Career and Technical Education Research

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Career and Technical Education Research (*CTER*) is published three times a year and is an official publication of Association for Career and Technical Education Research (*ACTER*). *ACTER* was organized in 1966 and strives to: (a) stimulate research and development activities related to career and technical education, (b) stimulate the development of training programs designed to prepare persons for responsibilities in career and technical l education research, (a) foster a cooperative effort in research, (c) foster a cooperative effort in research and development activities with the total program of career and technical education and other disciplines, and (d) facilitate the dissemination of research findings and diffusion of knowledge.

Career and Technical Education Research, 30(3), pp. 145-146

Editor's Note

Steven R. Aragon
University of Illinois at Urbana-Champaign

Welcome to Volume 30 Number 3. You are probably asking yourself, "shouldn't I be receiving Volume 31 Number 3 instead?". That is a legitimate question to be asking. My staff and I should be in the process of finalizing 31(3) but that is not the case.

Early in 2005, I got an email from a colleague congratulating me on becoming the Editor of the new *Career and Technical Education Research*. After saying "congratulations," this individual stated "I guess" in parentheses. When I read that, I wondered what was meant by that statement. I think I've figured it out.

I want to begin by saying that I am quite proud of the manuscripts that have been published in the three issues of Volume 30. I feel they are quality articles and have furthered our understanding of the field of career and technical education across different contexts. These articles have also increased our understanding of career and technical education as it works in international and diverse settings. More importantly, I think each of the manuscripts that have appeared in Volume 30 represent the high standards of the journal and help it to retain its reputation as a top research journal. However, getting to this point has not been easy.

I want to thank all of the reviewers who dedicate their time to evaluate manuscripts for Volume 30. As we all know, this is a time consuming task and manuscripts requiring several reviews make the process even more time consuming. I have had individuals that have reviewed a large number of manuscripts simply because our reviewer pool has been shrinking. In these cases, I have had to give them an additional four weeks to complete a review so they would not burn out which obviously slows down the process. Unfortunately, I have had some good senior scholars of the field ask to be removed from the reviewer list simply because they were tired of receiving so many papers that did not meet basic research standards. Other reviewers have joked with me by saying they felt they should have their name on a manuscript because of the significant amount of feedback provided to the author. I too have had to step in as a reviewer when others would decline and the *CTER* staff could not find a replacement.

I think we all have a role in ensuring the timely publication of the journal and the highest quality level of manuscripts possible. I thought about some of the challenges the *CTER* staff has faced this year and would like to offer some thoughts.

I would like to encourage students and new assistant professors to have their manuscripts reviewed by a senior faculty member prior to submission. The major reason manuscripts submitted by students and new assistant professors have been rejected over the past couple of years is because the manuscript lacks a theoretical framework. It is critical that all manuscripts articulate a solid foundation upon which the study was built. I have been mentoring a new assistant professor this past year who has also received feedback from reviewers stating his theoretical framework was weak. This is something I have been able to help him with in his writing during this past year.

CTER welcomes manuscripts from scholars in international countries. However, many of these manuscripts have also been rejected during this past year. My observation has been that these manuscripts fail to meet the publication requirements of the American Psychological Association (APA) which is the style and format guide for *CTER*. If you are an international scholar interested in submitting to *CTER*, we welcome your papers. However, they need to meet the APA 5th edition guidelines before they are sent out for review.

I was quite excited when Joe Kotrlik, Neil Knobloch and I came up with the idea of inviting the authors of the top papers from the 2005 Association for Career and Technical Education Research (ACTER) Conference to submit to the journal. We all thought this would be a quick way to get 30(2) and 30(3) out. This was not the case. Many of those papers needed significant work after they were expanded from a conference paper to a journal manuscript. Once again, in most of those cases, the problem was weak theoretical frameworks. What we thought would be a quick review over one month turned out to take the better portion of the '06 calendar year. We will end up publishing three of the five top papers within Volume 30.

At the 2006 ACTER Conference in Atlanta, Neil Knobloch and I will be presenting a session entitled "Effective Approaches to Getting Published in the CTER and JCTE." Neil and I welcome anyone who would like a refresher on developing a quality research manuscript. We will be discussing these and other issues in more detail and how to address them.

While we have enough manuscripts to publish 31(1), we have nothing in the pipelines for 31(2) or 31(3). I would like to challenge all of us to seek ways to strengthen the research in the field and keep it moving forward!

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Influences of Training and Strategical Information Processing Style on Spatial Performance in Apparel Design

Priscilla N. Gitimu, Jane E. Workman, & Marcia A. Anderson
Southern Illinois University Carbondale

Abstract

The study investigated how performance on a spatial task in apparel design was influenced by training and strategical information processing style. The sample consisted of 278 undergraduate apparel design students from six universities in the U.S. Instruments used to collect data were the Apparel Spatial Visualization Test (ASVT) and the Strategical Information Processing Style (SIPS). ANOVA results showed a significant difference in performance on the ASVT between students with more training and those with less training in apparel design. There was no significant difference in performance on the ASVT as a result of students' preferred strategical information processing styles. Findings of the study indicated that performance on a spatial visualization task was influenced by training but not by strategical information processing style.

Introduction

One of the cognitive components required for individuals aspiring to careers in apparel design is spatial visualization. The ability to visualize spatially has been established as a predictor of success in several technical career fields like apparel design (Strong & Smith, 2002).

Apparel design is one career where spatial skills are crucial. The core of apparel design is creation of ideas for new styles; therefore, it is important for designers to communicate design ideas. Communication of design ideas requires spatial visualization because ideas are intangible (Workman & Zhang, 1999). Trade sketches, patterns, and fashion illustrations are basic forms of communication in the apparel industry. For example, patterns are used to communicate technical details to designers and technicians. These basic forms of communication involve spatial visualization skills.

In apparel design, visual thinking is needed to understand patterns, to analyze styles and to interpret charts, graphs, or tables because words alone cannot convey the visual concepts involved (Workman & Lee, 2004). As individuals learn pattern-making skills, they also develop the ability to observe a three-dimensional form (i.e., a garment) and accurately translate it into two-dimensional shapes (i.e., the

pattern pieces necessary to create the style). This translation facilitates creation of pattern silhouettes that "come to life" when constructed into three- dimensional garments.

Research has shown that training can lead to improvement in spatial visualization ability (Mack, 1994). Presumably, an apparel design curriculum includes training in spatial visualization aspects that are required to perform well on a spatial visualization task. The challenge for apparel design instructors and researchers over the years has been to identify and measure specific spatial abilities needed by apparel design students so as to better prepare them for a design career. There are hundreds of tests available to measure a variety of spatial abilities (McGee, 1979). One limitation of these tests is that they measure general spatial abilities (Workman, Caldwell, & Kallal, 1999). This limitation led to the development of a spatial visualization test by Workman, Caldwell and Kallal, that measured spatial abilities associated with apparel design and product development, the Apparel Spatial Visualization Test (ASVT).

In order to plan curricula to help students develop skills appropriate to their chosen career, educators and researchers must be aware of individual differences in students' preferred method of using their cognitive abilities, that is, their preferred strategical information processing styles. How well a student uses his or her cognitive ability seems to depend on his or her preferred method of processing information (Farrell, 2001). Farrell found no relationship between strategical information processing styles (visual-spatial, analytical, social and categorical) and college major or credit hours and concluded that the constructs were unrelated to training. According to Farrell (2001), strategical information processing styles are probably not trainable but are related to personality attributes of an individual. Research is needed to investigate links between a student's strategical information processing style and his or her cognitive abilities (Farrell & Kotrlik, 2003).

Objective of Study

The purpose of this study was to contribute to a better understanding of individual differences in processing of spatial information. The study focused on how performance on a spatial task was influenced by training and strategical information processing styles. Understanding influences on spatial visualization will enable instructors in technical fields to identify methods to help students develop spatial skills.

The following research questions guided the study: How is performance on a spatial visualization task influenced by training? How is performance on a spatial visualization task influenced by preferred strategical information processing style? How does training influence preferred strategical information processing style?

Importance of Spatial Visualization

Spatial visualization ability has been shown to be a vital part of individuals' success in a wide range of cognitively demanding educational tracks, occupations, and professions. For example, spatial visualization ability is vital to careers in architecture, art, cartography, chemistry, drafting, engineering, mathematics, medical surgery, physics, and surveying (Miller & Bertoline, 1991; Strong & Smith, 2002). Humphreys, Lubinski, and Yao (1993) contended that spatial skills are also vital to success in occupations involving the creative arts. These authors challenged the prevailing emphasis on verbal and numeric skills of national achievement tests and supported inclusion of spatial skills testing for college entry-level tests. Humphreys et al. believed more spatially talented students could be entering technical disciplines which correspond to their abilities and interests. Although spatial tests have tended to be restricted to testing for suitability for occupations below the professional level, Humphreys et al. suggested that spatial tests should be used in selection of candidates for high-level technical disciplines at the professional level. Career counselors should be aware of the relevance of spatial abilities when advising students in the creative arts (Humphreys et al., 1993).

The neglect of spatial abilities may stem from false beliefs that spatial ability is more relevant to technical trades while academic or professional endeavors require verbal and numeric competencies. Identifying students with exceptional spatial abilities is an important societal function that can lead to great innovations (Smith, 1964). If the educational system is to fulfill its obligation to students and society, spatial visualization ability needs to be nurtured because it is a crucial feature of the human cognitive repertoire (Shea, Lubinski, & Benbow, 2001).

Spatial visualization ability is important in terms of navigation within the realm of computers and computer applications such as computer-aided apparel design. It is also a significant factor in predicting human/computer interaction (Strong & Smith, 2002). Despite the centrality of spatial aptitude to an understanding of human behavior, little is known about the underlying cognitive processes that contribute to spatial ability or about the nature and locus of individual differences in spatial skill (Cooper & Mumaw, 1985). According to Strong and Smith (2002), several factors including age, gender, individual aptitude differences, and experience impact spatial visualization ability. Of these factors, experience of sufficient length and type improves spatial visualization and may compensate for deficiencies caused by age, gender, or lack of relevant previous experience.

Training of Spatial Visualization

Attempts to improve spatial ability by providing training have met with conflicting results (Baker, 1990; Kyllonen, Lohman & Snow, 1984). Mumaw and Pellegrino (1984) studied individual differences in complex spatial processing using

a "hardware" versus "software" approach. They suggested that high ability subjects have a memory that allows them to construct representations and preserve more information over time, implying differences in cognitive hardware. The possibility that high ability subjects are simply more efficient in application of better strategies, thus extracting important information when encoding stimuli as a result of knowledge differences depends on a software explanation. The software approach has implications for training.

Drauden (1980) found that although spatial scores could be improved through training, it was difficult to consistently obtain improvement without an efficient training method. Drauden outlined attributes that are desirable for the form and content of a spatial training program. The training should make use of concrete materials and be gradual, from easy to more complex materials. Materials used should require subject participation and responses. Subjects should receive immediate feedback on their responses and have frequent experiences of success.

Individual differences in trainability have been found whereby individuals who are high in spatial ability do not always benefit from instruction (Kyllonen et al., 1984). Individuals with different levels of spatial ability appeared to use different strategies and to be affected differently by treatments that attempted to train the different strategies. The effect of training depended substantially on the aptitude profile of the learner. Strategic training for spatial aptitude task performance appeared beneficial to some extent. Long-term effects of training interventions may be quite different from short-term. Some individuals may show temporary decrement due to interference with established strategies. Continued practice with a different strategy may ultimately lead to substantial improvement in performance (Kyllonen, Lohman, & Snow, 1984).

Frandsen and Holder (1969) investigated differences in internal and external factors that cause individuals to vary in their effectiveness in solving complex problems. Examples of internal factors were amount of stored information and retention of concepts, while external factors included cues in problem solutions and instructions which guided the learner. Frandsen and Holder investigated whether external factors such as efficient instruction could compensate for a deficiency in an internal factor such as spatial visualization. The study showed that spatial visualization aptitude could be compensated for by instruction.

Whether specific course content can improve spatial visualization ability of college students is a question of interest. Lajoie (1986) commented that "It is likely that spatial abilities remain in the implicit rather than the explicit curriculum since the real world applications of spatial abilities are not apparent to many educators. Perhaps few teachers have highly developed spatial ability and thus they have difficulty using or teaching such skills" (p. 36).

Training of Spatial Visualization in Apparel Design

The educational system in the U.S. does not emphasize visual skill development (Roth, 1993), for example, high school offerings in art and apparel construction are limited. Thus college freshmen in an apparel design major often lack experience and ability to comprehend how three-dimensional garments are formed from two-dimensional garment parts (Orzada & Kallal, 2001).

Training students on how to interpret visual cues in a specific domain is part of many university curriculums. An apparel design curriculum is based on a foundation of domain specific knowledge that is used to solve complex problems in apparel design. Students cannot be exposed to every single design feature due to the continually changing nature of fashion. Hence, it is critical to teach students effective problem-solving skills (Workman & Lee, 2004).

Curricula in university programs that train apparel designers include courses in draping, sewing, fabrics and trimmings, drawing, pattern-making, principles of design, production and costing of items (Dolber, 1989). Many of these courses are designed to improve students' ability to draw and read graphic language. For example, the ability to recognize, read, and understand the graphic language of patterns, including their shape, sizes, curves, proportions, grain lines, symbols, labels, perforations and notches, are important skills incorporated in the fashion design curriculum. Spatial visualization skills required in the clothing construction process include mental synthesis and mental movement, for example, reflecting, rotating, reversing polarity, dimensionality crossing, folding/unfolding, and moving (Workman & Caldwell, in press). Some examples of procedures involving spatial visualization are folding and unfolding pattern pieces, reflecting sleeves, and matching edges. Beginning pattern makers often have difficulty visualizing the three-dimensional form of an apparel design from a flat pattern; however, their skills improve with practice (Armstrong, 1995). To prepare successful designers, educators must know what types of exercises will improve students' visualization skills.

Workman and Caldwell (in press) examined the effects of indirect training provided by apparel design and product development courses on spatial visualization skills. The Apparel Spatial Visualization Test was used to measure domain-specific spatial visualization skills in apparel design while the Paper Folding Test was used as a measure of general spatial visualization ability. Results showed improvement in scores on both tests at posttest compared with pretest. Workman and Caldwell concluded that indirect training provided in apparel design and product development classes lead to improvement in students' scores on tests measuring both general and domain-specific spatial visualization.

What strategies individuals use to solve items on spatial tasks such as the Apparel Spatial Visualization Test or Paper Folding Test is unclear. Individual differences in strategy use have implications for testing and training spatial ability.

The study of strategies individuals use to solve spatial tasks can enrich basic research on spatial cognition.

Spatial Visualization and Strategy Use

A strategy has been defined as one of several alternative methods for performing a particular cognitive task (Saczynski, Willis, & Schaie, 2002). Information processing is an active process that involves the use of strategies (Forrest, 2001). A strategy is an individual's approach to a task. It is the way an individual organizes the many sensory-motor systems for meaning. Because more than one possible strategy is available to solve a problem or do a task, which one is selected and used depends on a choice made by an individual. This decision is not consciously determined and may depend on many internal and external factors, including past experience. Though there are many information-processing strategies possible, two that appear most fundamental are pictorial and linguistic strategies. The linguistic strategy represents the use of internal and external verbal language. The pictorial strategy represents the use of visual imagery and is spatial.

Collins (1988) described individuals employing a holistic or simultaneous strategy as having an ease of manipulation due to the ability to treat all available information as a unitary whole. Individuals employing an analytical strategy were described as being able to internally represent spatial information in terms of its various characteristics one by one, dependent on words more than pictures. According to Gluck and Fitting (2003), materials and instruction for tests of spatial ability have been designed to evoke holistic rather than analytic strategies. Individuals who have a preference for analytic strategies may be disadvantaged in such tests.

Michaelides (2002) studied solution strategies in spatial rotational tasks by testing 107 fifth to eighth grade students on spatial rotation multiple-choice items. Thirty-one of them were interviewed and asked to explain their reasoning when solving four of the test items. Results showed that students did not make consistent use of only one type of strategy across tasks. Task characteristics may have influenced the choice of strategy in each case. Students switched between visual and non-visual strategies or combined both. According to Michaelides, the frequent occurrence of combined strategies could be attributed to the question format. The multiple-choice format encouraged attempts to confirm one answer, by eliminating the rest of the choices. Such a comparison could mobilize the use of analytic thinking to locate differences in the picture in a systematic and orderly manner rather than grasping a representation immediately as a whole.

Strategical Information Processing Styles

"One's preferred approach to information processing can be referred to as one's cognitive style" (Hayes & Allison, 1998, p. 847). Cognitive styles can be

divided into three categories: learning styles, cognitive strategies and cognitive abilities (Smith & Ragan, 1999). Learning styles are defined as the methods consistently employed by individuals to interact with the learning environment. Cognitive strategies are the procedures employed by learners to expedite knowledge gain. Cognitive abilities involve the application of mastered content knowledge to performance (Hayes & Allison, 1998).

Orzada and Kallal (2001) reasoned that spatial visualization is an important skill for apparel designers; and therefore, design students may have a preference for processing visual versus verbal information. These authors collected data from students in apparel design and merchandising classes using the Apparel Spatial Visualization Test (Workman, Caldwell, & Kallal, 1999) and the Style of Processing scale (Childers, Houston, & Heckler, 1985) which measures preferences for processing either visual or verbal information. Results showed a significant correlation between the Apparel Spatial Visualization Test and the visual component of the Style of Processing scale ($r = .24$, $p < .01$).

Khoza (2003) used the Perceptual Modality Preference Survey (Cherry, 1981) to identify fashion design and merchandising students' personal preferences for learning via print, aural, interactive, visual, haptic, kinesthetic, or olfactory perceptual learning styles. Khoza hypothesized that there would be a relationship between preferred learning style and performance on a spatial task (as measured by the Apparel Spatial Visualization Test). There was no significant correlation between preferred perceptual modality and scores on the Apparel Spatial Visualization Test. Further, preferred perceptual modality did not vary as a result of training, that is, students in lower level and upper level courses did not differ in their perceptual modality preferences.

According to information processing system theory, individuals receive and process information for memory encoding, rehearsal, storage, and retrieval. The theory includes the senses, sensory registers, short term/working memory, and long term memory. Information that is received through the senses and not discarded enters the sensory registers. Sensory registers act as information receptors or collection bins. From the sensory registers, information travels to working memory although some of it is lost. Information that receives attention and is meaningful is encoded for storage in long term memory. Long term memory has unlimited capacity and information is never lost. However, accessibility to the information is lost over time. Accessible information in long term memory can be retrieved into working memory for processing (Baddeley, 2002; Craik & Lockhart, 1972; Parker, 1993).

The Strategical Information Processing Styles (SIPS) instrument was designed based on information processing systems theory (Farrell, 2001). The SIPS instrument provides a measure of the strategies that individuals prefer to employ when processing information. Empirical evidence has verified four strategical

information processing styles: (a) visual-spatial, (b) analytical, (c) social, and (d) categorical (Farrell, 2001). Visual-spatial processors selectively attend to the characteristics of stimuli that involve imagery. Spatial tasks sustain the attention of the visual-spatial processors enabling them to arrive at accurate solutions. Analytical processors selectively attend to stimuli that are presented in a logical order. When a task makes sense and requires logical thinking, it sustains the attention of analytical processors. They are serial processors who encode information in a logical step-by-step fashion. Social processors selectively attend to stimuli that involve relationships and emotions. Group and social tasks sustain their attention. They have the ability to express their own perceptions of a situation through emotions. Categorical processors selectively attend to the detailed characteristics of either visual or verbal stimuli. They attend to tasks that require detailed, organized strategies.

According to Farrell and Kotrlik (2003), perhaps a student's strategical information processing style could provide a link between general intelligence and cognitive abilities. Awareness of a student's style would enable educators to design educational experiences that tapped into the student's cognitive resources.

Method

Participants

Participants in the study were students enrolled in apparel design classes in U.S. universities. Universities were considered for the study if they offered apparel design classes as indicated in the International Textile and Apparel Association (ITAA) 2004 Membership Directory. The researchers used professional contacts with professors and good reputation of the apparel design programs to select institutions to be included in the study. There was an effort to include universities from different geographic regions in the U.S.

Participants were 278 students from six universities (267 females; 11 males; mean age = 20.58). Most students were majoring in fashion design (n = 276). Participants' racial/ethnic background was: 218 Caucasian, 17 African American, 15 Asian, 10 Hispanic, 2 Native American, and 16 with missing data.

Materials

Three instruments were used to collect data: Apparel Spatial Visualization Test (ASVT), Strategical Information Processing Style (SIPS) instrument, and a demographic questionnaire.

The ASVT "measures apparel spatial visualization ability and requires mentally folding and unfolding, matching, and combining pattern pieces to form a complete pattern, and mentally transforming multiple two-dimensional pattern pieces into a three-dimensional garment" (Workman & Zhang, 1999, p. 172). Choosing the correct solution to items on the ASVT requires 2-dimensional to 3-dimensional

transformations. The ASVT consists of 20 sets of flat, 2-dimensional pattern pieces accompanied by front view sketches of five 3-dimensional garments. Participants are asked to choose which one of the garments could be made from the set of pattern pieces. The content validity of the ASVT has been established in previous studies (Workman, Caldwell, & Kallal, 1999; Workman & Lee, 2004; Workman & Zhang, 1999). The ASVT correlated significantly with the Surface Development Test (r = .65, $p < .001$) and the Paper Folding Test (r = .38, $p < .001$) indicating the tests measure a similar construct, that is, spatial visualization. ASVT content validity is also confirmed by test scores reflecting improvement as a function of training in apparel design courses (Orzada & Kallal, 2001; Workman, Caldwell, & Kallal, 1999; Workman & Lee, 2004; Workman & Zhang, 1999).

The SIPS instrument was designed to furnish educators with a high-quality, easily administered, self-assessment tool to determine students' strategical information processing style. Empirical evidence verified four strategical information processing styles: visual-spatial, analytical, social, and categorical (Farrell, 2001). The SIPS instrument has acceptable convergent and discriminate validities. Composite reliabilities for the factors were: visual-spatial .72; analytical .73; social .75; and categorical .78. The SIPS instrument contains 13 situations. For each item, five strategies were provided. Participants respond to each situation by indicating their level of preference for each strategy using a 5-point scale (5 = most prefer, 4 = more often prefer, 3 = prefer, 2 = seldom prefer, and 1 = least prefer). Participants rank each situation for each of the five strategies and can use each preference more than once per question. An example item is "When studying for a written exam in one of my courses, I…. (a) Become overwhelmed if there is too much to learn. (b) Outline the information. (c) Put information into categories. (d) Relate my experiences to the new information. (e) Use pictures and images to clarify the information."

The demographic questionnaire collected information about gender, age, major, and ethnicity as well as training in apparel design. Training was measured in three ways: year in school, basic (no prerequisite) or advanced (prerequisite) level of class in which questionnaire was completed and number of credit hours completed in apparel design courses.

The researcher studied each university's website and undergraduate catalogue in order to list the apparel design courses taught in that institution and the credit hours for each course. Each university had a different listing of courses in the demographic questionnaire. The purpose of using course titles specific to each university catalogue was to use course titles that were familiar to each student sample. In addition, use of familiar terms in the course titles enabled the students to recall the courses they had completed. Students checked the courses they had completed and the researcher used this information to calculate the number of credit hours a student had taken in apparel design courses.

An example of one of the classes in the apparel design curriculum is beginning clothing construction which has no prerequisite. In the course, students learn beginning skills in fitting, construction, and pattern and fabric usage. Course objectives include developing competency in basic sewing skills and production principles. Generally, the beginning class is followed by one or more higher level classes in clothing construction which concentrate on increasingly more complex skills in fitting, construction and fabric usage.

Advanced fashion design classes such as flat patternmaking, draping, and computer-aided apparel design, depend on skills learned in lower level classes. In pattenmaking classes, students draft, drape, and fit basic patterns; make patterns for various styles through flat pattern manipulation, drafting, or draping; test patterns by cutting and constructing the styles in muslin; then refine the patterns to adjust the fit. Course objectives include development of an understanding of the principles used in designing using flat pattern, drafting, and draping methods and developing an ability to create original designs. Computer Aided Design (CAD) courses provide basic skills related to technical flat sketching; pattern drafting, grading and marking; fashion illustration; and textile design.

Procedure

Human subjects' approval was secured from the university. The researcher used previous professional contacts with professors and good reputation of apparel design programs to select a sample of 10 institutions. One or two professors from each university were contacted via email to inquire as to whether they would be willing to administer the questionnaires in their classes. The professors informed the researcher via email of their willingness to participate and estimated the number of students who would be enrolled in their classes. Data were collected in September, 2005. Of the six universities used for the final sample, one was in the Southwest, two were on the East coast, two in the Midwest and one on the West coast.

The appropriate number of surveys was mailed to each institution. For ease in returning the surveys, a self-addressed envelope with the correct amount of postage was included. During usual class sessions, students from the various universities were provided with the ASTV, SIPS and the demographic questionnaire. Participants were informed of the purpose of the study, their voluntary participation, approval of the Human Subjects Committee and confidentiality in terms of their individual results. The survey was completed in the following order: demographics, ASVT and SIPS.

Pilot study

The purpose of the pilot study was to test the procedure for sending and administering the questionnaires and to assess whether students understood the

instructions on the instruments. Questionnaires were mailed in summer 2005 to one university in the southwestern part of the U.S. (not part of the final sample). Twelve students completed the questionnaire. Results showed the procedure was appropriate and the instructions were clear.

Analysis

Descriptive statistics were used to report demographic information. Reliability and correlation were calculated for the ASVT and the SIPS instruments. ANOVA was used to examine the research questions followed by Student-Newman-Keuls (SNK) post hoc test to examine differences between groups. An alpha level of 0.05 was used for all statistical tests.

Results

The total number of instruments collected from the sample was 312. However, 34 of the instruments were incomplete and were not used for analysis. The final sample consisted of 278 undergraduate students.

Participants' training in apparel design

Participants were comprised of 51 freshmen, 77 sophomores, 76 juniors and 74 seniors. Eighty-five students were in basic courses (i.e., no prerequisite) and 193 were in advanced classes (i.e., prerequisite required). The number of credit hours students had completed in apparel design courses ranged from 0-41. Dividing the students into four groups based on credit hours yielded the following breakdown: Group 1 (n = 73; 0 credit hours completed); Group 2 (n = 84; 1-6 credit hours completed); Group 3 (n = 66; 7-16 credit hours completed); and Group 4 (n = 55; 17 or more credit hours completed).

Reliability and correlation of instruments

The ASVT showed a moderate reliability (r = .77). Overall, the Strategical Information Processing Style instrument showed a low moderate reliability (r = .51). Three of the four processing styles showed moderate reliabilities: Analytical (r = .69); Social (r = .76); and Categorical (r = .70) while the Visual-Spatial (r = .56) style showed a low moderate reliability. Scores on ASVT and SIPS were not significantly correlated with one another (Pearson r correlation) (ASVT/Spatial = -.045; ASVT/Analytical = -.054; ASVT/Social = -.078; ASVT/Categorical = -.063).

Research question 1

How is performance on a spatial visualization task influenced by training? There was a statistically significant difference in performance on a spatial visualization task between students with more training and those with less training in

apparel design (see Table 1). Whether the training was measured as year in school, advanced and basic, or the number of credit hours, students with more training scored higher on the ASVT than those with less training in apparel design.

Table 1.

ANOVA of Performance on Spatial Task (ASVT) by Training

Training	Mean score	SD	Mean Square	F	p<
Year in School					
Freshman (n = 51)	10.92	3.70	169.08	12.78	.000
Sophomore (n = 77)	11.26	3.53			
Junior (n = 76)	11.86	4.24			
Senior (n = 74)	14.36*	2.96			
Training level					
Basic (n = 85) (No prerequisite)	10.62	3.94	304.21	21.91	.000
Advanced (n = 193) (Prerequisite)	12.90	3.62			
Credit Hours					
Group 1 (0 credit hours; n = 73)	10.70	4.08	236.32	18.91	.000
Group 2 (1-6 credit hours; n = 84)	11.05	4.04			
Group 3 (7-16 credit hours; n = 66)	13.08#	3.01			
Group 4 (> 16 credit hours; n = 55)	14.84+	2.28			

* The senior group differed significantly from all other groups, SNK p<0.05

Group 3 differed significantly from all other groups, SNK p<0.05.

+ Group 4 differed significantly from all other groups, SNK p <0.05

Research question 2

How is performance on a spatial visualization task influenced by preferred strategical information processing style? Because of the nature of the scoring of the SIPS instrument, comparisons between groups with different strategical information processing styles could not be made. Each student received a score on each strategical processing style; therefore, comparisons were made between students who preferred or did not prefer each style. There was no statistically significant difference in performance on the ASVT between students who preferred any of the strategical information processing styles and those who did not prefer that style (see Table 2).

Table 2.

ANOVA of Performance on Spatial Task (ASVT) by Preferred Strategical Information Processing Style (SIPS), n=278

	n	Mean Score	SD	Mean Square	F	p<
Visual-Spatial						
Not Prefer	112	12.36	3.75	5.43	.363	.547
Prefer	166	12.07	3.94			
Analytical						
Not Prefer	45	12.82	3.76	21.66	1.45	.229
Prefer	233	12.06	3.88			
Social						
Not Prefer	230	12.37	3.82	46.51	3.14	.077
Prefer	48	11.29	3.96			
Categorical						
Not Prefer	109	12.70	3.85	48.37	3.27	.072
Prefer	169	11.85	3.84			

Research question 3

How does training influence preferred strategical information processing style? ANOVA analysis showed no statistically significant difference in preferred strategical information processing style by training, whether training was considered by year in school, basic or advanced, or by credit hours.

Table 3

ANOVA of Strategical Information Processing Style (SIPS) by Training (Year in School)

SIPS	Year in School	n	Mean	SD	Mean Square	F	p<
Visual-Spatial							
	Freshmen	51	3.19	.91	.338	.452	.716
	Sophomore	77	3.02	.82			
	Juniors	76	3.13	.90			
	Seniors	74	3.07	.83			
Analytical							
	Freshmen	51	3.73	.84	.673	1.133	.336
	Sophomore	77	3.82	.71			
	Juniors	76	3.60	.80			
	Seniors	74	3.68	.75			
Social							
	Freshmen	51	1.93	.79	.393	.489	.690
	Sophomore	77	2.12	.93			
	Juniors	76	2.05	.93			
	Seniors	74	2.09	.89			
Categorical							
	Freshmen	51	2.96	.87	.447	.598	.617
	Sophomore	77	3.16	.88			
	Juniors	76	3.07	.91			
	Seniors	74	3.09	.80			

Table 4.

ANOVA of Strategical Information Processing Style (SIPS) by Training (Basic and Advanced)

SIPS	Training Level	Mean	SD	Mean Square	F	p<
Visual-Spatial						
	Basic (n=85)	3.03	.83	2.253	3.042	.082
	Advanced (n=193)	3.22	.92			
Analytical						
	Basic (n=85)	3.70	.75	.035	.059	.808
	Advanced (n=193)	3.72	.82			
Social						
	Basic (n=85)	2.08	.93	.386	.484	.487
	Advanced (n=193)	2.00	.81			
Categorical						
	Basic (n=85)	3.13	.85	1.901	2.561	.111
	Advanced (n=193)	2.95	.90			

Table 5.

ANOVA of Strategical Information Processing Style (SIPS) by Training (Number of Credit Hours)

SIPS	Credit Hours	Mean	SD	Mean Square	F	p<
Visual-Spatial						
	Group 1	3.27	.90	1.450	1.971	.119
	Group 2	2.97	.86			
	Group 3	3.01	.86			
	Group 4	3.16	.80			
Analytical						
	Group 1	3.74	.79	.430	.720	.541
	Group 2	3.77	.74			
	Group 3	3.59	.80			
	Group 4	3.72	.76			
Social						
	Group 1	1.99	.80	.788	.985	.400
	Group 2	2.19	.98			
	Group 3	2.05	.88			
	Group 4	1.97	.89			
Categorical						
	Group 1	2.95	.88	.737	.990	.398
	Group 2	3.17	.90			
	Group 3	3.06	.86			
	Group 4	3.14	.78			

Group 1 = 0 credit hours completed; n = 73

Group 2 = 1 to 6 credit hours completed; n = 84

Group 3 = 7 to 16 credit hours completed; n = 66

Group 4 = 17 or more credit hours completed; n = 55

Results showed that performance on the ASVT was influenced by training. However, there was no indication that performance on the ASVT was influenced by strategical information processing style. Strategical information processing style preferences were not influenced by training as measured by year in school, basic versus advanced classes, or number of credit hours.

Discussion

Influence of training on ASVT performance

Results of the ANOVA showed a statistically significant difference in performance on a spatial visualization task between students with more training and those with less training in apparel design. Whether the training was measured as year in school, advanced and basic, or the number of credit hours, students with more training scored higher on the ASVT than those with less training in apparel design.

This evidence supports research findings indicating that training in apparel design adds to knowledge that is imperative to the apparel spatial visualization component of the cognitive domain (Khoza, 2003). Training students on how to interpret visual cues in a specific domain is part of many university curriculums. An apparel design curriculum is based on a foundation of domain specific knowledge that is used to solve complex problems in apparel design (Workman & Lee, 2004). Apparel design programs include courses designed to improve students' ability to draw and read graphic language (Workman & Zhang, 2004).

In support of the results that students with less training in apparel design had less spatial visualization skill, Orzada and Kallal (2001) alleged that college freshmen in an apparel design major often lack experience and ability to comprehend how three-dimensional garments are formed from two-dimensional garment parts, however, their skills improve with practice. Research has shown that students enrolled in advanced level apparel design classes score higher on a spatial visualization task than those in lower level courses (Orzada & Kallal, 2001; Workman & Caldwell, in press; Workman, Caldwell & Kallal, 1999; Workman & Lee, 2004; Workman & Zhang, 1999).

Results were consistent with Workman and Caldwell (in press), who examined the effects of indirect training provided by apparel design and product development courses on spatial visualization skills. These authors concluded that indirect training provided in apparel design and product development classes improved students' scores on tests measuring both general and domain-specific spatial visualization. Academic experiences are important predictors of spatial visualization skills (Baker, 1990). Academic experience can be enhanced by including spatially enriching experiences for students.

Influence of strategical information processing style on ASVT performance.

Results showed that performance on the ASVT was not influenced by preferred strategical information processing styles as measured by SIPS. The SIPS instrument has four constructs (visual–spatial, analytical, social and categorical). It was assumed the visual-spatial aspect of the SIPS would be related to the spatial visualization construct of the ASVT. However, students who preferred the visual-spatial processing style did not differ in scores on the ASVT from students who did not prefer the visual-spatial style. Farrell (2001) acknowledged that the visual-spatial indicator variable of the SIP instrument is weak and needs to be strengthened. In this study, the visual-spatial variable of the SIPS instrument had the lowest reliability among the four SIPS variables.

The findings from the current study are similar to Khoza (2003) who used the Perceptual Modality Preference Survey and found that scores on the ASVT were unrelated to preference for perceptual modality. However, Orzada and Kallal (2001) used the Style of Processing scale and found a positive relationship between scores on the ASVT and preference for the visual (versus verbal) style of processing.

According to Thompson, Mann and Harris (1981), males' spatial task performance was related to cognitive style but females' was not. Because 96% of the participants in this study were women, this may help explain why there was no significant influence of SIPS on spatial task performance.

Influence of training on strategical information processing styles.

ANOVA analysis showed no statistically significant difference in preferred strategical information processing style by training, whether training was considered by year in school, basic or advanced, or by credit hours. Results are consistent with Hayes and Allison (1998) who argued that while cognitive style may produce consistent behavior across a wide variety of situations, strategies are specific and essentially represent the result of decisions individuals make to cope with immediate cognitive tasks.

Farrell (2001) found no relationship between the SIPS constructs (visual-spatial, analytical, social and categorical) and college major or credit hours. Farrell concluded that the SIPS constructs were unrelated to training but have to do more with personality attributes of an individual.

Pearson *r* correlation results indicated that there was a very low nonsignificant correlation between the ASVT and SIPS. Preference for strategical information processing style was not related to scores on the ASVT. Since performance on the ASVT was significantly influenced by training, it is logical to conclude that ASVT performance would not be influenced by SIPS which was not influenced by training. This result disputes Farrell and Kotrlik's (2003) assumption that a learner's cognitive ability seems to depend on his or her preferred method of

processing information. The cognitive ability measured by the ASVT does not seem to depend on strategical information processing styles.

Although the results of this study may be contextually bound and thus have limited generalization, performance on a spatial task was noticeably influenced by training. Results of this study indicated that strategical information processing style did not influence performance on a spatial task and that strategical information processing style was not influenced by training.

Implications for instruction and curriculum

Students need spatial skills in order to execute the apparel design process. The apparel design process includes identifying a problem, developing preliminary design solutions, refining the solutions, developing a prototype, evaluating the prototype, and finally implementing the solution (Lamb & Kallal, 1992). Each step in the apparel design process lends itself to instruction aimed at developing spatial skills. Although training students how to interpret spatial cues in apparel is already a vital part of apparel design courses, training could be designed to more specifically address each step in the design process. One instructional component that may complement traditional projects is development of exercises that will clarify when and how to use specific strategies such as matching, elimination of alternatives, stimulus analysis, checking and extraction of landmarks.

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The Authors

Dr. Priscilla Gitimu received her Ph.D. in Workforce Education and Development from Southern Illinois University at Carbondale in December 2005. She is an Assistant Professor at Youngstown State University in Youngstown, Ohio. This article is based on her dissertation.

Dr. Jane Workman is a Professor of Fashion Design and Merchandising in the School of Architecture at Southern Illinois University, Carbondale. Her research interests include development of spatial visualization skills in fashion design students.

Dr. Marcia Anderson is a Professor and Director of the Graduate Program, Workforce Education and Development, Southern Illinois University, Carbondale.

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Secondary to Postsecondary Technical Education Transitions: An Exploratory Study of Dual Enrollment in Georgia

Dorothy Harnish
University of Georgia

Richard L. Lynch
University of Georgia

Abstract

An exploratory study of credit-based transition programs was conducted to better understand the processes, outcomes, facilitators, and barriers to high school student access to and continuation in postsecondary education. This qualitative case study research examined characteristics and operations of dual enrollment programs and their link to key transition outcomes to address the question: Do credit-based-transition programs, specifically dual enrollment, facilitate college access and success for students who participate in them? Research questions focused on organization, participation, and outcomes of dual enrollment in the state of Georgia. Findings from site visits to technical colleges and high schools address emerging issues in organization, staffing, credit policies, funding, collaboration, student characteristics and motivation, programs of study, barriers to student access, benefits to student, follow-up, and program outcomes. This research is the first phase of a longitudinal, comprehensive multi-method study of dual enrolled students in Georgia and factors related to their transition into postsecondary education and work.

Introduction

Promoting access to college for increasing numbers of high school students and providing the academic foundation for success in college, the workplace, and the community are widely held contemporary goals for students, parents, educators, and policymakers across the nation. Recognizing that college-level education and credentials are important preparation for well-paying jobs and career advancement, attention has been focused recently on concerns about (a) the inadequacy of high school academic preparation for college and the workplace, and (b) the disconnect between high schools and postsecondary education transition systems.

As one solution to possibly rectify these twin concerns, at least 38 states – including Georgia -- have enacted policies that support the development of programs that encourage high school students to earn college credit while still in high school (Kleiner, Lewis, & Greene, 2005). Through a variety of initiatives such as advanced placement, dual enrollment, joint/concurrent enrollment, or Tech Prep, high school students can enroll in college courses and earn credits that meet both high school and college requirements. These credit-based transition initiatives are promoted as a means of increasing student access to postsecondary education, motivating more high school students to attend college, better aligning high school courses with postsecondary requirements, reducing time and costs of college, and improving student outcomes at the postsecondary institutions.

In Georgia, the number of high school students dually enrolled in technical college courses has increased dramatically over the past five years and now represents an important component in the enrollment mix in the state's technical college system. Many see this as an outcome of increased collaboration among secondary and postsecondary institutions, as well as the availability of state funding through HOPE (*Helping Outstanding Pupils Educationally*, the acronym for the state-funded tuition scholarship and grant program) to pay for technical college dual enrollment courses offered in high schools. However, no empirical research or evaluative studies have been conducted to date to determine outcomes and/or if the goals for the initiatives are being accomplished.

Conceptual Framework

Workforce development and human capital theories of economic development provide the underlying concept for growing national concerns about promoting college access and success for more high school students. Both demand-driven labor market needs for highly skilled employees and supply-driven individual worker desires for good jobs support calls for more (some say all) students to continue their education beyond high school (Grubb, 1999; Kazis & Selzer, 2000; Lynch, 2000; Education Trust, 1999). However, studies of the college participation gap in the U.S. point to the need for state policy and funding to ensure postsecondary education participation for greater numbers of secondary students, particularly those in underserved and disadvantaged populations (Ruppert, 2003; Venezia, Finney, Kirst, & Usanl, 2005). Because of the difficulties faced by many students in gaining access to and being successful in postsecondary studies (Bailey & Karp, 2003), educational reformers seek improvement both in the transition from high school to college and in the academic rigor of high school curriculum and graduation requirements (National Commission on the High School Senior Year, 2001). Creating a continuum of education that links disparate segments and levels of education, as well as better

preparation of students for college-level work are both needed to address postsecondary access and success issues.

The six year Stanford University Bridge Project, *Betraying the College Dream – How Disconnected K-12 and Postsecondary Education Systems Undermine Student Aspirations* (Venezia, Kirst, & Antonio, 2003), investigated how policy structures support, assist, or confuse students, their parents, and K-12 educators about the requirements and options of postsecondary education. In this study, both structural gaps between secondary and postsecondary education systems in the American schooling process, and the social value of college attendance linked to higher earning potential, were identified as explanations for this expectancy gap between student aspirations and the reality of college attendance. Bailey and Karp (2003) reviewed various credit-based transition programs and the limited evidence of their effectiveness in promoting college access and success for students nationwide. Particular attention in these two studies was paid to programs that target less-prepared high school students through early involvement with college-level coursework as part of their secondary education. In their review of state dual enrollment policies in 50 states, Bailey and Karp (2003) found that states are just beginning to grapple with complex methods of balancing student access, limitations of funding, and preparation of high school students for college-level work. Admissions requirements and funding were the dual enrollment program elements most often regulated by state policies, and program structure and use of earned credits were least regulated by states.

Because of the critical role of community and technical colleges in serving as the entry point into higher education for many students who would not otherwise participate in postsecondary education, studies centering on forging stronger links between high school and community/technical colleges are also relevant to the conceptual framework for the study of dual enrollment (Bueschel, 2003; Hughes & Karp, 2006; Hughes, Karp, Fermin, & Bailey, 2006).

Several national studies have been done on the growth of dual enrollment programs and policies to facilitate transition to postsecondary education. According to the Education Commission of the States (ECS), 26 states have c*omprehensive dual enrollment programs,* defined as one in which the student pays little or no tuition, both secondary and postsecondary credit is granted, and there are few prerequisites or restrictions. Another 21 states offer *limited dual enrollment programs* in which students pay postsecondary course costs, academic credit restrictions exist, and/or courses eligible are strictly limited. In addition to funding sources, credit restrictions, and course limitations, the programs offered also differ in terms of what types of students are targeted, where courses are taught, who teaches them, and how credit is granted (ECS, 2001). A recent national study of the extent of dual enrollment in high schools found that 71 percent of public high schools offered courses for dual credit with 1.2 million enrollments in these courses in 2002-03

(Waits, Setzer, & Lewis, 2005). Smaller size schools and those with large minority populations were least likely to offer dual credit courses for their students. The educational focus of dual credit courses was 92 percent academic and 51 percent career and technical (Waits, Setzer, & Lewis, 2005).

Among the benefits of dual enrollment frequently cited in the literature are that dual enrollment programs can: (a) smooth the transition from high school to college; (b) shorten the time required for a student to complete an undergraduate degree; (c) eliminate unnecessary duplication of curricula from high school to college; (d) improve student study habits and academic readiness for college; (e) expand academic options for college bound students; (f) result in financial savings for parents and/or states; (g) allow students to "test the waters" of college education; (h) increase student access to college; (i) provide for professional development of both high school and college faculty; (j) provide an effective recruiting tool for colleges; and (k) promote institutional relationships between high schools and colleges (Bailey & Karp, 2003; Conklin & Williams, 1989; Clark, 2001; Fincher-Ford, 1997; McMannon, 2000). There is considerable debate in each of these areas about whether or not dual enrollment programs have fulfilled their promise, but no clear answers have emerged.

While there is extensive and growing interest in dual enrollment programs and substantial investments have been made in them by many states, including Georgia, the literature provides little solid research on actual outcomes of these programs (Bailey, Hughes, & Karp, 2003; High School Leadership Summit, 2003). There is evidence that students like these programs and deem them to be both useful and motivating. The current literature on dual enrollment programs, however, is largely descriptive and/or editorial in nature. The evaluative reports that are available have mostly been completed by those involved in the programs themselves and tend to emphasize the positive. In addition, much of the available research does not control for anticipated outcomes in the absence of the dual enrollment program in question. Many existing research studies simply compare dual enrollment participants to non-participants. Because most of these programs are still targeted to high achieving students, it is not surprising when studies show that participants tend to fare better (Bailey, Hughes, & Karp, 2003).

Purpose of the Study

To address these and other related issues in Georgia, a comprehensive statewide study of high school and technical college dual enrollment programs was designed. The purpose of this multi-year, multi-method study was to investigate the transition of students from secondary schools to the technical colleges in Georgia to better understand the outcomes, process, facilitators, and barriers to high school student access to and continuation in postsecondary education. The first phase of the

study, which is reported in this article, involved exploratory case study research to better understand the organization, operation, and outcomes of dual enrollment; determine factors that facilitated or impeded the access of high school students to postsecondary education; and gain insight into the factors that encouraged students to continue their postsecondary studies. This exploratory data collection also was intended to serve as a guide for the design of the data collection protocol and instruments for subsequent phases of a longitudinal study on high school-technical college dual enrollment in Georgia, which is currently in process. The later phases of this comprehensive study are examining student-level state database information and surveying participants statewide to learn what happens to students who earn college credit in high school when they graduate, and what difference participation in dual enrollment programs makes in such key transition outcomes as admission to technical or four-year colleges and/or the workforce, remediation in college, and academic progress or completion of college credentials.

Information from the comprehensive study can contribute to better understanding of dual enrollment programs in high schools and technical colleges, their strengths and challenges, and how they affect the students who participate in them. The broader purpose of the comprehensive study investigates issues that surround inadequate student preparation for college, high levels of remediation, and low rates of college completion or continuation and how (or if) these are being addressed through dual enrollment. It looks at public school student access to accurate sources of information about college options including technical colleges; career counseling and opportunities to prepare for college – particularly among disadvantaged and low-achieving groups of high school students; and perceptions of students and high school educators about opportunities and expectations in technical colleges. The report which follows describes only the results of the first phase of this study, an exploration of dual enrollment organization, participation, and outcomes through case study research in a sample of high school and technical college sites.

Research Questions

The overall question of the comprehensive study is: Do credit-based transition programs, specifically dual enrollment, facilitate college access and success for students who participate in them? Research questions that guided the case study focused on three key areas of dual enrollment: organization, participation, and outcomes. The following specific questions were developed to guide the investigation into these key areas of dual enrollment.

1. How does dual enrollment facilitate <u>access</u> to postsecondary education for participating students?

2. How does dual enrollment facilitate success in postsecondary education for participating students?
3. What other impacts has dual enrollment had on participating students?
4. Who is being served by dual enrollment in Georgia?
5. Why is dual enrollment offered and why do students enroll?
6. What facilitates or discourages student participation in dual enrollment?
7. How is dual enrollment organized and administered?
8. Who teaches dual enrollment and how appropriate are their qualifications?
9. How is dual enrollment funded in Georgia and what effects does this have on participation in dual enrollment?
10. What issues have emerged from this study of dual enrollment in Georgia?

The information which follows includes only the results of the exploratory case study research which provided important insight for subsequent research and established the basis for the design and protocol used in later stages of the dual enrollment research.

Method

This exploratory study of dual enrollment used a qualitative, descriptive case study method in the first phase of research. Case study methodology is appropriate for investigating and understanding a phenomenon from the perspective of those involved with it and arriving at findings inductively derived from the data rather than testing pre-determined hypotheses (Merriam, 2001). The cases in this study focused on three collaborative efforts between high schools and technical colleges that were offering dual enrollment courses to high school students in Georgia during 2003-04.

This qualitative data collection enabled researchers to explore questions about how dual enrollment programs are organized and administered, what is being offered and to whom, why students enroll (or not), who teaches the courses, program coordination and promotion, participation barriers and facilitators, and perceptions of success.

Sample Selection

Three sites selected for case studies were a non-random, purposive sample that allowed investigators to study different settings, organization, and programmatic approaches to dual enrollment. Each case study site consisted of a technical college and its satellite campus(es) or center(s), along with two high schools that were participating in dual enrollment courses with that technical college. The actual sites were identified from a listing of all Georgia technical colleges offering dual enrollment in 2003-04. Investigators used input from the Georgia Department of

Technical and Adult Education (DTAE) staff and information about institutional size, location, socio-economic factors, and dual enrollments to select sites that maximized diversity of size, geographic location, urban-rural setting, and factors related to economic development. All three sites were among the top five most active technical colleges in terms of numbers of students enrolled in dual enrollment courses in 2002-2003. The sites also represented different models of delivery of dual enrollment and varying curriculum and program areas for dual enrollment courses with high schools. Site A served a primarily metropolitan area and included a separate educational center serving students from the high schools with dual enrollment and diverse career and technical programs. Site B served a primarily rural area with small school enrollments, high poverty, and low educational attainment. Dual enrollment classes were offered at both the high schools and a satellite campus of the technical college. Site C served a growing suburban or mixed suburban-rural area with a large minority population. All dual enrollment classes were offered at the high schools.

Instrument Development

Questions and a protocol for interviews and focus group discussions were developed by the research team based on issues identified in the literature on credit-based transitions, conversations with state educational leaders, and the research questions guiding this study. Data collection instruments and procedures were field tested with administrators, counselors, teachers, and students during a one-day on-site visit by the research team to one technical college and one high school site, prior to conducting the three actual case study visits for this research. Feedback from this field study visit established face validity for research questions and helped to provide a context for understanding subsequent interview and focus group responses. This field test also allowed the team to revise and refine research procedures and questions in the data collection instruments and contributed to reliability of multi-investigator use of common instruments in subsequent onsite visits.

A separate set of interview questions were developed for each data source. Administrators at the high schools and technical colleges were asked 27 questions about program characteristics, administration, and marketing; student characteristics; teacher selection; collaboration in developing the program; funding; challenges; and indicators of success. Counselors at high schools were asked 25 questions about program characteristics, administration, and marketing; student characteristics; challenges; indicators of success; their role with students; and the relation of dual enrollment to planned programs of study. Teachers of dual enrollment were asked 16 questions about program, teacher, and student characteristics; program promotion; challenges; and indicators of success. Students at high schools were asked 17 questions about program promotion; motivation to take dual enrollment; relation to

career and/or college paths; expectations; challenges; and indicators of success. The common set of questions was used by all researchers for the interview and focus group data collection at all sites.

Data Collection Procedures

Prior to the visit by the research teams, a letter from the Georgia Assistant Commissioner for Technical Education was sent to the president of each participating technical college and a letter from the Georgia Department of Education Technology/Career Education Director was sent to the chief administrator of each participating school and district describing the study and requesting cooperation. Across the three case study visits, eight high school administrators were interviewed, including principals, assistant principals, and career and technical education directors. Nine technical college administrators were interviewed, including presidents, student services and instructional services vice presidents, Tech Prep coordinators, a registrar, and directors of satellite campuses. Individual interviews also were conducted with three counselors and with 14 teachers hired by the technical colleges to teach dual enrollment courses for high school students. In addition, focus group discussions were conducted with 43 high school students who were former or current participants in dual enrollment classes offered by their high school and the technical college. Students were identified by high school administrators from the pool of students in dual enrollment classes at that school. These students were primarily seniors and were evenly divided by gender. At each site visit, researchers also collected printed information about the dual enrollment courses, marketing, admissions, policies, or other relevant documents. School or dual enrollment information on internet web pages also was reviewed by the researchers for each of the three sites.

Analysis of the Data

Research teams who conducted the onsite visits each prepared a detailed case study report on the field data collected from the various sources during the two day visit, using a common report format. Printed transcripts of audiotaped interviews and focus group discussions from field visits were reviewed, coded, and analyzed for key findings and themes using the constant comparative methods of Glaser and Strauss (1967). The analysis included both open-coding to allow categories to emerge from the data, as well as *a priori* categories identified from the literature on dual enrollment which structured the research questions and data collection questions and process for this study. Findings in each case study were summarized for each location (technical college, satellite center, or high school) and for each source of information (individual and group interviews with administrators, counselors, teachers, and students) using the three major a priori categories of the study. Within

each of these organizing categories, emergent themes were identified from the data for each of the three cases. Each case study report included demographic information for the region, high schools, and technical colleges to set a context for the findings. Following a description of the data collection procedures, schedule, and data sources, detailed findings and a summary of key issues and implications were described for each case. The following categories, which reflect the research questions of the study, were used to report emergent themes from the data for each onsite visit:

1. *Organization and Administration*: This category included findings on program characteristics, operation, administration; teacher selection, characteristics; course credit policies; funding issues; and collaboration.
2. *Participation*: This category included findings on student characteristics and motivation; programs of study; and promotion of the program.
3. *Outcomes*: This category included findings on program evaluation and follow-up; indicators of success; and challenges or changes needed.

While reliability and validity issues found in survey or quantitative research did not apply to this study (Merriam, 2001), consistency and trustworthiness of the analysis were addressed by involving the entire research team in the development and revisions of field instrument and protocol for the case study visits to ensure common understanding and implementation across multiple sites. Frequent meetings of researchers were held to discuss data collection procedures and issues, preliminary findings, and appropriate methods for analysis and reporting of qualitative data from the visits. Analysis of and categorization of data from field notes and transcripts were reviewed and verified by all members of each research team and the study co-principal investigators. The nine field investigators comprising this study team were all experienced qualitative researchers with extensive professional backgrounds in workforce education, career and technical education, Tech Prep, and school-to-work fields of inquiry.

A cross-case analysis of the three case studies resulting from this field data collection was completed to summarize findings from across all of the site visits, to identify key themes and issues, and to identify areas for further study. Results of the study reported herein are drawn from this cross-case analysis of the case study reports completed for each of the three sites visited by researchers. The findings and related discussion are not intended to be generalized to all schools and technical colleges in this state or elsewhere, but to provide seminal information about dual enrollment in Georgia from the perception of various stakeholders and to identify issues for further study.

Findings and Emerging Issues

Because the purpose of this first phase of the dual enrollment study was to describe the operation and participation factors of dual enrollment in select sites and to identify key issues and protocol for further data collection, the results are presented in the form of common issue areas emerging from this exploratory phase of the study. The following section presents the major categories of findings and themes emerging from cross-case analyses of the field data in these three case studies of dual enrollment sites.

Organization and Administration of Dual Enrollment

Administrative structure. All of the dual enrollment programs offered at the three technical colleges were relatively new, having been in place for less than five years, and each college used a different organizational structure for the design and delivery of dual enrollment in collaboration with area high schools. Decisions about whether to offer dual enrollment courses through the academic division or the economic development division of the technical colleges affected the types of courses and programs offered at the high schools. Dual enrollment classes administered by economic development business training units at the technical college were developed by DTAE's Quick Start office for the purpose of securing immediate employment. Successful completion of these classes typically resulted in the award of a technical certificate of credit (TCC) such as Certified Manufacturing Specialist or Certified Customer Service Specialist. Credits earned through a TCC usually do not transfer into a technical college (or other college) diploma or degree program. Particularly in the rural areas, curriculum decisions were frequently based on the economic development and industry hiring needs in the community with the goal of preparing high school students for employment immediately upon graduation. Administrators and teachers considered these offerings to be valuable in preparing students for the workforce and teaching work ethics. Courses could be completed in two semesters of high school and students could earn a TCC upon successful completion of the program. However, these courses did not address the goal of increasing access to postsecondary education because of limitations on credit transfer. Conversely, dual enrollment courses offered by the academic units of the technical colleges (e.g., in health care or business) were more closely aligned with long-term career pathways and existing diploma and degree programs and courses at the college.

Location of dual enrollment classes. Pros and cons of conducting the dual enrollment class at the high school or at the technical college campus raised concerns, particularly with instructors. Some thought it important to have students come to the technical college campus. There they would be treated like other college

students, given a sense of what it was like to attend college, and exposed to what the college had to offer, with the assumption that they would be more likely to attend after high school graduation. Another reason cited for holding the classes at the technical college was that the high schools do not have the prerequisite equipment, lab facilities, and materials needed to teach certain classes, such as welding. This restricts the choice of course offerings at each high school. However, due to the distances separating many high schools from a technical college or satellite center, commuting was not always a viable option. Transportation and coordination with the high school class schedule were identified as barriers to using the college campus location.

Staffing. In all cases, the instructors teaching dual enrollment classes were employed by the technical college. About half of those interviewed were full-time faculty members at the technical college and the others were adjunct instructors. Their academic credentials did not fit the customary profile of high school instructors. Many did not have college degrees or teaching experience prior to becoming dual enrollment instructors. Instead they had backgrounds in business or industry and brought extensive on-the-job experience to the classroom. Most thought they had been selected to teach dual enrollment classes because of their technical expertise and preparation and the real-world experience they brought to the teaching job.

Funding. The state's HOPE Grant (*Helping Outstanding Pupils Educationally*) paid for technical college tuition and up to $100 per quarter for books and supplies at no cost to the dual enrolled student in all three technical colleges. All administrators and instructors interviewed agreed that the program was funded adequately. High schools were pleased, because the program was essentially free for them and they kept their student full-time equivalent funding. Technical colleges were pleased because they received tuition revenue from the high school students' enrollment. Students were pleased to complete high school requirements and earn college credits at no cost to their parents and get funding from HOPE for books and supplies. An issue about future funding restrictions being considered by the state legislature at the time of this research was raised by several administrators, especially at the technical colleges. They were concerned that if HOPE funding was withdrawn for dual enrollment and/or a cap placed on the maximum number of credits that would be paid with HOPE funds, student enrollment would be negatively impacted.

Program development. Dual enrollment is intended to be a partnership between technical colleges and high schools, and input from business and industry in the community is also encouraged at the state level. One site in this study was designed with this three-way partnership in mind. At the other dual enrollment sites, collaboration happened primarily between the technical college and the high schools, with little involvement from business and industry. The dual enrollment instructors, who are the primary liaison between the two educational partners, described this

collaborative relationship between high schools and technical colleges as very strong. In general, dual enrollment collaboration had not extended to include area business and industry as active partners. Most technical colleges had advisory committees that gave input about the curriculum and courses needed to support local business needs, and businesses did participate in health technology courses by offering local medical facilities as student worksites. Discussions with two instructors suggested that personal connections between educators and business owners have played an important part in the development of specific health technology dual enrollment programs, particularly in smaller, rural communities

Choosing dual enrollment courses and programs seemed to happen rather haphazardly at all the study sites. Researchers could not unearth a consistent, coherent system or needs assessment process that was followed to determine course or program offerings.

Credit policies. Issues of transfer, that is, what will or will not transfer, to which colleges, and under what conditions, have yet to be resolved at all of the sites. Most administrators were not sure if university system colleges would take any of the courses or even if other technical colleges within DTAE would accept the dual enrolled courses within their diploma or degree programs. The consensus was that articulation issues need to be addressed at both the state and local levels to strengthen secondary-postsecondary education transitions.

Participation in Dual Enrollment

Characteristics of student participators. The research teams collected data from dual enrollment students who were chosen by school personnel to attend the focus groups at the six high schools visited in the study. In general, most of the 43 students interviewed were college-bound seniors who described themselves as relatively high achievers (70% had an A or B average). Over half of the students (58%) said they worked part-time outside of school, averaging 23 hours a week. Their jobs tended to be in food service, customer service, or construction. Their parents were generally high school graduates (90%), and a third had attended college. A fourth of the mothers worked at home, with others in the clerical, educational, or health field. Fathers worked in industry, health, construction, plumbing, or management, and three were retired military. Students reported that their current programs of study covered a wide range of courses, automotive (16%) and business (12%) being the most popular; however, nearly half of the students did not respond to this question. The highest number (42%) of the students said they planned to earn a dual-seal high school diploma (both college preparatory and technology/career preparatory), a third planned to complete a technology/career preparation diploma, and a quarter planned to complete a college preparation diploma.

Motivation. Motivation to attend dual enrollment classes varied. The two incentives most frequently mentioned in the student focus groups were to obtain college credit for dual enrollment courses and to increase their wage-earning potential, both during and after college. Other reasons mentioned were to learn a skill, to take something different or interesting, or because someone (often a friend) suggested it. In the small rural schools students have limited options for electives, and some students there said they were put into dual enrollment classes without requesting them because nothing else was available. In these cases, although their initial response to this may have been negative, students reported that once they were in the program they were motivated to stay because they were treated as adults and given adult responsibilities. Some students said they were motivated to attend dual enrollment courses because they were able to leave their high schools to attend classes at the technical college during the school day and were in classrooms at the college with state-of-the-art equipment.

Parents were not a factor in most student decisions and neither were school counselors. Peers were influential in students choosing to enroll in dual classes, as many students said friends had encouraged them to take dual enrollment classes.

The high school administrators had their own opinions about why students take dual enrollment courses. A primary motivator was considered to be peer influence; another, that some students already knew that they would be going to the technical school after graduation and wanted to get an early start. One administrator said that some students were attracted to the novelty of driving a forklift or learning to weld. Other administrators thought students would use the skills that were gained in the courses to immediately enter the workplace upon completion of high school, and others would use their skills to save money or support themselves while attending college. Instructors noted that many students enrolled in dual enrollment classes because they had very specific goals for the future.

Programs of study. The development of a formal program of study for students was inconsistent from school to school and from advisor to advisor. Although high school administrators and counselors said they established a course of study for students in ninth grade, no students interviewed in this study were aware of having done this. Some dual enrollment classes led to a clear career path but some did not. The health occupations dual programs generally prepared students for multiple career paths. Students were fully certified (e.g., as a certified nursing assistant) and able to be employed by the end of the junior or senior year. The credits earned in health programs could also be applied to a variety of medical diploma or degree programs at the technical college or potentially transferred to a university system institution. According to instructors, the completion of a dual enrollment program could reduce the time to obtain an LPN diploma or an RN associate degree by about six months. In contrast, other certified specialist programs were stand-alone programs, not aligned with any specific career or technical college

credit program offering, and the credits did not transfer to any other college. This raises questions about their value in helping students transition from secondary to postsecondary education.

Impact of admissions requirements. The ASSET test, which is a requirement for admission into dual enrollment classes, was seen as a barrier to participation in dual enrollment for many students. Both administrators and teachers believed that the test served as a screen that restricted access for students who do not do well on tests, who do not take the test seriously and do poorly for this reason, and for students who may not be academically strong but would benefit from dual enrollment courses, for example, students at risk of not completing school or not planning to attend college after graduation. One counselor pointed out that many dual enrollment applicants are beginning tenth graders when they take the ASSET, which was designed as a postsecondary admission tool. Thus, the possibility exists that students may well be tested over materials they haven't studied, almost guaranteeing their inability to meet the prerequisite score.

However, schools seemed proud of the fact that their dual enrollment students were "the cream of the crop," often those who were already planning to go on to college after high school but not necessarily at the technical college. While several dual enrollment instructors expressed concerns about academic screening of students, they did not challenge the requirement. One instructor observed that program-ready students did better in class than those who were not program-ready, yet he was willing to do the extra work that lower-performing but motivated students require. A principal who believed that, as a screening process, the ASSET was important for dual enrollment to be successful nevertheless expressed regret that "the ASSET test really prevents at-risk kids from taking some courses that may help them in the long-run. They may not be able to academically go to college but this would give them some entry-level job skills to perform better, maybe get a job and keep that job."

Outcomes of Dual Enrollment

Follow-up of graduates. Information on the number of dual enrollment students who complete high school, need remediation for college, or complete a technical college credential was not generally available at the high schools and technical colleges when requested by researchers. Likewise, no tracking mechanism was in place at high schools or technical colleges to evaluate the effect of dual enrollment on increased access to college or on the provision of an academic foundation for college success. Instructors at several sites shared anecdotal evidence of follow-up when they saw former students in the hallways and classrooms of the technical colleges or working at various local businesses, but they admitted that they were not able to evaluate the overall success of the program in this way. Some instructors also said they had received positive feedback from employers who had employed dual enrolled students.

Benefits to students. Students at the traditional high schools may not have been aware of dual enrollment's contribution to a pathway or course of study, but they consistently attributed the following benefits to their dual enrollment experience:

1. *Exposure to college.* Students indicated that they expected to get a small taste of what college life is like by participating in dual enrollment courses. As one said, "Instead of always taking a high school class, you get to take a college class and see different things."

2. *Increased options*. Dual enrollment classes have opened students' eyes to new possibilities. "It gives me a backup plan if something doesn't follow through," said one young woman who plans to go into the Air Force. Some of the welding students who were just going to take one class were now thinking of going on for a welding certificate.

3. *Narrowing down career choices*. Many had already made some decisions about careers, but the classes have helped them to narrow down their choices. "It gives you a heads up on what you want to major when you go to college instead of wasting two years," said one student.

Program success. Participants in this phase of the study found dual enrollment programs to be successful in a number of ways. Technical college administrators reported that enrollment at the technical colleges directly from students who have just completed high school is up 10% or more, indicated by the significant lowering of the average age of the technical college student as recent high school graduates enroll. They attributed this in part to the exposure the technical colleges get through the dual enrollment program. Students in one focus group said that attending classes on the college campus had changed their minds about the quality of the education that is available at a technical college. An indicator of the popularity of the classes was that students rarely asked to withdraw from a dual enrollment class, in contrast to other electives at the high schools. Administrators defined dual enrollment's success in terms of its contribution to a student's ongoing training and gainful employment rather than enrollment numbers at the technical college. Many believed that dual enrollment courses gave high school students a taste of what is required in college, from academic to behavioral expectations, thus smoothing the transition from high school to postsecondary education. They believed that the outcome was that students became more knowledgeable about careers, developed a better work ethic, and received positive feedback about skills. One high school technology-career director explained it in the following way:

> Every one of them (students) I saw mature. and I saw them become more focused and that's why I think they're going on to postsecondary education now. They've seen that they can do it. They've seen that the other college kids put

their clothes on just like they do and they are convinced that they can do college now.

Implications for Practitioners and Policymakers

This initial look at a small sample of high school-technical college dual enrollment programs in Georgia does support some claims from previous studies in that dual enrollment is increasing options for college-bound (and possibly other, particularly career and technical) students; resulting in financial savings for parents (i.e., as HOPE grant is paying the college tuition with no loss in funding to the high school); allowing students to "test the waters" of college courses; increasing access to college-level content; and providing an effective recruiting tool for colleges (Bailey & Karp, 2003; Conklin & Williams, 1989; Clark, 2001; Fincher-Ford, 1997; McMannon, 2002). A further benefit noted by these and other researchers is that dual enrollment in Georgia is forging stronger links between high school and community/technical colleges (Bueschel, 2003; Hughes & Karp, 2006; Hughes, Karp, Fermin, & Bailey, 2006).

Further, data provided by the stakeholders in these three case studies suggest that technical college courses have utility to high school students for career development, employment skills and jobs, and as enrichment courses, in addition to (or even instead of) the primary purpose of facilitating transition from secondary to postsecondary education. Student reasons for taking dual enrollment courses as well as the contribution of this experience to their decision making about further education and career paths were complex and varied. But it is clear that dual enrollment meets multiple needs and can enhance possibilities of either further postsecondary technical education or entry into the workforce for student participants.

However, if dual enrollment is to facilitate access to postsecondary education for more students in Georgia, based on data from this preliminary study, additional steps need to be taken. High schools and technical colleges are not reaching many students who could benefit from technical college. They particularly need to target the large number of high school students in the state who are not now planning to or in all likelihood will not attend college immediately upon high school completion. High school counselors could take a stronger role in promoting the technical career path, and the colleges need to create innovative ways to inform counselors about technical college options. Parents also need to be more involved and educated about technical career options. Administrators in this study noted that most parents believe that a traditional baccalaureate degree is still the best option for their children, even though contemporary data on college attendance and retention patterns do not support this outcome as realistic for many of Georgia's current high school students.

Both national and state policies on funding and support for expanded dual enrollment programs need to take into account the broader impacts of career and technical programs of dual enrollment in both college and career/workforce preparation. For many students who might not be considering postsecondary education, dual enrollment can open up the possibility of college and increase their confidence and motivation to complete high school and continue their education. Teachers and administrators in both high schools and colleges in this study pointed to dual enrollment as a major factor in opening doors for otherwise unmotivated and underachieving students. Because this is one of the important goals of dual enrollment, the importance of identifying and minimizing barriers to students who might most benefit from it is critical for practitioners and policy makers. This preliminary study suggests that admissions test requirements may need to be re-examined and a more flexible policy of selective exceptions established to allow more "borderline" or at-risk students to be admitted with additional support and instruction (e.g., remediation and developmental studies), while still preserving the academic standards required for college-level credit awards.

In addition, the historical successes of community and technical colleges in reaching diverse students ─ often those considered unready for higher education ─ and addressing a broad range of occupational, technical, and academic learning needs throughout the lifespan argues strongly for community and technical colleges playing a central role in the expansion of dual enrollment as a secondary-postsecondary education transition strategy.

Further Research

This first phase of the study on dual enrollment, along with a review of the extant literature, has raised a number of issues, especially about the outcomes for students who complete them and the schools and colleges who participate in them. The second phase of the study is examining data sets on 17,442 students in Georgia who completed dual enrolled courses while in high school from 2002-2004. Student-level descriptive information will include gender, race/ethnicity, family income status, type of high school diploma earned, program of study, remedial studies required, and which students matriculated into a technical college upon high school completion, in what programs, numbers of students needing remediation, and college credits and credentials earned.

Phase three of the study is analyzing data from surveys of three stakeholder groups, (a) administrators of all Georgia technical colleges, (b) administrators from a sample of high schools participating in dual enrollment, and (c) a sample of dual enrollment instructors from throughout the state. Researchers are particularly interested in selected aspects of program operation and administration identified in the exploratory case studies as facilitators or barriers to program offerings and

enrollments, and further challenges or issues identified by participants. Survey questions were developed to obtain more explanatory or deeper information about key themes from the case study research.

A final phase is also planned to follow those high school students who dual enrolled from 2002 to 2004 and matriculated after graduation into technical colleges, university system institutions, and/or the workplace. Examples of selected postsecondary factors to be examined include amount and nature of noncredit, developmental studies; grade point average; program of study; employment factors: and employment certificates or licenses and diplomas earned.

Analysis of information obtained from all of these sources, including the study completed in the first year and reported herein, will provide a more complete and in-depth understanding of credit-based transitions programs in Georgia, their strengths and challenges, and how they affect the students and schools or colleges who participate in them. It is anticipated that results of the study will help the state education systems and local technical colleges and high schools improve credit-based transition programs (especially dual enrolled programs), expand student access to them, and enhance students' access to postsecondary education and career-sustaining employment.

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The Authors

Dorothy Harnish is Associate Research Scientist and Director of the Occupational Research Group, College of Education, University of Georgia, Athens, GA 30602.

Richard L. Lynch is Professor Emeritus, Workforce Education, Leadership, and Social Foundations Department, and former Director, Occupational Research Group, College of Education, University of Georgia.

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Employability Standards: Teachers' Perceptions of Inclusion in Family and Consumer Sciences Secondary Curriculum

Bettye P. Smith
University of Georgia

Shana Katz
Riverwood High School

Abstract

The purpose of this study was to determine the extent that the Georgia Quality Core Curriculum (QCC) employability standards were included in the family and consumer sciences (FCS) curriculum. This study included 262 secondary teachers. Teachers were asked to indicate if in their teaching the employability standards were not an objective, an incidental objective, an important objective, or a major objective. Results showed that 24% of the participants identified the employability standards as major objectives in their teaching whereas, 76% identified them as important objectives. There were no significant differences found on any teacher group based on years of teaching experience and the seven areas within the employability standards. However, teachers with 21 to 30 years of teaching experience had the highest overall mean on the seven areas of the employability standards.

Background

A number of trends have been evident during the last four decades that have had an impact on the profession of family and consumer sciences (Simerly, Ralston, Harriman, & Taylor, 2000; Wild, 2000). Among those trends are shifts in society, economics, reforms in education (Wild, 2000), and the changing workplace. In response to the demands of the rapidly changing workplace, the expanded education and training opportunities was among the societal trends that served as an impetus to family and consumer sciences redefining its mission and direction. Thus, secondary family and consumer sciences programs have made considerable changes in response to the redefined mission and societal trends (Erwin, Moran, & McInnis, 1996).

A notable change in secondary family and consumer sciences programs is in the types of programs offered. Traditionally, family and consumer sciences prepared students for personal, family, and community roles which was known as a family-oriented program. However, as a result of the redefined mission and direction, secondary family and consumer sciences education programs are now moving towards a career-oriented curriculum that allows for career exploration outside of the home (Georgia Department of Education, 2005a). Furthermore, family and consumer

sciences has become part of the school-to-work/work-based learning initiative. As family and consumer sciences education continue to implement work-based learning programs, the content of employability is becoming increasingly important and relevant. Addressing the issues of employability skills can be accomplished through the implementation of employability standards.

In Georgia, the Quality Core Curriculum (QCC), mandated by the Quality Basic Education Act of 1986 was established (Georgia Learning Connections, 2005a). The QCC is a statewide basic curriculum that created standards detailing what students should know and be able to do upon completion of courses within every content area. Standards were developed by a committee of public school educators, both secondary and postsecondary and have undergone revisions every four years (Georgia Learning Connections, 2005b). Employability standards were developed for all Technology and Career Education courses and intended to be integrated through the instructional course sequence of Technology and Career Education programs. At the time of the latest revisions of the QCC standards in 2004, employability standards were categorized into seven areas. Those areas are basic skills, thinking skills, personal qualities, interpersonal skills, technology, business aspects, and career development. These standards are intended to help prepare students for the transition from high school to employment. The QCC in Technology and Career Education contains two parts, the employability standards (also referred to as core skills) and the content area standards. The term employability standards, was used on the learning connections official website (Georgia Learning Connections, 2005c) and therefore, used for this study.

The implementation of employability standards in family and consumer sciences is entrusted to the teachers serving the profession. Schlossberg (as cited in Herr, Cramer, & Niles, 2004) synthesized the work of adult theorists and advanced several propositions. One proposition which has relevance to this study concluded that adults continually experience transitions requiring adaptations and reassessment of the self. The implementation of work-based learning programs merits a change in the curriculum for family and consumer sciences teachers and therefore, attention should be given to how teachers adapt to these changes at different periods in their career. Hall and Smith (1999) proposed that how teachers respond to educational reform initiatives could depend on factors such as years of teaching experience.

Besides, Georgia teachers of family and consumer sciences have a broad range of years of teaching experience (Smith, Jones, & Hall, 2003; Smith, Hall, & Jones, 2001) therefore, it is conceivable that teachers have adapted the employability standards in their teaching at varying degrees based on years of teaching experience. Thus, the purpose of this study is to determine the extent that secondary family and consumer sciences teachers are including the employability standards in their teaching, and if teachers differ based on years of teaching experience and the inclusion of employability standards in their teaching?

Conceptual Framework

Employability skills are included in secondary teaching programs with the expectation that students will be better prepared to obtain and maintain employment after high school. To ensure implementation of employability standards, attention must be given to including them in the curriculum. The notion of including essential content in the curriculum is grounded in curriculum design. Thereby, the concept of curriculum design guided this study.

Overtime, several curriculum designs have been proposed. Separate subject, multidiscipline, interdisciplinary, and integrated curriculum designs as identified by Beane (1993) were explored for use in this study. After careful deliberation, the integrated curriculum design was chosen as a framework. The integrated curriculum has been used and defined by several researchers. According to Beane, the integrated curriculum design promotes personal and social integration through the organization of curriculum around significant problems and issues that have been identified without regard for subject area lines. Shoemaker (1989) defines an integrated curriculum as one that cuts across subject-matter lines, bringing together various aspects of the curriculum into meaningful association to focus on broad areas of study. Additionally, an integrative curriculum can start with an organizing theme followed by questions, projects, and activities that involve integration and application

of knowledge in the context of the theme. Dohner (1994) maintains that as themes are studied in and outside of the school, students will become generally educated about real-life problems, and teachers will be able to use their specializations in this general education context.

Employability standards are broad and cover several different kinds of essential skills that are applicable to all career and technical education program areas. Based on the description of the integrated curriculum, it was chosen as the lens for this study to view the implementation of these general skills desired of employers.

Review of Related Literature

More than two decades ago, researchers were interested in the qualities that employers desire in employees as evidenced by the syntheses of research associated with employability skills (Ascher, 1988; Cotton, 1993; Lankard, 1994; Overtoom, 2000). Generally, the research has shown that employers are not satisfied with the employability skills of entry-level employees (Cotton, 1993; Davies, 2000), are looking for employees with basic skills (Ascher, 1988; Cotton, 1993; Lankard, 1994), as well as affective skills and traits (Ascher, 1988; Cotton, 1993), and there is greater employer satisfaction with employees who had a vocational-technical background (Lankard, 1994).

Some studies of employability skills, asked the question: what do employers want? To answer that question, 65% of employers in a North Carolina study reported a skills gap between what they wanted and what graduates of educational institutions had (Vasu & Frazier, 1994). Additionally, 46% of the employers believed that high school graduates had inadequate reading skills, 52% found writing skills to be lacking, 48% were disappointed in math skills, and 51% were unhappy with the communication skills. The next year, McLaughlin (1995) found that employers wanted employees who could communicate, think, and continue to learn throughout their lives. Concerning affective traits in McLaughlin's study, employers wanted employees to demonstrate positive attitudes, behaviors, be responsible, adaptable, and work well with others. A year later, Heinemann (1996) discovered that employers wanted individuals who were trained in the skills of the job. Specifically, employers wanted individuals with good people skills, and good grades and attitudes.

The following year, an interview with six business and industry professionals on what they were looking for in employees was conducted (Techniques, 1997). Of the six professionals interviewed, all of them identified communication skills as the primary skill sought in an employee. Participants in this interview were also interested and desired employees to process basic skills, ability and willingness to learn, teamwork, and generally portable skills; that is, skills that were transferable from job to job (Techniques, 1997). Yet another year later, Kretovics and McCambridge (1998) discovered through a focus group that employers want employees with technical skills, communication skills, social effectiveness skills, and presentation skills.

Richens and McClain (2000) surveyed 400 employers on their perceptions of skills and competencies required for employees. Employers reported that they preferred employees to possess employability skills over technology skills. Basic skills, thinking skills, personal quality skills, and interpersonal competencies were all rated as the most important to employers by 93% while technology and system competencies were rated the lowest by 55% and 53%, respectively. Most recently, Taylor (2005) reported that employers are looking for attitudinal attributes rather than skill proficiency in young employees.

Zinser (2003) described a teacher education program that is training pre-service teachers to teach for transferable career skills. Zinser (2003) believed career and technical education teachers may be in the best position to include employability skills in their classrooms because it is more natural for CTE classes to have discussions on careers and the work environment. Zinser also believed one of the best ways to improve the teaching of employability skills it to improve the teacher preparation programs of pre-service Career and Technical Education students. The University of Michigan has therefore developed a new course on teaching career and employability skills. The course is based on the ideas presented in the SCANS (1993) publication called *Teaching the SCANS Competencies*.

From the review of the literature, the desires of employers today are consistent with those over a decade ago. That is, employers are seeking employees with basic, thinking, communication, and teamwork skills as well as good personal

and/or attitudinal traits. Additionally, employers favor the acquisition of employability skills as opposed to technical skills. However, the literature shows that generally employers are not pleased with the skills of entry-level employees. The review also indicated that career and technical education programs are conducive for these skills to be taught and developed. In order to continue to supply the workforce with capable employees, there is a need to include employability standards in the curriculum of career and technical education generally and family and consumer sciences specifically.

Method

Purpose and Research Questions

The purpose of this study was to determine the extent that secondary family and consumer sciences teachers were including the employability standards in their teaching and if teachers differ based on years of teaching experience and inclusion of employability standards. Specifically, the following research questions guided this study. To what extent are secondary family and consumer sciences teachers including the employability standards in their teaching? Are there differences in teacher groups based on years of teaching experience and the inclusion of employability standards in their teaching?

Procedure

Secondary family and consumer sciences teachers in Georgia were surveyed. Names and addresses of 444 high school teachers were obtained from the Department of Education. A questionnaire packet including a cover letter and a pre-addressed, stamped return envelope was mailed to teachers. Using Dillman's (2000) survey implementation strategies, a thank you postcard was sent a week after the initial mailing as a reminder; a second questionnaire was mailed 3 weeks later to teachers who had not responded to the first questionnaire or the postcard. Of the 444 high school teachers identified, 262 (59%) responded to the questionnaire. The teachers ranged in age from 22 to 62 years (M = 43.9, SD = 8.77) whereas, years of teaching experience ranged from 1 to 36 years (M = 16.9, SD = 8.75). Eighty-nine percent (232) of these teachers taught in a comprehensive (family-oriented) program

whereas, the remaining 11% of teachers taught in an occupational (career-oriented) program.

Instrumentation. The scale for the questionnaire consisted of twenty-five employability standards found in the Georgia Quality Core Curriculum. Face and content validity of the instrument were evaluated by an expert panel of family and consumer sciences educators. Changes suggested by the validation panel such as formatting of items and instructions for completing the instrument were made. According to Litwin (1995), levels of .70 or higher on Cronbach's alpha suggest acceptable or good reliability. For this study, the scale showed a Cronbach's alpha score of .96 which is well above the .70 recommended.

Part one of the questionnaire was developed by using the employability standard statements on a Likert-type scale. The 4-point Likert-type scale used in the instrument was adapted from the *Curriculum Orientation Survey (COS)* developed by Hall (1981). The instrument was developed to measure the extent to which selected objectives are included by teachers in their family and consumer sciences programs (Hall, 1981); it measures what you teach in your program (Anderson, Ley, & Mears, 1982). Specifically, participants were asked to indicate if the standard was *not an objective*, *an incidental objective*, *an important objective*, or *a major objective* in their teaching. The value for each anchor was: not an objective = 1, an incidental objective = 2, an important objective = 3, or a major objective = 4. A quantitative measure such as daily, weekly, or monthly was not established. Therefore, it is the teacher's perception that these standards are included in their teaching. Part two of the questionnaire requested demographic and program related information. Participants' age, number of years of teaching experience, and program type were sought.

Descriptive statistics, one-way analyses of variance (ANOVA), and Tukey's post hoc tests were used to analyze data. The a priori alpha level for analytical test of differences was established at the .05 level. The effect sizes for the analyses of variance were interpreted using Eta Squared.

Findings

In Table 1, frequencies and percents are recorded for employability standards taught in family and consumer sciences programs. Of the 25 employability standards, all of them were perceived as *major objectives* or *important objectives* for the most teachers who responded to the questionnaire. Six of the 25 employability standards were identified as a *major objective* in teaching family and consumer sciences by majority of teachers. Of the six employability standards that were *major objectives*, it is interesting to note that three of them were under the area of Interpersonal Skills. Those three Interpersonal Skills standards were: demonstrates the ability to participate as a team member (*major* for 64% of the teachers); demonstrates the ability to resolve conflicts; and the ability to perform in a work environment with individuals of different ages, gender, cultures, attitudes and abilities, 45% and 43%, respectively. Two of the six employability standards rated as *major objectives* were under the area of Personal Qualities. The two Personal Qualities standards rated as *major objectives* by 47% and 54% of the respectively were: demonstrates the ability to accomplish tasks in a forthright and timely manner; and demonstrates the ability to be trusted. The final employability standard rated as *major objective* was in the category of Business Aspects. Demonstrates the ability to maintain safety, health and environmental standards at a worksite was a *major objective* for 36% of teachers in this study.

The remaining 19 employability standards were considered *important objectives* in the teaching for family and consumer sciences teachers. Five of the *important objectives* were categorized as Basic Skills. The Basic Skills standards and the percent of teachers rating them as *important objectives* included: demonstrates the ability to locate, understand, and interpret written information (45%); demonstrates the ability to communicate thoughts, ideas, information, and messages in writing by creating documents (39%); demonstrates the ability to perform basic computations by using numerical concepts and calculations (43%); demonstrates the ability to receive, interpret, and respond to verbal and nonverbal messages appropriate to a given situation (46%); and demonstrates the ability to orally (or with sign language) present ideas, thoughts, and messages to listeners in a clear, concise, and courteous manner (47%).

Three of the *important objectives* were under the area of Thinking Skills. The three Thinking Skills standards and their respective ratings included: demonstrates the ability to create new ideas, combine ideas or information, make connections, and reshape goals that reveal new possibilities (46%); demonstrates the ability to specify goals, generate alternatives, consider risks, and evaluate and choose workable alternatives (46%); and demonstrates the ability to recognize a problem exists, to identify reasons for the problem, to develop a plan for a solution, to evaluate the plans, and to plan revisions when warranted (45%).

Two of the *important objectives* were under the area of Personal Qualities. The two Personal Qualities were: demonstrates an awareness of one's impact on others, knowledge of one's own emotional needs, and how to address those needs; and demonstrates the ability to assert self appropriately in social situations, and take interest in what others say and do. These standards were important objectives to 48% and 49% of the teacher, respectively.

Three of the *important objectives* were under the area of Interpersonal Skills. The three Interpersonal Skills and their respective ratings were: demonstrates the ability to teach others new skills (44%); demonstrates the ability to interact appropriately with a customer/client in a business situation (33%); and demonstrates the ability to provide leadership in an organization (43%).

The one technology skill on the list of employability standards was rated as an *important objective* by the family and consumer sciences teachers. The Technology Skill standard was demonstrates knowledge and application of computers and/or technology which was rated *important* by 35% of the teachers.

The remaining four *important objectives* all fell under the area of Career Development. The four Career Development standards and their ratings included: demonstrates the proper skills for seeking and securing employment (39%); demonstrates the proper skills necessary for successful transition to a work environment (43%); demonstrates the ability to identify key elements that comprise professional standards and appropriate behavior (39%); and demonstrates the ability to understand that most people will change careers and employers several times in their lives and be prepared for this change (39%).

Employability Standards

None of the employability standards were considered as *incidental objectives* or *not an objective* by the teachers who responded to the questionnaire.

Table 1
Frequencies and Percents for Teachers' Views of Employability Standards Taught in Family and Consumer Sciences Programs

EMPLOYABILITY	Not an Objective		Incidental Objective		Important Objective		Major Objective	
STANDARDS	n	%	n	%	n	%	n	%
Basic Skills								
Demonstrates the ability to locate, understand, and interpret written information (manuals, graphs, schedules, publications, etc.)[a]	12	5	52	21	112	45	73	29
Demonstrates the ability to communicate thoughts, ideas, information, and messages in writing by creating documents (letters, memos, directions, manuals, reports, graphs, flowcharts, etc.)	14	6	57	23	98	39	80	32
Demonstrates the ability to perform basic computations by using numerical concepts and calculations (addition, subtraction, multiplication, division, fractions, whole numbers, decimals and percentages).	10	4	53	21	108	43	78	31
Demonstrates the ability to receive, interpret, and respond to verbal and nonverbal messages appropriate to a given situation.	5	2	23	9	116	46	105	42

STANDARDS	n	%	n	%	n	%	n	%
Demonstrates the ability to orally (or with sign language) present ideas, thoughts, and messages to listeners in a clear, concise, and courteous manner.	7	3	23	9	118	47	101	40
Thinking Skills								
Demonstrates the ability to create new ideas, combine ideas or information, make connections, and reshape goals that reveal new possibilities.	8	3	38	15	116	46	87	35
Demonstrates the ability to specify goals, generate alternatives, consider risks, and evaluate and choose workable alternatives.	10	4	25	10	116	46	96	38
Demonstrates the ability to recognize a problem exists, to identify reasons for the problem, to develop plans for a solution, to evaluate the plans, and to plan revisions when warranted.	8	3	18	7	114	45	109	43
Personal Qualities								
Demonstrates the ability to accomplish tasks in a forthright and timely manner.	7	3	17	7	106	42	119	47
Demonstrates an awareness of one's impact on others, knowledge of one's own emotional needs, and how to address those needs.	8	3	21	8	120	48	99	39
Demonstrates the ability to assert self appropriately in social situations, and take interest in what others say and do.	7	3	18	7	123	49	101	40

EMPLOYABILITY	Not an Objective		Incidental Objective		Important Objective		Major Objective	
STANDARDS	n	%	n	%	n	%	n	%
Demonstrates the ability to be trusted.	8	3	14	6	90	36	136	54
Interpersonal Skills								
Demonstrates the ability to participate as a team member.	6	2	6	2	75	30	161	64
Demonstrates the ability to teach others new skills.	5	2	26	10	110	44	107	43
Demonstrates the ability to interact appropriately with a customer/client in a business situation.	32	13	59	23	82	33	72	29
Demonstrates the ability to provide leadership in an organization.	18	7	39	15	108	43	82	33
Demonstrates the ability to resolve conflicts.	5	2	24	10	104	41	113	45
Demonstrates the ability to perform in a work environment with individuals of different ages, gender, cultures, attitudes, and abilities.	18	7	35	14	87	35	107	43
Technology Skills Demonstrates knowledge and application of computers and/or technology.	32	13	74	29	87	35	53	21
Business Aspects								

STANDARDS	n	%	n	%	n	%	n	%
Demonstrates the ability to maintain safety, health, and environmental standards when using and disposing of hazardous materials.	58	23	59	23	64	26	65	26
Demonstrates the ability to maintain safety, health, and environmental standards at a worksite.	29	12	50	20	76	30	91	36
Career Development								
Demonstrates the proper skills for seeking and securing employment.	17	7	36	14	99	39	95	38
Demonstrates the proper skills necessary for successful transition to a work environment.	21	8	41	16	107	43	78	31
Demonstrates the ability to identify key elements that comprise professional standards and appropriate behavior.	18	7	41	16	99	39	89	36
Demonstrates the ability to understand that most people will change careers and employers several times in their lives and be prepared for this change.	19	8	50	20	97	39	81	32

Employability Standards

With the exception of one area, there were at least two standard statements in each area of the employability standards. Participants responded to each statement; however, responses within each area were summed to provide a holistic understanding of a given area. Table 2 shows teachers' overall mean and standard deviation for each area of the employability standards. For the summated areas of the employability standards, mean scores ranged from 2.65 to 3.32. Personal Qualities and Thinking Skills received the highest overall mean, 3.32 and 3.21, respectively. On the other hand, Business Aspects and Technology Skills received the lowest overall mean, 2.75 and 2.65, respectively. Therefore, teachers included the Personal Qualities and Thinking Skills standards in their teaching more than they did the Business Aspects and Technology Skills standards.

Table 2

Means and Standard Deviations for Areas in the Employability Standards

Employability Standard Area	*M*	*SD*
Basic Skills	3.10	0.66
Thinking Skills	3.21	0.69
Personal Qualities	3.32	0.67
Interpersonal Skills	3.20	0.65
Technology Skills	2.65	0.96
Business Aspects	2.75	0.95
Career Development	3.02	0.81

Teachers varied in their years of teaching experience. Eight teachers reported 1 year of experience while two reported 36 years of teaching experience. In order to better understand the effect of teachers in various stages of their careers, teachers were sub-grouped according to number of years of teaching experience. This grouping yielded the following categories of years of teaching for the participants: 1-10, 11-20, 21-30, and 31 - 40. On the Certified Personnel Data section of the Georgia Public Education Report Card, teachers are grouped in ten-year increments for years of experience (Georgia Department of Education, 2005b). Teachers in this study were categorized accordingly.

Frequencies for years of teaching experience were disproportionately distributed among the four groups (see Table 3). The category representing 11-20 years of teaching experience was the largest group, (n = 99). The second largest

group (70) represented participants who had taught 21-30 years, while the lowest count (n = 15) was reported for the 31 to 40 years of teaching.

Table 3 shows that teachers who had taught 21 to 30 years had the highest overall mean on the areas within the employability standards which means these teachers included employability standards in their teaching more than other teacher groups. One-way analyses of variance (ANOVA) were used to determine if teacher groups were different on years of teaching experience and the areas included in the employability standards. Analysis indicated no significant difference on the seven areas of the employability standards and any teacher group. Eta-square is routinely used to calculate effect size for ANOVA. Effect size is an estimate of the degree of association for the sample. Effect size quantifies the size of the difference between two groups, and provides a way to interpret statistically significant results in practical terms. In this study, the effect sizes ranged from .001 to .013 with Business Aspects and Technology Skills receiving the lowest and highest correlations, respectively (see Table 3). According to Cohen (1988), an effect size less than 0.1% is trivial or negligible. For these data, less than one percent of the variance is attributed to years of teaching experience thereby years of teaching experience did not influence whether teachers included the employability standards in their teaching.

Table 3

Effects of Years of Teaching Experience on Areas in the Employability Standards

Years (n)	1-10 (62)		11-20 (99)		21-30 (70)		31-40 (15)				
Area	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*P*	*ES*
Basic Skills	3.04	0.70	3.09	0.62	3.18	0.65	3.11	0.88	.49	.68	.006
Thinking Skills	3.14	0.72	3.18	0.66	3.29	0.66	3.31	0.80	.74	.53	.009
Personal Qualities	3.26	0.62	3.35	0.63	3.35	0.64	3.35	0.90	.27	.85	.003
Interpersonal Skills	3.25	0.63	3.19	0.68	3.22	0.66	3.06	0.63	.38	77	.004
Technology Skills	2.73	0.89	2.55	0.97	2.78	0.97	2.46	0.99	1.06	.37	004
Business Aspects	2.79	0.97	2.75	0.98	2.72	0.99	2.73	0.95	.06	.98	.007
Career Development	2.97	0.81	3.03	0.81	3.05	0.81	3.13	0.92	.19	.91	.002
Overall	3.03	0.76	3.02	0.76	3.08	0.77	3.02	0.87			

Conclusion and Discussion

One major finding emerged from this study. Twenty four percent (24%) of the employability standards were rated as *major objectives* while the remaining 76%

were rated as *important objectives* by family and consumer sciences teachers. From this finding, family and consumer sciences teachers are teaching the employability standards in their classes. Traditionally, family and consumer sciences programs were geared toward preparation for the work of the home rather than preparation for a career whereby employability standards were not as pertinent to the program and its content. However, by including the employability skills in their teaching, it appears family and consumer sciences educators have adapted and embraced the school-to-work/work-based learning educational reform initiative and are also contributing to the preparation of students for the workplace. Family and consumer sciences educators are therefore positioning themselves in the mainstream educational reform movement. This finding also corroborates findings from previous studies (Cotton, 1993; Lankard, 1994; Davies, 2000) which showed that employers want employees with basic skills, personal skills, are creative problem solvers, and work well with those around them.

When the overall mean score for each area of the employability standards was considered, Personal Qualities and Thinking Skills received the highest mean scores. The two areas of employability standards, Personal Qualities and Thinking Skills, are considered portable skills. Portable skills are those that can be taken from workplace to workplace (Techniques, 1997). Personal quality, thinking skills, and interpersonal skills are some of the most important skills for job applicants to possess, according to a group of employers (Richens & McClain, 2000). This finding supports those from previous research whereby employers prefer employees have attitudinal traits (Taylor, 2005) and basic skills (Techniques, 1997; Richens & McClain, 2000) rather than technical skills. Family and consumer sciences teachers are uniquely positioned to stress the characteristics of the aforementioned areas of employability standards based on their knowledge of content areas dealing with child, family, and interpersonal relationships.

Although their were no significant differences found between teacher groups based on years of teaching experience, teachers with 21 to 30 years of teaching experience received the highest overall mean score for the seven areas of the employability standards.

Employability Standards

According to Schlossberg (as cited in Herr et al., 2004), who summarized the work of major theorists in adult career development, the concept of transitions suggests that adults are constantly experiencing change either deliberately or due to external forces. She further asserts that changes can engender growth or new concepts. The event of family and consumer sciences migration to career-oriented programs did not affect teachers with extended years of teaching experience. This finding is consistent with previous studies of Georgia teachers (Hall & Smith, 1999; Smith, Jones, & Hall, 2003; Smith, Hall, & Jones, 2001) concerning years of teaching experience and educational reform initiatives. These writers contend that although teachers have been teaching at least two decades, they can and will embrace change. In fact, from this study teachers with 20 or more years of experience embraced the inclusion of the employability standards in their teaching more than teachers with less than 20 years of teaching experience as evidence by the mean ratings. This also supports the notion of the adult development theory that adults continually undergo change; these teachers by including employability standards as major or important objectives in their teaching. Based on the high mean scores in this study, the writers postulate that the inclusion of the employability standards in the secondary family and consumer sciences curriculum brought about growth as a new educational reform initiative, work-based learning, was implemented.

The teaching of employability skills to future employees is an effort that should be undertaken by a total school. Miller (1989) maintains that family and consumer sciences teachers have a vital role in teaching essential skills. Historically, family and consumer sciences within high schools has taught basic living skills which are important to individuals, families, and society. The image of the traditional family and consumer sciences program is still held by some people. However, the results of this study confirm that family and consumer sciences teachers in Georgia have gone beyond the traditional anticipated curriculum and are including employability skills in their teaching. Subsequently, family and consumer sciences teachers are helping to prepare students for the workforce by contributing to the desires and needs of employers while simultaneously participating in an educational reform initiative, work-based learning.

Implications for Practice

It is the design of the Quality Core Curriculum (QCC) that the employability standards are taught by all career and technical education teachers. Therefore, the concept of the integrated curriculum is useful and appropriate for blending specific subject matter content and general employability standards. Beane (1994) ascertain that while using the integrated approach, teachers listen to the concerns of students. However, the process used for curriculum planning is still tightly constructed and thereby representative of what should be included in the curriculum.

Adhering to the guiding principles of the integrated curriculum, family and consumer sciences teachers can be successful in implementing the employability standards into any course within the program. Based on an assumption of an integrated curriculum, one begins with a theme and then questions and activities follow. With the employability standards, family and consumer sciences teachers could use a standard from any of the seven areas and integrate into the different subject areas such as nutrition and wellness, parenting, or child development.

In as much as family and consumer sciences teachers are teaching employability standards, the notion of contextualizing the curriculum is encouraged and supported. Contextualizing the curriculum may be done inside or outside the family and consumer sciences classroom. Experiences that take place inside the classroom are known as in-school laboratory experiences where classrooms are set up to resemble work situations. In-school laboratory experiences can be handled through activities such as Bake Shops and Nursery Schools. Experiences that take place outside the classroom are termed extended laboratory experiences and usually take place in a business or agency in the community such as Preschool Centers or restaurants. Participation in real or simulated work settings such as in-school laboratory or extended laboratory experiences will afford students an opportunity to practice the employability standards.

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The Authors

Bettye P. Smith, PhD is an Associate Professor at the University of Georgia. Her research focuses on teacher preparation and teacher development.

Shana Katz is a Family and Consumer Sciences Teacher at Riverwood High School, in Atlanta.

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Dr. Steven R. Aragon
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352 Education Building, MC-708
1310 S. Sixth Street Champaign, IL 61820

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