing problems
    - Internalizing problems

In the revised Adolescent Development course, students continued to address course concepts through readings in the textbook, lectures, discussions, guest speakers, and videos. In addition, students chose a service-learning experience that would enable them to observe and apply course concepts through association with adolescents. Students worked with adolescents two hours per week for nine weeks of the semester by serving at community agencies that assisted adolescents. These agencies were: Watauga Youth Network, a big brother/sister program for adjudicated youth; Watauga Youth Network Resource Center, an after-school program for adjudicated youth; GEAR UP, an after-school program for high school students planning to attend college; Upward Bound, a program assisting first-generation beginning college students from low-income families; Mountain Alliance, an outdoor experiential program for at-risk youth; Watauga County after-school programs; and Cherokee Park Youth Center, a residential treatment program for adjudicated adolescents.

Depending on the site, students engaged in a variety of experiences with their adolescents including tutoring, sports activities, arts and crafts, hiking, canoeing, caving, and just "hanging out." Although students were often engaged in group activities, they selected one adolescent to focus their observations and reflections upon and generally had ample one-on-one time with the adolescent.

Throughout the semester, students engaged in class activities that enabled them to reflect upon their service-learning and connect it to course content. For example, as the concept of

physical development was addressed, students not only read about and discussed it, but they also assessed the physical development of the adolescent upon whom they were focusing. In the study of adolescent peer groups, students not only identified the typical cliques and crowds in schools today, but also analyzed their adolescent's social standing in his or her school. In addition to the class activities, students prepared a report in which they applied the concepts they were learning in class to their particular adolescent. They used the theories and research to explain their adolescent's development and behavior.

Findings and Discussion

At the end of the semester, all 24 students completed a survey that evaluated the service-learning component of the course. Thirteen students were seniors, nine were juniors, and two were freshmen. They represented the following majors: child development, family and consumer sciences education, sociology, and psychology.

The findings revealed that a majority of students felt that the academic projects associated with their service-learning helped them to more effectively learn and retain the course material. On a 4-point scale, with 4 being "strongly agree," the average response was 3.5. Their level of satisfaction seemed particularly significant considering the additional time commitment for the typical student outside of class associated with the service-learning. Other findings included the following: 84% of the students agreed that they had been adequately prepared for their service-learning experience. Ninety-six percent agreed that the service-learning made the course more interesting and applicable to "real world" issues. Eighty percent agreed that their time was effectively used while serving at their agency. Eighty-eight percent agreed that the class had helped them to become more aware of social issues that existed in the community. Eighty-eight percent felt their service-learning activity provided a needed service to the agency and community. All agreed they had learned more about the concepts presented in the course as a result of their service-learning experience.

Almost all students agreed that service-learning made the course more interesting and applicable to the "real world." One student noted, "It is different to see things rather than just read about them in a textbook. It was interesting to get to see how the adolescent I was observing exemplified the concepts we were learning in class." Others noted the value of gaining experiences related to their futures: "I am a prospective teacher, and the service-learning put me in that role;" and "Observing at-risk adolescents helped me to see who I will be working with in the future."

With the inclusion of the service-learning, students seemed more satisfied with the course, noting many times how they were actually experiencing what they were learning as shown by the following statements. "Situations were presented in real life instead of just out of the book." "I got to apply the discussion in class to the actions of the adolescents, and that made the information meaningful." "The adolescents taught me many different things that the book couldn't." "I saw better for myself what we were talking about in class."

Several students noted the personal growth they experienced through the service-learning as shown in the following. "I felt like I made a difference to the girls with whom I worked." "I got to take a look at what it was like to be a teenager again. Adolescents are just trying to find out who they are, and a lot of people forget about that." "I found that I could learn as much from the adolescents as they could from me!"

The service-learning helped many students to become more aware of social issues that existed in the community. One commented, "I never realized there were so many adolescents

who came from bad homes. My service-learning experience showed me that there are kids out there who need help and I can make a difference by being involved." Another stated, "More kids drink and do drugs than I thought."

This service-learning experience seemed to give many students their first meaningful experience with diversity and helped them to question some previous assumptions and stereotypes they had held.

- "The service-learning experience caused me to look at adolescents differently than I had before and also to understand better that a person's lifestyle does not always dictate the person that they are inside."
- "I believe that it made me more empathic to other people's situations."
- "I became more accepting towards others and realized that they aren't much different from me, other than they might not have been given the opportunities I have."

Upon completion of their service-learning experience, many students felt an increased sense of responsibility toward their community. One student reported, "I feel a greater responsibility to work with young people in my home town." Another added, "I definitely feel that I can help make a difference in the lives of these kids, and I need to give of my time." Some students even planned to continue their service-learning beyond the course requirements: "I have been a role model for these kids, and I feel a special bond and responsibility toward them. So I will continue to work with them."

In a final open-ended question, students were asked to share the most important thing they had learned during their service-learning experience. Responses including the following:

- "How adolescents think and work"
- "That I love getting to know all kinds and ages of people"
- "That I do enjoy service"
- "How blessed I am to have the family situation and opportunities that I do"
- "You can't learn everything from a textbook; it can't prepare you for the real experiences"
- "That all adolescents have their own unique personalities"
- "That not everyone had a good life like me"
- "Positive interactions can greatly influence adolescents in the right direction"
- "Adolescents are unique and interesting individuals who deserve respect and a chance to express who they are"

No formal evaluations were completed by service-learning site supervisors; however, several commented on the success and helpfulness of the project. One site supervisor shared, "The service-learning enabled our agency to better carry out its mission of helping young people."

Conclusions and Implications

In this Adolescent Development class, the service-learning enabled students to not only apply course concepts in the real world and bring the lessons learned back to the classroom, thus enriching the learning environment for all. Therefore, the service-learning component will continue to be a part of this class. Efforts will be made to secure additional sites to provide further diversity for future service-learning experiences. Further reflection of activities will also be developed to provide even more opportunities for students to connect the course concepts

with their service-learning. Data will continue to be collected in order to assess the effectiveness of the service-learning experience and any changes that are implemented.

Other family and consumer sciences programs could also utilize service-learning to enable students to better understand course concepts, as well as broaden the student's perspectives. There are numerous opportunities in all communities to "give back" by allowing students to apply what they are learning in class. For example, students in foods and nutrition classes could provide menu-planning and even food preparation services for agencies, such as women's or homeless shelters. Child development projects might be geared toward providing quality child care at these same sites for parents who are actively looking for work. Apparel and textiles students might assist by creating an "interview" wardrobe that residents might access during their job search. An interior design service-learning experience might involve the remodeling or redecorating of one of the rooms at the homeless shelter. Family and consumer sciences education students might offer basic instruction on a variety of helpful topics, such as parenting and child development, consumer education, appropriate interview dress, or basic meal planning. Such service-learning experiences would require students to "humanize" the information they were learning in class, and in the end, benefit not only the community, but themselves.

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