Editor's Note

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By the time you receive this issue of *CTER*, the Career and Technical Education Research Conference (CTERC) will have come and gone. For those of you who were unable to attend this year's conference in Kansas City, you missed an outstanding conference featuring 27 quality research paper presentations. The conference provided a great opportunity for those of us in attendance to reconnect with old friends and to meet many of the new faces of those studying career and technical education. The Association for Career and Technical Education owes a huge word of "thanks" to Joe Kotrlik from Louisiana State University for serving as the 2005 conference chair. I would encourage you to take a look at the conference papers as well as the various comments from the discussants. The conference program and proceedings can be found at http://www.lsu.edu/faculty/kotrlik/cterc/.

I would like to take this opportunity to encourage all who have not done so already to turn their conference papers into manuscripts according to the guidelines and submit them to *CTER* for publication consideration. These papers contain some great knowledge that should be distributed across the field. Janet Bray, Executive Director of ACTE, remarked during the conference luncheon that ACTE is looking to the Association for Career and Technical Education Research to be one of the primary providers of current research that can help inform policy and decision making concerning career and technical education. Consequently, use the feedback provided from the CTERC review to make revisions to your papers and send them to us.

At this year's *CTER* Board Meeting, we voted in new individuals to fill some vacant positions. I would like to welcome the following colleagues to the Board:

Board Members
Paul Brauchle, Illinois State University
Jamie Cano, Ohio State University
Marisa Castellano, University of Louisville
Wanda Fox, Purdue University

Chair & Co-Chair

Levon Esters, Iowa State University (Chair)

Neil Knobloch, University of Illinois at Urbana-Champaign (Co-Chair)

Associate Editor

Michael Swan, Washington State University

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Oscar Aliaga, National Research Center for Career and Technical Education

On behalf of the entire *CTER* Board, I would like to thank Morgan Lewis for his four years of service as the Managing Editor. The role of the Managing Editor is critical to ensuring that the journal is professionally printed and distributed to all subscribers. Morgan's attention to this detail has helped *CTER* to maintain its rating as a professional research journal.

Publishing Editor

Pete Magnuson, ACTE

During my Editor's Report at the *CTER* Board Meeting, I noted that the journal is getting back on its regular publishing schedule. Volume 30, No. 3 will be going to press shortly after the first of the year. We will then get back on a spring, summer, and fall schedule for Volume 31 Nos. 1-3.

CTER has been receiving larger numbers of quality manuscripts based on my initial review as well as those from the referees. I believe our 2005 slump was based on the fact that people were not aware of the name change – both for the association and the journal – assuming that one or both no longer existed. However, we should be able to fill all three issues of Volume 31 without difficulty and possibly have manuscripts ready to go into Volume 32.

The Presidential Address to the Association for Career and Technical Education Research
Using Standards to Reform Teacher Preparation in
Career and Technical Education: A Successful Reformation*

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ACTER President 2005

Introduction

The purpose of the presidential address at our annual conference is to examine a current issue facing the profession, and pose challenges to the membership in the context of that issue. In seeking a timely topic in which to address you, I sought council from my former department chair, Dr. N.L. "Mac" McCaslin. Dr. McCaslin, in his usual passion for career and technical education, insisted that I speak to you on Perkins Legislation. I tried. I spent several hours in the National Center for Career and Technical Education Library, and finally decided that choosing a topic more dear to my heart than Perkins Legislation was the best route for me to follow. Therefore, I chose to share with you today the standards-driven, real-life, undergraduate teacher education reform effort in the Department of Human and Community Resource Development at The Ohio State University. I shared this two-year reform experience with my colleagues, Drs. Jamie Cano, Jim Connors, Wes Budke, and Neil Knobloch. I hope that our successful endeavor will inspire and motivate you to actively review and consequently reform your preservice teacher programs in career and technical education. Collectively and individually my colleagues and I have written and presented several papers and posters nationally (Cano, Connors, Whittington, & Knobloch, 2003a; Cano et al., 2003b) and regionally (Knobloch, Cano, Connors, & Whittington, 2002) as a result of this rich work. The paper presented regionally (Knobloch, et al., 2002) provides the most comprehensive examination of our reform effort.

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*The thoughts and writings presented in this address are the compilation of two years of thinking and writing by my team of colleagues in the Department of Human and Community Resource Development at The Ohio State University: Dr. Jamie Cano, Dr. Jim Connors, Dr. Wes Budke, and Dr. Neil Knobloch. The words in this address are edited directly from our final department report, "A New Vision for Undergraduate Education", which began as a class assignment for Neil Knobloch, and developed into our department's life-long, work-in-progress.

I will briefly discuss teacher education, the themes that emerged from the literature regarding successful curriculum reform, and our review of the foundations of teacher education in career and technical education, especially in agricultural education. Finally, I will lead us in an overview of the results of our work—a reformed teacher education curriculum in agricultural education.

Teacher Education

Policy makers and stakeholders are calling for better prepared teachers as a means for raising the academic achievement of students in an increasingly diverse society. Darling-Hammond (2000) suggested that, "universities are essential to high quality teacher education" (p. 181). Smith and Orlosky (1975) wrote that the overall role of the university in preservice teacher preparation was to teach technical and pedagogical knowledge to preservice teachers.

Universities and colleges have traditionally served as the units in which teachers in agricultural education have been prepared. The nature of such preparation, however, has changed very little since its origins in university education. The problem, according to Harris Mitchell, Castenell, Hendricks-Lee, and Mooney (2000), is the complexity of reforming teacher education within the organizational culture of the university. Harris et al. warned that the collegial, managerial, developmental, and negotiating cultures of the university either help or impede the progress of teacher preparation and consequently—teacher education reform.

Successful Reform

My colleagues and I focused on seven themes identified in the literature as being critical to the success of new models for preparing teachers. First, teacher educators must model the knowledge, skills, and dispositions of a caring, compassionate, and competent teacher (Darling-Hammond, 2000; Kettlewell, Kaste, & Jones, 2000; Murray, 2000). Second, teacher preparation programs should be created, implemented, and evaluated based on a body of knowledge consistent throughout the nation for what all teachers need to know to be effective (Darling-Hammond, 2000; Fullan, Galluzzo, Morris, & Watson, 1998; Kettlewell et al., 2000; Lynch, 1997; Murray, 2000; National Commission on Teaching and America's Future, 1996).

Third, the delivery of teacher preparation programs needs to shift from on-campus, formal college classroom settings to clinical learning (Darling-Hammond, 1997; Fullan, et al., 1998; Kettlewell et al., 2000; Lynch, 1997; Task Force on Field Experience Standards, 1999; Thiessen, 2000). Fourth, university teacher educators should conduct collaborative teaching and planning to model integration and improve the articulation of teacher preparation course experiences (Darling-Hammond, 1997; Early, 2000; Harris Mitchell et al., 2000; Kettlewell et al., 2000; Murray, 2000).

Fifth, collaborative partnerships with cooperating centers need to be established and cultivated, and cooperating teachers should be campus partners as well (Darling-Hammond, 1997; Darling-Hammond, 2000; Fullan, et al., 1998; Harris Mitchell et al., 2000; Kettlewell et al., 2000; Lynch, 1997; National Association of State Boards of Education , 2000; Thiessen, 2000).

Sixth, technical, pedagogical, and professional knowledge needs to be integrated within and among technical and general education courses for conceptual understanding (Kettlewell et al, 2000; Lynch, 1997; National Association of State Boards of Education , 2000; Thiessen, 2000). Seventh, all university faculty, including the arts and sciences, need to model effective teaching and create collaborative teaching and planning teams across departments and colleges (Darling-Hammond, 2000; Early, 2000; Fullan et al., 1998; Harris Mitchell et al., 2000; Kettlewell et al., 2000; Lynch, 1997; National Association of State Boards of Education , 2000; Thiessen, 2000).

Need for Reform

Our department and our agricultural education program had experienced a series of transitions over the past several years including a change in department chairs, a reduction in the number of teacher educators, a turnover of existing teacher educators, and a curriculum revision two years earlier in response to a) new state teacher licensure standards, b) university-wide reduction in credits required for graduation, c) reorganization of coursework requirements in the college placing greater emphasis on cultural diversity, students with special needs, and the use of technology in delivering instruction, and d) student-centered learning initiatives. In addition, although the undergraduate curriculum had been revised to meet the National Council for Accreditation of Teacher Education (NCATE) standards, the curriculum and courses had not been assessed for their alignment with the Interstate New Teachers Assessment and Support Consortium (INTASC) principles, nor the Praxis criteria for licensure. In addition, the American Association for Agricultural Education (AAAE) standards for teacher preparation had been recently adopted by our profession, so we were anxious to examine our program against these standards. Finally, feedback from our students had indicated that the curriculum lacked continuity from course to course and from beginning to end, and that the courses were not preparing them for successful completion of the new teacher licensure examination series.

Objectives

The following undergraduate career and technical education in agricultural education reform objectives guided this effort:

1. Identify the foundations and major goals underpinning our teacher preparation program.

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2. Identify the major knowledge, skills, and dispositions needed by beginning agriculture teachers.
3. Identify and cross-walk the state and national standards impacting the teacher preparation program.
4. Identify the scope, structure, and sequencing of teacher preparation educative experiences.

To accomplish these objectives, my colleagues and I committed four hours per day every two to four weeks, in an off-campus setting, for two years. We reviewed literature, cross-walked applicable standards, reviewed student input, examined courses of study, and discussed our philosophical beliefs about preservice career and technical teacher education.

Results of the Reformation

Objective 1—Foundations and Major Goals: The philosophical foundations of agricultural education teacher preparation include, but are not limited to, Dewey's (1938) experiential learning, Lancelot's (1944) problem-based teaching, Bandura's (1986) social cognition, and Schön's (1983) reflective practice. In addition, we wanted our teacher preparation program to nurture preservice teachers into successful learners through educative experiences (NCATE, 2001) and to develop teachers who are qualified, competent, and caring (National Commission on Teaching and America's Future, 1996). Based on these foundations, we wrote the major goals of our teacher preparation program: to (a) develop enlightened teachers who exhibit the knowledge, skills, and dispositions aligned with NCATE standards, INTASC principles, Praxis criteria, and AAAE standards; (b) build teacher confidence to teach diverse learners in formal and nonformal educational environments; and (c) create, implement, and evaluate the scope, sequence, and structure of our program based on experiential learning.

Objective 2—Knowledge, Skills, and Dispositions: Experts have asserted that preservice teachers should know and demonstrate proficiency in content knowledge, learning theory, pedagogy, pedagogy-content knowledge, and professional knowledge (Darling-Hammond, 1997; NCATE, 2001). Preservice teachers should also develop pedagogical knowledge based on psychology, sociology, educational anthropology, and human development (Barrick, 1989; Smith, 1969), and possess professional knowledge of the history, philosophy, and current issues of the discipline of agricultural education.

Today, secondary agricultural education teachers are expected to effectively educate elementary, middle school, high school, and adult learners. In addition, Wenglisnky (2000) found that, effective teaching practices that conveyed higher order thinking skills and engaged students in hands-on learning experiences resulted in greater student achievement. Therefore, preservice teachers in our new program are expected to demonstrate competency, and are evaluated throughout the

curriculum, in the following ten standards of state licensure: (1) subject matter; (2) student learning; (3) diversity of learning; (4) instructional strategies; (5) learning environment; (6) communication techniques; (7) planning; (8) assessment strategies; (9) professional development; and (10) student support. Further, our preservice teachers, as a result of our reform, are currently evaluated on their teaching effectiveness using the four domains of the Praxis III performance assessment: (A) organizing content knowledge for student learning, (B) creating an environment for student learning, (C) teaching for student learning, and (D) teacher professionalism (Educational Testing Service, 2001).

Teachers should possess the disposition that all students can learn (Darling-Hammond, 1999; NCATE, 2001). Lancelot (1944) believed that good teachers have certain characteristics: (a) interest in teaching and thinking about the problems it presents; (b) passionate desire to be superior teachers; (c) seeking to understand the principles of teaching and learning and finding better methods of teaching; (d) continuing to perfect their skills of teaching; and, (e) finding genuine pleasure and satisfaction in teaching. Therefore, based on these fundamental beliefs, my colleagues and I adopted a vision of what a preservice agriculture teacher should know, do, and be upon completion of each of four years of an undergraduate teacher education program. A portion of that chronological sequence includes (NCATE, 2001):

- know how students learn and how to make ideas accessible to the learners

- develop meaningful learning experiences that facilitate learning for all students

- reflect on their practice and make necessary adjustments for enhancing the learning experience for all learners

- consider school, family, business, and community contexts in connecting concepts to students' prior experiences, and apply ideas and concepts to real-world problems

Objective 3—State and National Standards for Teacher Licensure: As a beginning point of our two-year reform initiative, our team of teacher educators analyzed and cross-walked four sets of standards (NCATE, INTASC, Praxis, and AAAE) that were pertinent to our preservice teacher preparation program. After cross-walking each item from each set of standards, we discussed them one-by-one, then built our model (see Figure 1).

Objective 4--The Scope, Structure, and Sequencing of Educative Experiences: Because mentoring and support are critical in developing teachers (Glickman, Gordon, & Ross-Gordon, 2001), our new model ensures that preservice teachers interact with the teacher education faculty every year of the sequence. Additionally the model is designed to engage preservice students in discovering and applying, annually, their technical, pedagogical, and professional knowledge through

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experiential learning in real teaching contexts (Task Force on Field Experience Standards, 1999).

The characteristics of experiential learning (Dewey, 1938), defined as "hands-on, contextual, problem-solving, and project-based," provided the framework in sequencing courses in our new model of teacher preparation in agricultural education. In expounding upon the foundation of experiential learning in our program, the planning, instruction, and assessment of our preservice teachers is now measured using Wehlage, Newmann, and Secada's (1996) standards for worthwhile, significant, and meaningful intellectual accomplishments, also known as authentic achievement. Authentic achievement incorporates four foci: (a) higher order thinking, (b) deep knowledge, (c) substantive conversation, and (d) connections to the world beyond the classroom (Wehlage, Newmann, & Secada, 1996). We wove these foci into our assessment activities throughout the model.

Figure 1
A model for teacher preparation in agricultural education
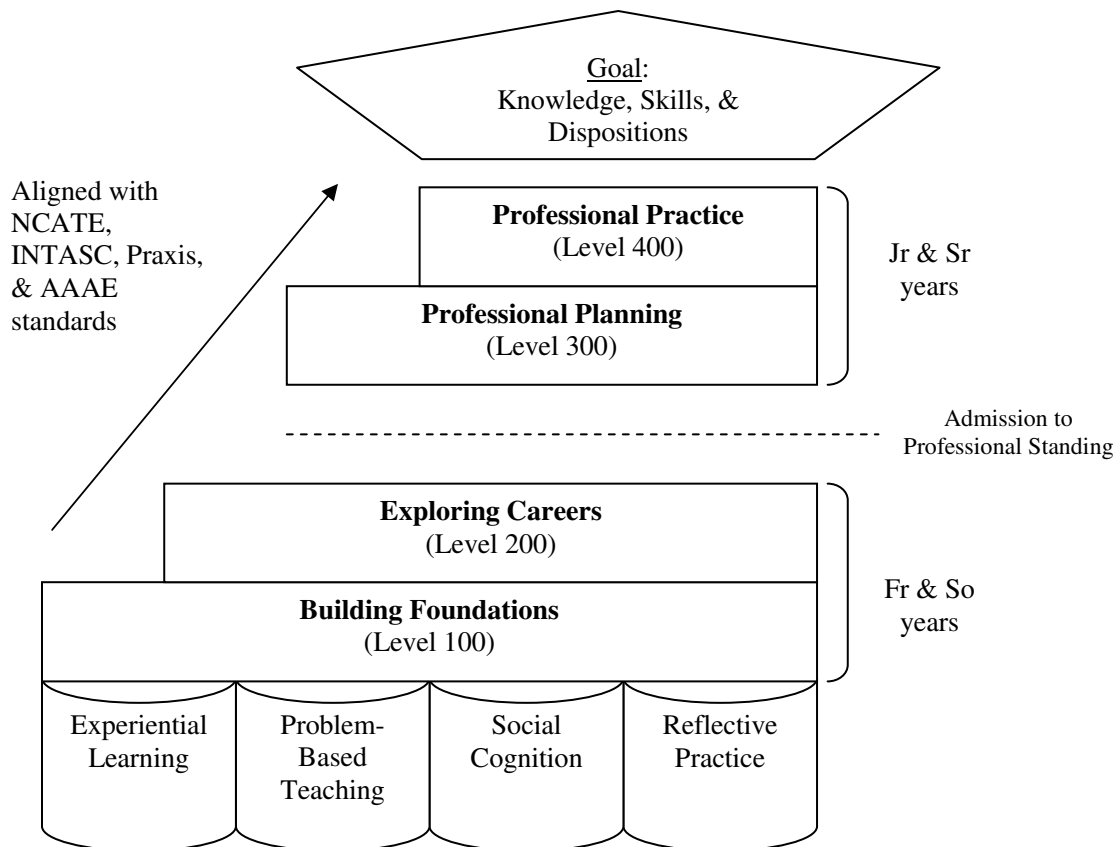
The Model

A model (see Figure 1) for our preservice teacher preparation program emerged from our two-year initiative. The model is a 2 + 2, four-year undergraduate scope of experiences sequenced in four stages of preservice teacher development: (a) Building Foundations; (b) Exploring Careers; (c) Professional Planning; and (d) Professional Practice. The four stages of preservice teacher development emerged from the matrix of teacher education standards and Lancelot's characteristics of good teachers. Further, this sequence of career preparation (Glickman, Gordon, & Ross-Gordon, 2001) is grounded on Lancelot's (1944) philosophy that "real life is, for the most part, a succession of new situations to be met and problems to be solved" (p. 11).

The "building foundations" experience, based on Lancelot's (1944) stage of being interested in teaching and thinking about the problems teaching presents, focuses on peer-teaching activities and professional meetings or career development events with agricultural educators during the freshman year. The "exploring careers" experience, based on Lancelot's (1944) stage of developing a passionate desire to be superior educators, focuses on a 2-week placement in a formal educational setting such as a secondary school, and in a nonformal educational setting such as FFA leadership camp during the sophomore year. The building foundations, and exploring careers experiences, provide undergraduate students opportunities to evaluate their beliefs and intentions as prospective teachers. Moreover, undergraduate students apply, after their sophomore year, for admission to the teacher preparation program.

The "professional planning" experience, based on Lancelot's (1944) stage of seeking to understand the principles of teaching and learning and to develop better methods of teaching, is taught by a collaborative teaching and planning team (Newmann, King, & Secada, 1996) of teacher educators in a 17-credit block during spring term of the junior year. During the block, preservice teachers learn to conceptualize technical knowledge and to plan to teach it based on effective pedagogical knowledge. Further, our teacher education team models, coaches, and evaluates the preservice teachers through clinical learning experiences (Lynch, 1997) in urban, middle, and high schools. The "professional practice" experience, based on Lancelot's (1944) stage of continued perfection of teaching skills and the development of a genuine pleasure and satisfaction in teaching, is the student teaching experience that is facilitated by teacher educators and cooperating teachers during fall term of the senior year. All teacher educators and cooperating teachers are trained in the Praxis framework to mentor and assess the preservice teachers (Educational Testing Service, 2001; Lynch, 1997).

A capstone course is taught the term following the student teaching experience to synthesize the practice teaching experiences and to prepare the preservice teachers for entry into the teaching profession. The overall goals are to help preservice teachers enter the profession, make decisions based on a professional code of ethics,

and develop a program that integrates agriculture and education based on critical issues at the local, state, national, and international levels.

Conclusions

The foundations underpinning our career and technical teacher preparation program in agricultural education are grounded in experiential learning, problem-based teaching, social cognition, and reflective practice. Second, the goals of our teacher preparation program are philosophically sound. Third, our preservice teacher education program is aligned with NCATE, INTASC, Praxis, and AAAE teacher education standards; the collective goal being the development of qualified, competent, and caring teachers, who exhibit confidence in formal, nonformal, and diverse settings. Fourth, a new model reflecting the scope, structure, and sequencing of field experiences and learning opportunities emerged based on four stages of teacher development: building foundations, exploring careers, professional planning, and professional practice.

Recommendations

Our reform effort provides teacher educators with an example of a process for guiding you and your colleagues in identifying key steps to reforming career and technical teacher education programs. Our team of teacher educators was so enriched by this reform process that we recommend that all teacher education teams engage in examining programming efforts to identify foundations and goals; knowledge, skills, and dispositions of graduates; state and national standards; scope, structure and sequencing of field experiences; and key changes for successful implementation of a reformed career and technical teacher education program.

It has been my pleasure to serve as the President of AVERA. I look forward to a new year with a new name, ACTER, and a renewed vision for the future. Thank you for the opportunity to serve our profession.

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Preservice Teachers' Motivation and Leadership Behaviors Related to Career Choice

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Abstract

The purpose of this descriptive survey was to explore and describe why graduates who were certified to teach agriculture in secondary education chose teaching as a career. Twenty-nine student teachers from four universities in a Midwestern state participated in the study. There were several findings from the study. First, the researchers found that 24 out of 29 preservice teachers in the study planned to become teachers. Second, career choice was related to intrinsic and extrinsic career choice motives. Preservice teachers choosing formal education as a career had intrinsic motives. On the other hand, preservice teachers who anticipated careers in non-formal education had extrinsic career choice motivation. Third, preservice teachers who plan to pursue formal education careers were more efficacious than their peers who planned to pursue nonformal education careers or were undecided about their careers. Third, the preservice teachers identified as having transformational and transactional leadership behaviors and these leadership behaviors were not related to career choice.

Introduction and Theoretical Framework

Recruiting and retaining quality teachers is crucial to attaining excellence in education (Darling-Hammond, 1999; McCampbell & Stewart, 1992). Preservice agricultural education teachers who possess the characteristics of being qualified, caring, and competent (NCTAF, 1996) are likely to be sought after by non-profit and business organizations, which could also benefit from these characteristics. The teaching profession competes against other important professions for the most talented people (McCampbell & Stewart, 1992), and changes that have occurred in agriculture in recent years have made it possible for qualified preservice agricultural education teachers to secure employment outside of the classroom at very competitive salaries (Miller & Muller, 1993).

Graduates who are certified to teach in agricultural education are entering non-formal education careers. In 2001, only 59% of qualified preservice teachers in agricultural education entered the teaching profession. At the same time, 67 positions for agricultural education teachers remained unfilled nationwide (Camp, Broyles, & Skelton, 2002). Furthermore, Craig (1984) found that, though the number of preservice teachers who completed degrees and were qualified to teach exceeded the need for classroom teachers, the number who chose careers outside of education ultimately led to the teacher shortage in the nation. Harper (2000a, 2000b) conducted a needs assessment of future issues and concerns in agricultural education in Illinois. Stakeholders identified recruiting good people to teach and offering teacher salaries that are competitive with the rest of the agricultural industry were important needs. This study was conducted because understanding the influences of preservice teachers' choices to teach or not to teach could help to more effectively recruit high-quality individuals *and* provide targeted strategies to help retain them in the teaching profession.

As college students complete internships and use past experiences in preparing to enter the workforce, many of them ask a variety of questions to help them choose the appropriate careers. The researchers inductively conceptualized career development to represent why preservice teachers in agricultural education would choose to teach in a formal classroom setting. Creative and thoughtful integration of theories in career psychology can stimulate theory building and enhance career development practice (Chen, 2003). When choosing careers, people are faced with a series of questions. People are drawn to questions that are most important to them or upon which they place the most value or emphasis. Although there are many, three questions guided the researchers to help narrow the scope of the many possibilities for choosing a career: Can I be successful in this career? Will my needs and expectations be met by this career? Do I see myself influencing others to reach their fullest potential in this career? In addition to striving to answer these questions, often interdependently, people making decisions about their careers also gather information from their environment and make career decisions within the contexts in which they find themselves. The conceptual framework (Figure 1) was informed by a constructivist perspective of career development, primarily based the assumptions of social cognitive career theory (Lent, Brown, & Hackett, 1996), and was grounded on three theories: Maslow's (1954) needs theory, Bandura's self-efficacy theory, and Bass's (1985) transformational leadership theory. Each theory is briefly reviewed in the context of career choice for the theoretical framework. Furthermore, career choice is reviewed for people in general, for those in helping careers (e.g., nursing and teaching), and more specifically for those in career and technical education and agricultural education.

Figure 1
Conceptual Framework

Career Choice
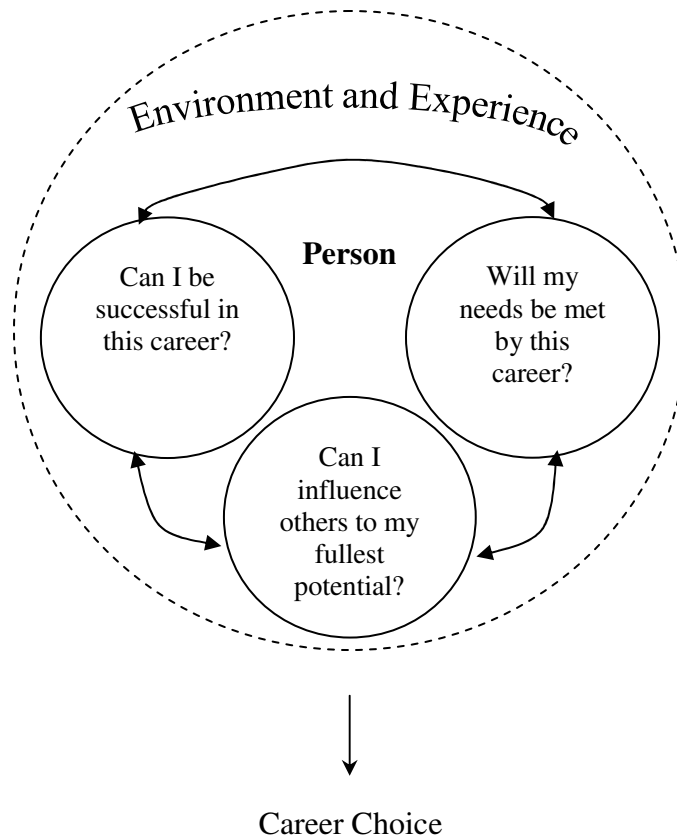
Needs Motivation: Will my needs and expectations be met by this career?

      Maslow's (1954) needs theory represented the question related to whether people's needs would be met by choosing among their career alternatives. In his theory, Maslow suggested that people are motivated by a series of unmet needs, and that lower-level needs must be satisfied before higher-level needs (e.g., self-actualization) can be satisfied. Needs theory can potentially influence career choice in several different ways, both through anticipated job satisfaction and making career choices. Research in education has shown that needs theory relates to job satisfaction, as the absence of three higher-order needs (self-esteem, autonomy, and self-actualization) was shown to be a major contributor to low teacher satisfaction (Carver & Sergiovanni, 1971; Frances & Lebras, 1982; Sweeney, 1981; Trusty & Sergiovanni, 1966; Wright, 1985). Additionally, although Maslow did not believe

that a fulfilled need could serve as motivation, research has shown that satisfying self-actualization needs increases motivation (Glassman, 1978; Heneman, Schwab, Fossum, & Dryer, 1980). Thus, as individuals have self-actualizing experiences during career preparation, they may be more motivated to enter the career field in which they had that experience. For example, if a preservice teacher had a self-actualizing experience during student teaching or in early field experiences, that individual may be more likely the pursue a career in the formal education field. Likewise, if a preservice teacher has a self-actualizing experience during an internship in agribusiness, that individual may more likely pursue a career in non-formal education. According to Wankat and Oreovicz (1993), intrinsic motivation generally satisfies basic human needs, whereas extrinsic motivation may satisfy a higher-level need (i.e., people may equate salary with esteem). Tenably, those whose career decisions are shaped by intrinsic motives may be satisfied with different careers than those who have extrinsic career choice motives, as the two groups seek different things from potential careers. For the purpose of this study, needs theory was represented by individuals' intrinsic and extrinsic career choice motives.

Teaching Self-Efficacy: Can I be successful in this career?

Bandura's (1997) self-efficacy theory underpins career choice. Bandura's theory relates to whether people believe they can be successful in their chosen careers and the number of career alternatives that they may consider. Bandura suggested that self-efficacy, or people's beliefs in their own abilities to complete a specific task, influences performance, behavioral choices, and persistence. The influence of self-efficacy on performance is related to career choice in a number of ways. Self-efficacy complements skill sets in individuals seeking careers and may facilitate career attainment for those seeking careers in areas that align with their skill sets. However, because entering a profession is also based on the fit of skills to preferred careers, if individuals do not have the required skills for a position, even high self-efficacy beliefs may not allow them to perform well in that role (Vroom, 1964). Lent, Hackett, and Brown (1996) further suggested that self-efficacy may facilitate career attainment in a given performance domain when paired with requisite skills.

As people perform better and as people's belief in their self-efficacy grows, they consider more career options, show greater interest in their career options, perform better educationally in their career preparation, and have greater staying power in their chosen pursuits (Bandura, 1997). People formed a sense of efficacy in a variety of job-related activities as they performed them at home, school or within the community (Lent, Hackett, & Brown, 1996). The stronger students' efficacy beliefs, the more interest they expressed in a given occupation (Betz & Hackett, 1981; Branch & Lichtenberg, 1987) and the more career options they believed were possible (Betz & Hackett, 1981; Lent, Brown, & Larkin, 1986). Interest in job-related tasks can be viewed as an extension of self-efficacy, because people often

form an interest in an activity when they see themselves as competent in performing it and see it producing valued outcomes. People also developed a dislike for activities that they did not enjoy or anticipated negative or non-valued outcomes, and they often avoided attempting those activities (Bandura, 1986; Lent, Larkin, & Brown, 1989). In the context of this study, highly efficacious preservice teachers should have a higher likelihood of entering a career in the area in which they are efficacious, whether it be in the classroom, Extension, or business/industry.

Transformational Leadership: Do I see myself influencing others?

Transformational leadership is a leadership behavior that motivates followers and leaders to do more than they thought possible by "(a) raising followers' level of consciousness about the importance and value of specified and idealized goals, (b) getting followers to transcend their own self-interest for the sake of the team or organization, and (c) moving followers to address higher-level needs" (Bass, 1985, p. 20). Transformational leaders were concerned with the performance of followers and with developing followers to their fullest potential (Avolio, 1999; Bass & Avolio, 1990). According to Bass and Avolio (1993), people express their leadership behaviors on continuum of three domains: (a) transformational leadership; (b) transactional leadership; and, (e) nonleadership.

The transformational leadership domain is comprised of five factors: idealized influence (attributed), idealized influence (behavior), inspirational motivation, intellectual stimulation, and individualized consideration. Leaders with *Idealized Influence (attributed and behavior)* display conviction; emphasize trust; take stands on difficult issues; present their most important values; and emphasize the importance of purpose, commitment, and the ethical consequences of decision. *Idealized Influence (attributed)* occurs when followers identify with and emulate those leaders who are trusted and seen as having an attainable mission and vision. *Idealized influence (behavior)* refers to leader behavior that results in followers identifying with leaders and wanting to emulate them (Barnett, McCormick, & Connors, 1999; Bass & Avolio, 1995). Leaders with *Inspirational Motivation* articulate an appealing vision of the future, challenge followers with high standards, talk optimistically and with enthusiasm, and provide encouragement and meaning for what needs to be done. Leaders with *Intellectual Stimulation* question old assumptions, traditions, and beliefs; stimulate in others new perspectives and ways of doing things; and encourage the expression of ideas and reasons. Leaders with *Individualized Consideration* deal with others as individuals; consider their individual needs, abilities and aspirations; listen attentively; further their development; and advise and coach.

The transactional leadership domain is comprised of three factors: contingent reward, management-by-exception (active), and management-by-exception (passive). *Contingent Reward* leaders are leaders who: engage in a constructive path-goal transaction of reward for performance, clarify expectations, exchange promises and

resources, arrange mutually satisfactory agreements, negotiate for resources, exchange assistance for effort, and provide commendations for successful follower performance. *Management-by-Exception (active)* leaders are leaders who: monitor followers' performance and take corrective action if deviations from standards occur and enforce rules to avoid mistakes. *Management-by-Exception (passive)* leaders are leaders who fail to intervene until problems become serious and wait to take action until mistakes are brought to their attention. The nonleadership domain is comprised of one factor: laissez-faire. *Laissez-faire* leaders are leaders who avoid accepting responsibility, are absent when needed, fail to follow up requests for assistance, and resist expressing views on important issues (Bass & Avolio, 1995).

The most direct tie that research in transformational leadership has to career choice is through the distinction between authentic and inauthentic transformational leadership. According to Bass and Steidlmeier (1999), "the authentic [transformational leaders] are inwardly and outwardly concerned about the good that can be achieved for the group, organization, or society for which they feel responsible" (p. 188). Individuals who were authentic transformational leaders— those concerned for the common good—were altruistic in nature (Howell & Avolio, 1992). Young (1995) found that some of teachers' career choice reasons were altruistic in nature. Therefore, if authentic transformational leaders are altruistic, and individuals tend to enter teaching careers for altruistic reasons, the altruistic nature of teaching may positively influence transformational leaders' career choices, leading transformational leaders into formal education careers. Researchers in CTE have stated that leadership development is an important and long-standing concern in CTE, as indicated from their commitment to leadership development in the students involved in the related student organizations (Wonacott, 2001), including the National FFA Organization. In the last 15 years, leadership development in CTE has moved away from task-oriented behaviors toward a model of transformational leadership to point CTE in new directions (Moss & Liang, 1990). The National Center for Research in Vocational Education conceptualized leadership development as:

> …improving those attributes—characteristics, knowledge, skills, and values—that predispose individuals to perceive opportunities to behave as leader, to grasp those opportunities, and to succeed in influencing group behaviors in a wide variety of situations. Success as a leader in vocational education is conceived primarily as facilitating the group process and empowering group members (Moss, Leske, Jensrud, & Berkas, 1994, p. 26).

Additionally, beyond CTE but still related to agricultural education, research in Extension has shown that transformational leadership behaviors had a consistently positive correlation with organizational outcomes such as organization effectiveness and job satisfaction (Brown, 1996).

Though not appearing in agricultural education or CTE studies and not related to career choice, additional research that has been done is also related to this study,

as it lends additional weight to the researchers' belief that career and technical education teachers that demonstrate transformational leadership behaviors will meet with greater success. Much of the research on transformational leadership that has been done in schools has focused on the positive effects that school personnel's transformational leadership behaviors had on the students and school culture (Leithwood & Jantzi, 1997; Leithwood, 1994; Silins, 1994). Furthermore, research has shown that a positive school culture was associated with increased student motivation and achievement, improved teacher collaboration, and improved attitudes among teachers toward their jobs (Sashkin & Sashkin, 1990; Sashkin & Wahlberg, 1993; Ogawa & Bossert, 1995). Therefore, teachers that are transformational leaders may also influence students through improving school culture and enjoy higher levels of job satisfaction.

Career Choice in Career, Technical, & Agricultural Education

Career development starts early in a person's life and is shaped by personal and environmental factors (Bandura, 1986; Betz & Hackett, 1981). Personal and social experiences influence helping professionals' career choices. Professionals in the helping professions often choose careers based upon childhood experiences, personal and professional goals, beliefs and values, and being inspired by family and peers to serve others (Fischman et al., 2001). Further, the presence of teachers in the family was a significant factor influencing teacher candidates' decisions to teach (Marso & Pigge, 1994).

Personality plays a role in the careers people choose. Holland (1973) suggests that people fall into one of six personality types: realistic, investigative, artistic, social, enterprising, or conventional. People tend to seek careers where they can be around others that are similar to themselves, creating a positive work environment and experience. Holland posited that people who are in work environments with others like themselves will be more satisfied and successful. Holland's (1973) career choice theory has been shown to apply to populations of elementary teachers (Walsh & Huston, 1988). Because of this, Young (1995) suggested that the teaching profession may attract individuals who consider the job a good "fit" for them and who want to make a contribution to society and work with young people. Perhaps some feel that this "fit" is a calling to serve in the career. Additionally, Ginzberg (1988) suggested that career choice is a three-stage process that begins at childhood and develops through teenage years. During the final stage, realistic (age 17 through young adulthood), people familiarize themselves with alternatives and eventually develop a compromise that allows them to use their talents and interests while as many of their goals and values as possible will be satisfied. Perhaps some considering careers will be drawn to a greater extent by intrinsic or altruistic motives, while others may be pulled toward other careers due to extrinsic motives depending upon the motives and values of those making the career choices.

Various factors explain career choice for people in general, for those in helping careers, and more specifically for those in career and technical education and agricultural education. Some of the research that has helped to identify these influential factors has been focused specifically on determining the influences on career choice, while other research has determined the factors through gathering data on what causes individuals to remain in and/or leave careers. The researchers summarized the review of literature into six factors—both intrinsic or extrinsic motives—that influenced career choice of preservice teachers. Three of these items, (a) serving others, (b) touching people's lives/making an impact, and (c) "calling" to a career, measured intrinsic career choice motivation, while the remaining three, (d) salary and benefits, (e) balance between career and personal time, and (f) opportunities for advancement/personal growth, measured extrinsic career choice motivation.

People are likely attracted to teaching because of a combination of altruistic, intrinsic, and extrinsic motives (Seng Yong, 1995). Bergsma and Chu (1981) stated that people do not enter teaching to satisfy needs, but rather to help young people and to help the education system. Studies on prospective and practicing teachers actually revealed that the two main altruistic reasons for choosing teaching were the desire to work with young people (Brown, 1992; Chandler, Powell, & Hazard, 1971; Fox, 1961; Joseph & Green, 1986; Serow, Eaker & Ciechalski, 1992; Thom, 1992) and the desire to contribute to society (Brown, 1992; Chandler et al., 1971; Freidus, 1992; Goodlad, 1984; Joseph & Green, 1986; Richardson, 1988; Toppin & Levine, 1992). Research in other helping careers has indicated that people enter those careers for similar reasons. It has been shown that altruism, a desire to help others, or intrinsic motivation are factors that strongly explained a portion of the decisions of those choosing to enter a career in nursing (Fagermoen, 1997; Good, 1993; Parker & Merrylees, 2002; Wicker 1995).

While intrinsic factors influence some to enter helping careers, extrinsic factors have been shown to influence teachers' decisions to leave the teaching profession. A market-responsive model has been used to explain why people choose careers. This model suggests that individuals make career choices based on demand and the level of compensation (Ochsner & Solmon, 1979). This model predicts that students prepare for an occupation that will be in high demand and will maximize their earnings. Though a much more extrinsically-focused model, the research in teaching has supported its suggestion, as well. Han (1994) found that teachers' salaries relative to alternative occupations pursued by college graduates had an effect on career choices of prospective and current teachers. In addition to investigating reasons for entering a career, some of the research reviewed related to reasons for leaving careers, as well. These include maintaining a balance between career and personal time (Fischman, Schutte, Solomon & Wu Lam, 2001), salary and opportunity for advancement (Litt & Turk, 1985), lack of support from the principal (Ladwig, 1994), problems with student discipline, lack of student motivation, and

lack of respect from community, parents, administrators, and students (Marlow, Inmar, & Betancourt-Smith, 1996). Research in another helping field, Extension education, has shown that a portion of agent attrition in that field is also related to pay, excessive time requirements, and too many requirements for advancement (Rousan & Henderson, 1996)—reasons which are extrinsic.

More specifically, research in agricultural education and CTE supports the results of the research in general helping careers. Those who choose careers in agricultural education often do so due to altruistic or intrinsic motives, as evidenced by what attracted them to the profession, their reasons for remaining in the profession (Pucel, 1990; Ruhland, 2001), or what they most enjoy about the profession (Wright & Custer, 1998). On the other hand, of those who leave, many attribute the decision to extrinsic motives (Pucel, 1990), including salary, little opportunity for advancement, and an inadequate balance of career and personal time (Knight, 1977). Several researchers have looked at various factors regarding career choice, satisfaction, and retention in agricultural education and CTE include: stress (Ruhland, 2001; Pucel, 1990), quality of first teaching experiences (Grady, 1990), academic ability (McCoy & Mortensen, 1983; Miller & Muller, 1993; Wardlow, 1986), teacher self-efficacy (Knobloch & Whittington, 2002), student morale (Moss & Briers, 1982), and adequacy of teacher preparation (Cole, 1984; Miller & Muller, 1993).

Career choice among individuals, those in helping careers and in agricultural education and career and technical education, is shaped by many influences. The relationships between needs theory and self-efficacy theory relating to career choice and satisfaction have been studied much more than transformational leadership. Research in helping careers and in agricultural education and CTE clearly indicates that people who enter those careers are often driven by intrinsic motives (representing needs theory for this study), while those who leave sometimes do so for extrinsic reasons. Self-efficacy influences commitment to and performance in careers, and it also influences the career options that individuals may consider as they begin their career search. Although no studies in agricultural education and CTE were found to have investigated transformational leadership and career choice, transformational leadership theory suggests that those who are transformational leaders may be more altruistic in nature and therefore, perhaps they will be more inclined to enter formal education—teaching in the school classroom setting.

Purpose and Objectives

The purpose of the study was to explore and describe why graduates who were certified to teach agriculture in secondary education chose teaching as a career. The objectives of the study were to: (a) identify anticipated career choices for preservice agricultural education teachers after their student teaching internships, (b) describe differences in preservice teachers' motives, self-efficacy, and leadership behaviors

based on their career choices, and (c) describe the relationships of motives, self-efficacy, and leadership behaviors with career choice.

Methods and Procedures

This was an exploratory descriptive survey. The target population was a census of all preservice teachers who completed their student teaching internship in agricultural education in a Midwestern state during the spring semester of 2003. Twenty-nine out of 30 preservice agricultural education teachers from four universities responded to the mailed questionnaire, yielding a 97% response rate. Demographically, 52% were women, 72% were enrolled in high school agricultural education classes for at least one year, and 66% were enrolled in four years of high school agricultural education. Sixty-nine percent of the participants were members of the National FFA Organization for at least one year during high school, 58% served as chapter officers, and 10% served as either minor (section president) or major (state president, vice-president, reporter, secretary, or treasurer) state officers. All participants who were FFA members ($N = 20$) served as at least a chapter officer. Finally, 69% of the respondents fulfilled one or more leadership roles in college organizations.

The data were collected through a survey questionnaire using Dillman's (2000) tailored design method within one month of the conclusion of the student teaching experience. The items that measured variables for this study were part of a larger instrument comprised of 105 items. The items for this study consisted of 48 of those items, measuring five variables and six characteristics. The study had five independent variables: (a) intrinsic and extrinsic motives, (b) teacher efficacy, (c) transformational leadership behaviors, (d) transactional leadership behaviors, and (e) nonleadership behaviors. The dependent variable of the study was expectancy of entering the teaching profession and was measured through the use of one open-ended question that asked the participants, "At this point in time, what is your career choice?"

The independent variable of intrinsic and extrinsic motives was measured by an instrument developed by the researchers based on career choice and longevity literature. The six-item instrument asked participants to rank-order six items that influence career choice, from (1) most important to (6) least important. Three of these items, (a) serving others, (b) touching people's lives/making an impact, and (c) "calling" to a career, measured intrinsic career choice motivation, while the remaining three, (d) salary and benefits, (e) balance between career and personal time, and (f) opportunities for advancement/personal growth, measured extrinsic career choice motivation. The three items that measured intrinsic career choice motivation were summed to represent the type of career choice motivation of participants. The rank-order sum of the three intrinsic items ranged from 6 to 15. Participants' sums that were in the 6 to 10 range were identified as having an

intrinsic motivation. Participants' sums that were in the 11-15 range were identified as having an extrinsic motivation (Table 1).

Teachers' sense of efficacy was measured using 24 items from the Teacher Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) and 7 items developed from Dare and Leach's (1999) study. The items were measured using Bandura's (1997) 9-point efficacy scale with anchors at: (1) nothing; (3) very little; (5) some influence; (7) quite a bit; and (9) a great deal. The reliability of the TES instrument has ranged from 0.92 to 0.95 (Tschannen-Moran & Woolfolk Hoy, 2001).

The Multifactor Leadership Questionnaire (MLQ), written by Bass and Avolio (1995), was used to measure three leadership behaviors: (a) transformational leadership (20 items); (b) transactional leadership (12 items); and, nonleadership (4 items). The instrument used a 5-point scale with anchors at (0) not at all, (1) once in a while, (2) sometimes, (3) fairly often, and (4) frequently, if not always. The developer of the instrument tested the reliability of the instrument with nine samples (n = 2,154) composed of others evaluating a target leader, and reliabilities for the total items and each leadership factor scale ranged from 0.74 to 0.94 (Bass & Avolio, 2000). Although the MLQ had content and construct validity, a panel of experts in agricultural education reviewed the existing instrument to establish content validity in agricultural education.

A field test was also conducted to establish face validity and reliability of the instrument in agricultural education. The instrument was field tested with seven graduate students in agricultural education, three of whom had previously completed their student teaching internships. Changes were made to reflect the feedback provided by the field testers. The instrument was pilot tested with 15 preservice agricultural education teachers who completed their early field experience and were enrolled in a teacher education seminar. Additionally, three graduate students in agricultural education that had already completed their student teaching internships were part of the pilot test. The internal consistency was tested using Cronbach's (1951) alpha. The estimate of reliability using Cronbach's alpha was 0.65 for the 36-items from the MLQ that represented the chosen variables.

The researchers analyzed the data using the Statistical Package for the Social Science, Personal Computer version (SPSS/PC+). Participants whose responses were incomplete were automatically excluded in the data analysis procedures. Depending on the level of measurement of the variable, appropriate descriptive statistics—frequencies, percentages, population means, and population standard deviations—were used to describe the accessible population. Population means, population standard deviations, and effect sizes were rounded to the nearest 1/100th. Frequencies were rounded to the nearest whole number. For objective one, the researchers coded the open-ended question of, "At this point in time, what is your career choice?" by grouping responses into one of three response categories: (0) formal education careers, (1) non-formal education careers, and (2) undecided. The researchers then reported frequencies for each of the career choices. For objective

three, the researchers averaged the scores for intrinsic motives, extrinsic motives, teachers' sense of efficacy, and each of the three leadership behavior domains. The researchers determined *a priori* that a mean of 2.50 or greater indicated that a participant identified himself or herself as exhibiting that leadership behavior. Effect sizes were calculated to determine the difference in motives, self-efficacy, and leadership behaviors between those choosing formal education careers and those choosing non-formal education careers. Effect sizes were calculated using Cohen's (1988) *d*. Cohen's descriptors were used to interpret the effect sizes: (a) small effect size: $d = .20$; (b) medium effect size: $d = .50$; and, (c) large effect size: $d = .80$. For objective 3, the researchers used *Eta*^{2} (η^2) to determine the measure of association between the rank-order of the intrinsic and extrinsic motives and career choice, and measure of associations between self-efficacy, leadership behaviors and career choice. Relationships were described using Davis (1971) conventions: (a) very strong association: $\eta = .70$, (b) substantial association: $\eta = .50$, (c) moderate association: $\eta = .30$, (d) low association: $\eta = .10$, and (e) negligible association: $\eta = .01$. Effect sizes were interpreted using Cohen's (1988) descriptors: (a) small effect size: $\eta^2 = .01$; (b) medium effect size: $\eta^2 = .09$; and, (c) large effect size: $\eta^2 = .25$. Medium effect sizes were used as the decision criterion for relationships.

Findings

Regarding career choice, 83% ($N = 24$) indicated in their responses that, at the end of their student teacher experience, their anticipated career choice was formal education (e.g., high school agriculture teacher). Additionally, 10% ($N = 3$) indicated their anticipated career choice was non-formal education (e.g., agribusiness salesperson, youth development educator) and 7% ($N = 2$) were undecided. Regarding career motives, 42% ($N = 10$) of the preservice agricultural education teachers whose anticipated career choice was formal education ranked the three extrinsic motives highest among the six career choice motives provided (Table 1). These 10 preservice teachers had the lowest possible rankings for intrinsic motives (i.e., 1, 2, or 3). Eighty percent of the formal education preservice teachers based their career choice on intrinsic motives. Of those who chose non-formal education, two of the three preservice teachers based their career choice on extrinsic motives. The two preservice teachers who were undecided in their anticipated careers were split between intrinsic and extrinsic motives.

The groups were compared on their mean rankings of motives. Preservice teachers who planned to pursue a formal education career had an average mean ranking of 7.82 (SD = 2.06) for intrinsic motives and 13.18 (SD = 2.06) for extrinsic motives. Preservice teachers who planned to pursue a nonformal education career had an average mean ranking of 12.00 (SD = .00) for intrinsic motives, and 9.00 (SD = .00) for extrinsic motives. The two preservice teachers who were undecided regarding their career had an average mean ranking of 9.67 (SD = 4.04) for intrinsic motives, and 11.33 (SD = 4.04) for extrinsic motives. Preservice teachers planning

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to pursue formal education careers based their decision on intrinsic motives compared to their peers. Preservice teachers who planned to pursue nonformal education careers based their decision on extrinsic motives compared to those who were undecided. Preservice teachers who were undecided on their career plans identified with both intrinsic and extrinsic motives. There was a substantial association between intrinsic motives and career choice ($\eta = .56$) and a moderate association between extrinsic motives and career choice ($\eta = .41$). These associations had a large and medium effect sizes, respectively.

Table 1
Frequencies of Rankings of Motives by Career Choice ($N = 29$)

Career Choice	Intrinsic Motives (Rank-order sum)				Extrinsic Motives (Rank-order sum)			
	6	7	9	10	11	12	14	15
Formal Education (N = 24)	10	4	5	1	1	2	0	1
Non-Formal Education (N = 3)	1	0	0	0	0	2	0	0
Undecided (N = 2)	0	0	1	0	0	0	1	0

Note. The minimum score possible by summing the rank-orders of intrinsic motivation items is 6.00 and the maximum possible is 15.00. The dashed line indicates the median of all possible scores.

Preservice teachers' sense of efficacy was 5.76 (SD = 1.35) for those who planned to pursue a teaching career in formal education, 4.93 (SD = .00) for those who planned to pursue a career in nonformal education, and 4.25 (SD = .21) for those who were undecided. Preservice teachers who planned to pursue a formal education career were more efficacious than their peers who were undecided ($d = 1.14$, large effect size) or planned to pursue a nonformal education career ($d = .63$, medium effect size). Preservice teachers who planned to pursue a nonformal education career were more efficacious than their peers who were undecided about their careers ($d = 4.58$, large effect size). There was a moderate negative association ($\eta = .382$) between teachers' sense of efficacy and career choice. This relationship had a medium effect size.

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Table 2
Descriptive Data for Motives and Teachers' Sense of Efficacy by Career Choices

Career Choice	Formal Education (N = 24)	Non-Formal Education (N = 1)	Undecided (N = 3)
Intrinsic Motives[a]	7.82 (2.06)	12.00 (.00)	9.67 (4.04)
Extrinsic Motives[a]	13.18 (2.06)	9.00 (.00)	11.33 (4.04)
Teaching Self-Efficacy[b]	5.76 (1.35)	4.93 (.00)	4.25 (.21)

Note. [a]Range of summed rank-orders, (1) most important to (6) least important, was 6.00 - 15.00 for intrinsic motivation items. [b]Scale: (1) Nothing; (3) Very little; (5) Some influence; (7) Quite a bit; (9) A great deal.

Regarding leadership behaviors, all three groups of preservice teachers identified themselves as exhibiting transformational leadership behaviors *fairly often*, transactional leadership *sometimes*, and exhibit transactional leadership behaviors and they exhibit nonleadership behaviors *once in a while* (Table 3). There were some group differences on leadership behaviors. Preservice teachers planning to pursue non-formal education careers identified having higher transactional leadership behaviors than their peers who planned careers in formal education ($d = .65$, medium effect size) or were undecided ($d = 1.34$, large effect size). Preservice teachers who were undecided about their career identified having fewer transformational and transactional leadership behaviors than their peers who planned to pursue formal ($d = .62$, medium effect size for transformational leadership behaviors; $d = .61$, medium effect size for transactional leadership behaviors) or nonformal education careers ($d = 1.36$, medium effect size for transformational leadership behaviors; $d = 1.34$, large effect size for transactional leadership behaviors as previously noted). There were no differences in *nonleadership behaviors* among the preservice teachers regardless of their career choices. There were low associations between transformational leadership and career choice ($\eta = .19$), and transactional leadership and career choice ($\eta = .26$). These associations had small effect sizes. There was a negligible association between nonleadership and career choice ($\eta = .06$) with no effect size.

Table 3

Descriptive Data for Leadership Behaviors between Career Choices

Career Choice	Transformational Leadership	Transactional Leadership	Nonleadership
Formal Education (*N* = 24)	3.26 (.38)	1.99 (.40)	.90 (.48)
Non-Formal Education (*N* = 2)	3.35 (.28)	2.25 (.47)	1.00 (.35)
Undecided (*N* = 2)	3.03 (.18)	1.75 (.24)	.88 (.53)

Note. Scale: (0) Notat all, (1) Once in a while, (2) Sometimes, (3) Fairly often, and (4) Frequently, if not always.

Discussion and Implications

The researchers found that 24 of the 29 participating preservice teachers planned to become teachers. This was higher (83%) than the overall average placement rate of 59% and 73% who probably wanted to teach (Camp et al., 2002), which suggests that these preservice teachers were motivated and had positive student teaching experiences. However, the small, one-shot nature of this study limits the generalizability of this finding. Overall, the findings should not be generalized beyond this small census study. This study should be replicated and conducted on a larger scale to strengthen the generalizability of the findings. By having a larger sample, structural equation modeling should be used to determine causal relationships between variables and career choice. Teacher educators should seek to understand factors (e.g., student teaching experience and relationship with the cooperating teacher) that influence preservice teachers' career choices. According to Grady (1990), positive first-year teaching experiences lead to higher retention. Further study on student teachers' self-actualizing experiences may serve as motivation for preservice teachers to enter the career in which the experience happened (Heneman, Schwab, Fossum, & Dryer, 1980).

Career choice was related to intrinsic and extrinsic career choice motives. Preservice teachers choosing formal education as a career had intrinsic motives. On the other hand, the preservice teachers that planned to pursue careers in non-formal education had extrinsic career choice motivation. This conclusion corroborated with the literature, in that those in helping careers tend to choose those careers for altruistic reasons (Bergsma & Chu, 1981; Eick, 2002; Fagermoen, 1997; Good, 1993; Jantzen, 1981; Parker & Merrylees, 2002; Seng Yong, 1995; Wicker 1995). This also supported the literature in career and technical education indicating the same finding (Pucel, 1990; Ruhland, 2001; Wright & Custer, 1998). Because of the differences in motives, teaching self-efficacy, and leadership behaviors of the preservice teachers, this suggests that individuals are attracted to the teaching profession if they consider the job a good fit for them (Young, 1995). Although the

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skill sets are similar, the nature and culture of work in formal education is different than non-formal education or business and industry. Recruitment efforts for future teachers should be based on intrinsic motivation. Recruiters should advise potential agricultural education teachers (i.e., those that are interested in the intrinsic benefits) based on intrinsic motives as students make decisions about their college major.

Preservice teachers' sense of efficacy was related to career choice. Preservice teachers who plan to pursue formal education careers had a higher sense of teaching self-efficacy than their peers who planned to pursue nonformal education careers or were undecided about their careers. This conclusion supported studies that found students had more interest in a given career when they had stronger self-efficacy beliefs (Betz & Hackett, 1981; Branch & Lichtenberg, 1987). This finding suggests that preservice teachers identify more closely with classroom teaching competencies than their peers who plan to pursue nonformal education careers. Although teaching responsibilities are a component of a non-formal educator's job responsibilities, the overall responsibilities also include administrative leadership, personnel and volunteer management, and program management (Boyd, 2004; Cooper & Graham, 2001). This could be the reason why participants planning to pursue non-formal education careers reported higher leadership behaviors. Due to the broader scope of job responsibilities in agricultural education, a self-efficacy instrument should be created that includes administrative leadership and personnel and program management. This would help preservice teachers assess their self-efficacy regarding the different skill sets utilized in agricultural education. Faculty should continue to help college students in agricultural education develop a sense of efficacy, and further research should be conducted to understand how a teacher's sense of efficacy influences career choice.

Leadership behaviors of the participating preservice teachers were not shown to be related to career choice. This conclusion was not congruent with the literature regarding transformational leadership behaviors in education because of the homogeneity of participants' self-reported leadership behaviors. Transformational leadership has become increasingly important in career and technical education (Wonacott, 2001), and leadership is also important in agricultural education (Buriak & Shinn, 1993; Hughes & Barrick, 1993). Transformational leadership behaviors do make a difference in the teaching profession because they positively influence school culture (Leithwood & Jantzi, 1997; Silins, 1994) and in turn, student achievement (Sashkin & Wahlberg, 1993; Ogawa & Bossert, 1995). Because all participants identified themselves as exhibiting transformational leadership behaviors, there was no variability, thus implying no relationship exists between transformational leadership and career choice. The small sample and agricultural education's mission being focused on leadership development could have contributed to the homogeneity of responses. Nearly 70% of the preservice teachers were involved in leadership development as FFA members in high school and served in leadership roles in college organizations. Self-reported measures can be influenced by the halo effect.

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This occurs if participants respond in a socially desirable way and inflate certain aspects about their behaviors (Kuh, 2001). Multiple methods such as peer ratings and personal interviews should be conducted to develop a better understanding how leadership behaviors might influence career choice. Further investigation should explore why preservice teachers who planned to pursue careers in non-formal education reported higher transactional leadership behaviors, and why preservice teachers who were undecided about their careers reported fewer leadership behaviors than their more decisive peers.

Two motivational theories, needs and self-efficacy, were related to career choice of preservice teachers in agricultural education. This is an important finding that should help CTE researchers explore factors that shape the choices preservice teachers make to become classroom teachers. This exploratory descriptive study was limited in its size and the positivist nature of studying leadership. Further investigation of leadership behaviors in the context of career development should be continued. One cannot easily deny the important role that life experiences, personality, and leadership play in the development of career and technical teachers. Mixed methods and naturalistic studies should be conducted to understand the role these factors play in career choice and development of career and technical education teachers.

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Career & Technical Education and School-To-Work at the End of the 20th Century:
Participation and Outcomes

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Abstract

We examined participation in the Career and Technical Education concentration (CTE), and School-to-Work activities at the end of the century following more than a decade of education reform in the United States. Using data from the National Longitudinal Survey of Youth 1997, we also explored whether school-to-work activities have extended beyond their traditional CTE curricular base and have become part of the high school experience for all youth. We explored the relationship between students' background characteristics and curriculum concentration and key education outcomes, including course-taking patterns, high school GPA, school completion, and post-school expectations. We concluded that there are ethnic, racial and socioeconomic differences among youth in the four curriculum concentrations. CTE concentrators, more than general concentrators, appear to benefit from changes aimed at increasing the academic rigor of their high school programs, as evidenced by their enrollment in math and science courses, high school GPA, and school completion.

Over a decade ago, at a time when the U. S. economy began a sustained period of economic growth, concerns were voiced about the quality of education, and in particular the contribution of the educational system to ensuring that the United States remained competitive in the emerging global economy through the adequate preparation of youth for work. Spurred by reports such as *A Nation at Risk* (Gardner, 1983), states and federal legislators sought to fix what was perceived to be a poorly

performing education system. Different educational reforms then both sought to increase the number of rigorous academic courses required for graduation and introduce changes in work-related education.

The latter included efforts to increase participation of high school students in CTE, to prepare them for the world of work, and to ensure they were well prepared for educational and economic attainment. Toward this end, the federal government initiated in the early 1990s a wave of CTE reforms providing national guidelines and funding for program and systems change with the purpose of improving the quality of high school preparation for careers. We are now at a time when the federal government is proposing a substantial change in CTE legislation, which is based, in part, on assumptions about the lack of progress under previous legislation.

Purpose and General Approach

The purpose of this study is to examine participation in CTE and in school-to-work (STW) activities at the end of the 20th century, vis-à-vis a set of family background and school achievement characteristics. We also examined the extent to which career major (CM), tech prep (TP) and specific, work-based learning school-to-work activities have become infused in the schooling of all adolescents.

We do so from the perspective that social origins affect school achievement. Studies in the sociology of education tradition have explored the impact of social factors on educational achievement. Specifically, they have focused on sets of factors that influence how students do in school. One such factor is the family background (Dauber, Alexander, & Entwisle, 1996; Ensminger & Slusarcick, 1992; Roscigno & Ainsworth-Darnell, 1999), which includes socio-economic status, race, and family structure characteristics. In particular, research studies during the 20th century have focused on the differences in educational achievement based on social inequalities (Gamoran, 2001). It has been well documented that race/ethnic differences in achievement reflect conditions outside school, but also the quality of schooling, since "what students bring to school from home greatly influences how they perform" (Peng, Wright, & Hill, 1995, p. 20) and is related to educational processes like quantity of courses, aspirations, and tracking. Other factors look into the effects of school behavior, and community characteristics (Dauber, Alexander, & Entwisle, 1996; Stull, 2002), in particular prior academic achievement at the pre-high school level, as well as family values and expectations (Ensminger & Slusarcick, 1992).

We therefore examined the direct effects of a set of social factors on participation in CTE and STW activities (career major, tech prep, and specific STW activities—cooperative education, job shadowing, mentoring, school-based enterprise, and apprenticeship/internship) and how they influenced overall school achievement, school completion and post high school aspirations. The factors included are students' family background characteristics (e.g., gender, race,

ethnicity), family socioeconomic status (e.g., father's and mother's education), school performance and achievement (e.g., 8th grade GPA), and community characteristics (e.g., community location).

CTE and the High School Experience

Adolescents enter high school with different home and neighborhood backgrounds, different levels of academic preparation, varying degrees of commitment to education, and a wide range of aspirations for their post-high school years. Which concentration pattern a student follows depends on both individual choice and the sorting mechanisms of schools (Garet & DeLany, 1988). Because building the workforce skills and increasing the academic performance of high school students was viewed as vital for the health of the domestic economy (Bozick & MacAllum, 2002), the federal Perkins reform legislation aimed to provide both for all students—a departure from traditional vocational education perceptions, policies and practices that had focused mostly on the disadvantaged (Halperin, 1994), or those considered non-college bound.

The goal of the CTE-focused reforms was perceived as an effort to blur the boundaries between curriculum concentrations. The emphasis on improvement of work and academic skills for all students was based on the positive associations found between work-based learning and students' educational outcomes (Wanacott, 2002). Academically, early research indicates CTE and STW can help decrease dropout rates and increase college enrollment, as well as improve attendance and grades, although there are no studies available about the impact on test scores (Hughes, Bailey, & Mechur, 2001). Other studies have reported the positive, yet limited impact, of CTE and STW on at-risk youth (Castellano, Stringfield, & Stone, 2003).

But while federal legislation has sought to increase the availability of work-related education for all students, high schools tend to have their own internal logic. Despite years of reform efforts, most high schools still have a recognized academic track or concentration and a concentration for students thought to be headed for early entry into the labor market. The rest of the students are left to wander haphazardly through their high school years, mostly under the umbrella or influence of a pseudo-academic concentration (the general concentration), a problem that has been recognized for more than a decade (Hallinan, 1994; Hughes, et al., 2001; Oakes, 1994; Oakes, Selvin, Karoly, & Guiton, 1992). One result of the CTE reform is the emergence of a fourth concentration, comprised of students who follow both a rigorous academic sequence of courses and a rigorous sequence of CTE courses (dual concentration). While small in numbers, it may represent the culmination of the reform efforts by combining the two long-standing philosophical traditions and curricula prevalent in high schools since the early 1900s.

CTE Enrollment Prior to the School Reform of the 1990s

An often debated issue is the definition of CTE participation—and how to measure it. How one makes these distinctions will have a profound effect on the examined outcomes. There are two main approaches used by researchers to describe CTE and STW participation and each yields different findings. The first, commonly used approach is to impose a template on transcripts and define CTE participants post hoc—hence, *transcript* analysis. The second is an alternative method that uses the student's self-classification, and it is based on the assumption that the participant is in the best position to define his or her curricular concentration.

CTE Participation: Transcript Analysis

Roey and his colleagues (2001) illustrated how high school students are sorted into curriculum patterns. Imposing a template over transcript data, they found that the percentage of high school graduates from both public and nonpublic institutions that were CTE concentrators has decreased from 23.2% in 1982 to 4.4% in 1998, while academic concentrators increased from 42.5% in 1982 to 71% in 1998. Based on the U.S. Department of Education's High School Transcript Study and the National Educational Longitudinal Study of 1988 (NELS 88), Tuma (1996) reported that in 1982, 33.7% of public high school graduates were CTE concentrators, and 24.4% in 1992. Plank (2001), also using the NELS 88 data, calculated that 18.9% of 1992 graduates were CTE concentrators and 36.3% were academic concentrators.

Levesque and her colleagues (2000) found that CTE concentrators were 33.1% of all students in 1982 but declined to 21% by 1994. The current (2004) National Assessment of Vocational Education (NAVE) concludes that the decade of decline through the 1980s appears to have leveled off, with occupational concentrators falling substantially between 1982 and 1992 and remaining steady since then, at about one-quarter of all high school graduates (Silverberg, Warner, Fong, & Goodwin, 2004). These sometimes contradictory findings suggest that using researcher-imposed templates on transcripts does not guarantee consistent findings.

CTE Participation: Self-Classification Analyses

Other researchers have used a different approach—self-classification, provided through student surveys. Self-classification data are more likely to show student *intent* rather than student placement by counselors or others. For example, the almost 35% of youth who self-classified as an academic concentrator is a proportion more closely aligned with current estimates of college enrollment (see Rosenbaum, 2002) than are estimates derived from transcript analysis. Similarly, we might assume that the true number of CTE concentrators is much lower than identified through transcript analysis.

This review highlights the lack of current knowledge about who participated in CTE and STW activities at the end of the 1990s. This gap is the focus of the present study. This study will also provide data and analyses covering other topics. Research on CTE prior to the mid-1990s does not report on career major and only on a limited basis for tech prep as these are recent innovations. The concept of STW is similarly absent or lightly addressed in the literature (Boesel, Rahn, & Deich, 1994; Levesque et al., 1995; Milne, 1998). Thus, the analysis provided in this paper can be considered benchmark analysis for student participation in CTE and STW activities in the 1990s.

Research Questions

In these analyses, we examined the following research questions:

1. What are the participation rates in the career and technical education concentration in schools? How do they compare to participation in the general, academic and dual tracks? What are the participation rates in career major, tech prep, cooperative education, job shadowing, mentoring, school-based enterprise, and internship/apprenticeship?

2. What family background, community and school achievement characteristics define participants in the different CTE-related curricula offered in American high schools? How do they compare to participation in the general, academic and dual tracks?

3. To what extent have CTE-related activities become embedded in the high school curriculum concentrations? To what extent do non-CTE youth participate in STW and STW related activities?

4. What is the relationship between curriculum participation, family background, school achievement and community characteristics and measures of academic rigor (math and science course taking), achievement (GPA and high school completion) and post high school four-year college aspirations for youth who completed high school at the end of the 20th century?

Data

We analyzed data from the National Longitudinal Survey of Youth (NLSY97), Rounds 1 to 5 of youth interviews to answer the research questions of the study. The NLSY97, described by the Bureau of Labor Statistics (2002) as a database consisting of a nationally representative sample of approximately 9,000 youth who were 12 to 16 years old as of December 31, 1996, was designed to document the transition from school to work and into adulthood.

Method and Procedure

Youth who had attended the 9th grade or higher were asked a number of questions about their participation in school programs, including what curriculum concentration they believed best described their high school experience and the extent to which they participated in CTE, CM, TP, and STW activities. Some limitations to the data relate to the limited options in questions regarding, for example, school-to-work activities, or even in the type of courses taken at school.

For this study, CTE is analyzed in its two different meanings. First, CTE corresponds to the *curricular program* students can be enrolled in while in high school. For this purpose, the analyses are based on their reported curriculum concentration as last reported in any of the five rounds of interviews. Second, CTE is also referred to as a set of structural strategies related to preparation for work supported by the STWOA or the Perkins amendments—i.e. career pathway, tech prep, and the following School-to-Work activities: cooperative education, job shadowing, mentoring, school-based enterprise, and internship/apprenticeship, while respondents were enrolled in high school. We refer to the latter as to *CTE-related activities*.

Analysis of participation in CTE and CTE-related activities has been conducted by examining reported participation during high school. Those indicators were dummy coded to reflect participation or no participation. Family background characteristics were obtained from the first round of interviews, as was the urbanicity. Family socioeconomic status was determined by using a proxy—parent education. In this case, the father's educational background was used if the respondent was living with his or her family. The biological or residential parent's education was used if the respondent came from a single-parent home. Eight-grade GPA, a school achievement indicator, was reported last as was the high school GPA. The number of courses for both math and science is a composite number of courses in those areas during high school only. High school completion excludes those that dropout of high school and those with a GED, as well as those currently enrolled by the 5th Round of interviews.

Analyses were performed with two types of statistical tests. First, we used crosstabulations for the descriptive part of the analysis. In that case, we weighted the observations, following the Bureau of Labor Statistics (BLS) guidelines, to estimate population parameters (Bureau of Labor Statistics, 2003; p. 38) and to control for the survey oversampling. The weighted sample enables estimation of the number of individuals represented by each respondent. We also performed logistic regression and linear regression analyses, for which we used omitted or reference variables.

Results

CTE Curriculum Participation in U.S. High Schools

An estimated 6.6% of the youth in the country identified themselves as CTE concentrators (see Table 1), a figure far lower than current NCES reports of 20.9% based on transcripts for public high schools (Hudson & Hurst, 1999; Levesque et al., 2000). Estimates for dual concentrators show more similarities with the other studies. Yet even our smaller estimation shows that CTE engages a large number of students across the nation.

Table 1

Participation in Curriculum Concentration (Percentages and Weighted Estimates)

	Percentage	Population Estimate
Concentration *		
General	52.2	10,026,963
Academic	34.6	6,641,333
CTE	6.6	1,270,071
Dual	5.9	1,126,828
Total	99.3 **	19,197,151
Sample n	8,765	

* Last reported for years 1997 through 2001

** Does not add up to 100% because others did not report participation in these concentrations.

For our prediction model of youth who participate in the four curricular options, we included characteristics they brought with them as they entered 9th grade (see Table 2). One predictor that is significant across all four models for curriculum concentration is parent's education, our proxy for the family socio-economic status.

Table 2

Logistic Regression Probabilities for Curriculum Concentration Participation

Independent Variable	Dependent Variable: Curriculum Concentration			
(Omitted)	General	Academic	CTE	Dual
	(Odds Ratios)			
Female (Male)	1.009	1.138 *	0.893	0.719 *
Black (White)	0.710 *	1.174 *	1.694 *	1.277 *
Hispanic (Non-Hispanic)	1.280 *	1.101	0.391 *	0.615 *
Parent Education	0.936 *	1.134 *	0.895 *	0.947 *
Urban (Suburban)	1.308 *	0.644 *	1.284 *	1.081
Rural (Suburban)	1.001	0.844 *	1.442 *	1.160
8th Grade GPA	0.508 *	2.826 *	0.723 *	0.916
N	6934	6934	6934	6934
-2 Log likelihood	8930.68	7528.23	3580.31	3186.46

* Statistically significant at $p < .05$. General, Academic, CTE, and Dual models were significant at $p < .05$. Curriculum Concentration is last reported. Data for the independent variables are for 1997.

Five background characteristics predicted participation in CTE. Blacks were more likely than whites to identify with this concentration, and Hispanics were less likely than non-Hispanics. Like general concentrators, CTE youth entered high school with lower academic ability compared to other youth. As the parent education increases, the odds that a youth will identify as a CTE concentrator decreases—as with general concentrators. Like general concentrators, CTE concentrators are more likely to live in urban communities than suburban. These data suggest that CTE and general concentrators bring similar academic preparation to high school, share similar socioeconomic backgrounds, and come from similar communities.

General concentrators can be identified by five characteristics: race, ethnicity, GPA, community location, and parent education as follows. The odds that Black youth were general concentrators were 71% those of white youth, and Hispanic youth were more likely to identify with the general concentration than non-Hispanic youth. As 8th grade GPA increases, the odds that a youth identified with the general concentration significantly decreases. Urban youth were more likely than suburban youth to indicate they were in the general concentration.

Participation Patterns in Career Major, Tech Prep and STW Activities

We then examined how background characteristics combined with curriculum concentration to define youth who participated in a CM, TP, and the specific STW activities identified in this data base. Only a modest proportion of youth reported participation in STW activities at any time during their high school careers (see Table 3). The majority of youth reported not participating at all in any of these activities while in high school.

Table 3

Participation in School-to-Work Activities (Percentages and Weighted Estimates)

	Percentage	Population Estimate
STW or CTE-Related Programs *		
Career Major	32.7	6,136,522
Tech Prep	13.4	2,519,751
Specific STW Activities		
Cooperative Education	14.6	2,741,117
Job Shadowing	21.6	4,052,771
Mentoring	9.2	1,717,738
School-Based Enterprise	12.2	2,284,360
Internship/Apprenticeship	9.5	1,776,621
No Participation in Tech Prep or any STW Activities in all Years while in High School	51.4	9,637,027
Sample n	8,498	

*Analyses for 1997-2001 are performed for participation in CTE-related activities at any point during high school. For No Participation in Tech Prep or STW, data refer to students that did not participate in *all* high school years. Total percentage exceeds 100 because of multiple options to respond.

About a third of students in the country indicated they were career major participants at some point in their high school career. Over a fifth of high school youth participated in job shadowing. A substantial proportion of youth, approximately 25%, participated in cooperative vocational education and apprenticeships/internships, both arguably intensive work-based learning activities and perhaps surprisingly high participation rates coming after nearly two decades of increasing academic requirements.

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To predict participation in STW our model included curriculum concentration to allow an examination of the relationship between curriculum, especially CTE, and STW participation.

Race is a defining characteristic of STW participation (see Table 4). Blacks were significantly more likely to participate in all but job shadowing compared to white youth. Gender too is a defining characteristic in TP, job shadowing, mentoring and school-based enterprise: females were significantly more likely to participate in the latter three activities and less likely in TP. The odds that a Hispanic student would participate in TP, job shadowing and school-based enterprise were significantly lower than for non-Hispanics.

Table 4

Logistic Regression Probabilities for High School Participation in STW-Related Activities (Odds Ratios)

Independent Variable (Omitted)	Dependent Variable: CTE-Related Activities						
	CM	TP	CE	JS	ME	SBE	IA
	(Odds Ratios)						
Female (Male)	1.012	0.913 *	1.015	1.116 *	1.194 *	1.129 *	1.037
Black (White)	1.202 *	1.168 *	1.194 *	0.999	1.267 *	1.143 *	1.144 *
Hispanic (Non-Hispanic)	0.949	0.925	0.992	0.837 *	1.056	0.843 *	1.054
Parent Education	0.966 *	0.962 *	0.970 *	1.018	1.028	1.002	0.996
Urban (Suburban)	1.031	0.949	1.025	0.941	1.114	1.079	1.171 *
Rural (Suburban)	1.023	1.045	0.974	1.161 *	0.956	0.927	0.798 *
8th Grade GPA	0.974	0.975	1.112 *	1.015	1.047	1.185 *	1.060
General (Academic)	0.577 *	0.559 *	0.608 *	0.894 *	0.793 *	0.826 *	0.694 *
CTE (Academic)	1.528 *	1.857 *	1.736 *	1.102	1.039	1.125	1.180
Dual (Academic)	1.573 *	1.653 *	1.551 *	0.982	1.172	1.133	1.379 *
N	6735	6732	6732	6732	6732	6732	6732
-2 Log likelihood	8290.15	5255.96	5524.52	6926.22	4052.60	4841.57	4058.84

* Statistically significant at $p < .05$. The CTE-Related Activities models are all significant at $p < .05$. CM=Career Major; TP=Tech Prep; CE=Cooperative Education; JS=Job Shadowing; ME=Mentoring; SBE=School-based Enterprise; IA=Internship/Apprenticeship. Data for STW activities are for participation at any point during the high school experience. 8th-Grade GPA is last reported for 1997-2001.

As the education level of students' parent increases, youth were significantly less likely to participate in a CM, TP and cooperative education. However the 8th grade GPA had limited predictive power in defining STW participation with the exception of cooperative education and school-based enterprise, where each unit increase in 8th grade GPA increased the odds of participation by 11% and 19% respectively.

There were significant relationships between curriculum concentration and various elements of STW. We found that the odds that CTE and dual concentrators participated in a CM were more than 50% greater than for their academic counterparts and that the odds of general concentrators were half that of academic youth. In fact, general concentrators, compared to academic concentrators were less likely to participate in any STW related school activity.

CTE and dual concentrators were more likely than academic concentrators to participate in TP. Given that TP was built largely on articulation agreements between two-year colleges and CTE courses, this relationship is not surprising. Similarly, our finding that the odds of a CTE or dual concentrator participating in cooperative education are significantly greater than an academic concentrator is not unexpected. As with TP, cooperative education is part of the traditional CTE curriculum.

The profiles that emerge for the CM, TP and cooperative education student are quite similar in that curriculum concentration, race and parent's education are significant predictors of participation. We did not find such consistent patterns in the profiles of youth who participate in work based learning STW activities except that general concentrators are significantly less likely than academic concentrators to participate in any form of STW.

As we noted at the beginning of this report, there are no benchmarks for participation measures on most of these activities. The NLSY97 was one of the first efforts to document these activities. What these data show is a mixed picture of the extent to which STW is a part of the high school experience for all high school youth at the end of the 20th century. A majority youth do not participate in any STW activity. Of those who do, curriculum concentration was not predictive of participation in three specific STW activities but was for two important structural reforms—TP and CM—and two of the more intensive work-based learning pedagogies—cooperative education and internships/apprenticeships.

Predicting Student Achievement and Aspirations

One salient feature of the Perkins amendments and the STWOA was the focus on upgrading the academic rigor of the high school programs followed by CTE students. As part of the Perkins II and Perkins III, TP specifically sought to increase the amount of math and science course taking by CTE students. There is some evidence in the recent NAVE report that this is occurring (see Silverberg, et al,

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2004). With the data available, we sought to determine if there were different course taking patterns in math, science and CTE amongst all concentrators. A second measure of academic achievement was GPA. High school GPA, we argue, is at best a proxy for academic achievement. It is also interesting to note that lowest percentage of youth completing high school were general concentrators. Despite the lowest completion rate, the general concentrators have relatively high expectations of completing a four year college degree. CTE concentrators had a higher completion rate than general concentrators but the lowest expectation of completing a four year degree. Given the low percentage of youth who actually complete a four year degree (see Hoffman, 2003), one could argue that CTE students were more realistic about four year college aspirations and general concentrators less so.

As shown in Table 5, gender, race, ethnicity, and parents' education were significantly related to how much math and science a student reported taking in high school. Somewhat surprisingly, when we control for key background characteristics, blacks and Hispanics reported taking more math and science courses while in high school than did whites.

It has been widely reported that academic concentrators take more math and science than other concentrators (Roey, et al, 2001). In our study, students who participated in general, CTE and dual concentrations take significantly fewer math and science courses than academic concentrators. However, these data show that the effects differ among the three alternative curriculum concentrations. Controlling for critical background characteristics, the relative difference in math and science course taking between academic and general concentrators is greater than between academic and either CTE or dual concentrators. Independent of curriculum concentration and other background characteristics, we found that youth who participated in any form of STW reported taking more math and science than youth who do not. This finding suggests these reforms are influencing course taking in ways they were intended. The positive association between the specific STW, work-based learning activities, and greater math and science course taking is intriguing. This may suggest that classes or programs where these are included have higher standards for participation. Alternatively, it may mean that youth who get engaged in real-world learning see the value of math and science and thus elect to include more in their high school program. Regardless, these associations merit further examination.

Table 5

Measures of High School Achievement and Aspirations: Course-Taking, Students' High School Grade Point Average, High School Completion, and Expectations of Obtaining a 4-Year College Degree by Age 30

Independent Variable	Dependent Variable				
(Omitted)	Number of Courses		High School		Expectations
	Math	Science	GPA	Completion	
	ß	ß	ß	Odds Ratio	ß
Female (Male)	-0.025*	-0.029*	0.097*	1.022	0.015
Black (White)	0.072 *	0.098 *	-0.073*	0.904*	0.081*
Hispanic (Non-Hispanic)	0.046*	0.030*	-0.011	1.189*	0.039
Parent Education	0.122*	0.094*	0.105*	1.193*	0.173*
Urban (Suburban)	0.017	0.017	-0.040*	0.891	0.016
Rural (Suburban)	-0.038*	-0.015	0.024*	0.976	-0.093*
8th Grade GPA	0.230*	0.175*	0.528*	1.637*	0.140*
High School GPA	---	---	---	2.802*	0.166*
General (Academic)	-0.128*	-0.144*	-0.136*	0.662*	-0.193*
CTE (Academic)	-0.091*	-0.090*	-0.076*	0.711*	-0.174*
Dual (Academic)	-0.074*	-0.074*	-0.061*	0.932	-0.076 *
Career Major (no CM)	0.067 *	0.060 *	0.021	1.162 *	0.054
Tech Prep (no TP)	0.054 *	0.057 *	0.014	1.279 *	-0.053
Any Specific STW (no STW)	0.086 *	0.086 *	-0.002	1.183 *	0.006
N	6730	6730	4609	4543	1026
Adjusted R-Square	0.14	0.11	0.45	---	0.25
-2 Log likelihood	---	---	---	3362.21	---

* Statistically significant at *p*<.05.

All models are statistically significant at *p*<.05. "High school completion" excludes from the analysis those still enrolled in school. Data for "Expectations …" are for 2001 only.

Six sets of variables are associated with high school GPA. It is no surprise that of the six, 8th grade GPA is the strongest predictor. In addition, gender, race, parents' education, and community location are all significant contributors to explaining students' self reported high school GPA. Higher high school GPA is associated with being female, white and living in the suburbs rather than in an urban community.

While general, CTE and dual concentrators reported lower GPA than academics as expected (see Roey, et al, 2001) we note that the general concentration was a stronger, negative predictor of GPA than the either CTE or dual concentrations. Coefficients for CTE and dual concentrators are nearly half that of the general concentration. We found no relationship between participation in STW or STW activities and reported high school GPA.

There has been some debate about the effect of CTE in keeping youth in school (see Plank, 2001; Silverberg, et al., 2004). Determining a meaningful answer to this question is fraught with difficulties. Part of it is definitional (i.e., who is a CTE participant and which CTE does one include in the definition?). Defining a completer is also problematic. Under the current *No Child Left Behind* federal legislation, a 5th year senior is counted as a drop out. Yet there are vocational schools designed to take five years to complete. Many schools have programs designed to help struggling students complete high school in five years.

Another issue is timing. Much of the occupationally focused CTE is available only to 11th and 12th graders, so that those who drop out before 11th grade have not been exposed to that type of CTE. However, youth in this sample who were 16 and 17 (10th and 11th grade) reported the highest rate of CTE participation and even 18% of those in 9th grade reported they were a CTE concentrator (Stone & Aliaga, 2001). This suggests that even though occupational CTE may not be part of the 9th and 10th grade experience, students may be participating in other kinds of CTE (e.g., introduction to computers, family and consumer science).

In our model, each unit increase in 8th grade GPA increases the odds of completing high school by a factor of 1.6. We have a similar finding for high school GPA but the factor is greater (2.8). The direction of this coefficient is an expected finding.

An unexpected finding is the increased odds that Hispanic youth will complete high school compared to non-Hispanic youth. There are some explanations. While Hispanic youth have the highest drop out rates of all race and ethnicity groups (Kaufman, Alt, & Chapman, 2001), it is also true that Hispanic youth arrive in school with the greatest number of characteristics that put them at risk of dropping out (Romo & Falbo, 1996). Also, Hispanics drop out sooner than other youth, even before 8th grade (Schwartz, 1996). Therefore, they may have dropped out before the interviews for the NLSY97 surveys. We may also have a disproportionate number of whites who identified as Hispanic in our sample: 48% of Hispanics indicated they were white, and less than 3% as Black. The largest group of Hispanics self-identified

as "other" (49%). Another possible source of bias in these analyses is that in the NLSY97, Hispanic may also mean Cuban, Mexican, Puerto Rican, Colombian, or even individuals from Spain. Regardless, this finding deserves additional consideration in future analyses of the NLSY97.

When we compare the likelihood of completing high school as a function of curriculum concentration, we find that identifying as either a general or CTE concentrator decreases the odds of completing high school. The odds that a general concentrator will complete high school are only 66% those of academic concentrators. While CTE concentrators do better than general concentrators, the odds that a CTE concentrator will complete high school are 71% those of an academic concentrator.

The odds that youth who participate in STW or related activities will graduate from high school are significantly greater than for those who do not, independent of the effect of curriculum concentration. This is an intriguing finding. It could be that a sizable percentage of academic concentrators participate in one or more of these activities. Or that strategies like career pathways do engage youth and keep them in school (see Plank, DeLuca, & Estacion, forthcoming). Still another explanation is that of reverse causality, that is activities like Tech Prep and some, but not all, of the STW activities are largely associated with 11th and 12th graders. One could make the argument that youth who make it to the 11th grade are likely to complete high school and thus able to access the array of STW activities open to older students.

Youth in this study were asked their expectations that they would complete a four year college degree by age 30. Unfortunately, the data are limited to discussions of four-year college aspirations. As many youth, especially those in the CTE and dual concentrations, are likely to aspire to a two-year colleges or other, non-four year post high school education options, we expect that academic concentrators are more likely to think in terms of attending and completing a traditional four-year degree.

In these analyses, general, CTE, and dual concentrators are significantly less likely to aspire to a four-year degree than are academic concentrators. Similar to our findings for course-taking, and GPA, the three non-academic concentrations vary in their differences from academic concentrators. The beta coefficients for the general and CTE concentrators are similar. As with high school GPA, we found no statistically significant relationship between participation in STW and college expectations.

Discussion and Conclusions

The NLSY97 offers evidence that allows us to create a portrait of student participation in career related education and pedagogies in the late 1990s. Our findings that the average number of CTE courses taken by all students is only slightly lower than that taken by CTE concentrators and given that CTE concentrators are a very small proportion of all students suggest that many youth are investing in CTE.

Despite continuing demands on school schedules for inclusion of more academic courses, CTE remains a large part of the high school experience.

While the percentage of youth who identify as a CTE concentrator is considerably smaller than reported elsewhere, we suggest that the difference may be more than simply the difference between transcript and self-report data. The difference may also reflect student motivation or fear of stigma when self-reporting. CTE for some youth may be a matter of conscious choice and for others may be a matter of tracking. The use of vocational education as a tracking system is a concept that has been described previously (Oakes, Gamoran, & Page, 1992).

The disparity may also be explained by the percentage of general concentrators who report taking many CTE courses. It is likely that many of these students have been placed in these courses by school counselors. It may also be true that many of these students elect to take CTE courses but do not see themselves as CTE concentrators because they believe, like most youth, that they are going to college and view CTE as a place for the non-college bound.

Regardless of how youth come to identify with a particular curriculum concentration, we find strong associations between family background and enrollment in CTE. Our findings show race, gender, ethnicity, and social class play an important role in such assignments.

An important point is found in the relationship between the early school achievement and CTE participation. While both general and CTE concentrators enter high school less academically prepared than academic concentrators, CTE concentrators exit high school with a smaller achievement gap compared to their academic counterparts than do general concentrators. Dual concentrators similarly exit high school behind academic concentrators, albeit with a smaller gap than that of either the CTE or general concentrators. This suggests there may be a small academic penalty or cost to combining career focused and college focused coursework while in high school. The benefit for this apparent cost may be worth it in the long run (Bishop & Mane, 2004).

The CTE and STW legislation of the 1990s intended to improve the transition of youth to careers through increased contact with and study of the workplace, and by improving the academic rigor of the high school experience. We found evidence of a positive relationship between participation in CTE and STW activities and key measures of high school achievement; however most students do not concentrate in CTE or participate in any STW activities. In the post No Child Left Behind era, many states are increasing the amount of traditional academic coursework required for graduation (e.g., requiring four years of mathematics). Given the fixed school day, such an increase in required coursework reduces the time available for elective coursework including CTE. As political leaders seek simple solutions to the complex problems confronting public education, we expect the trend toward mandating more academic coursework to continue, thus reducing the levels of participation in CTE and STW reported here.

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ACTER Membership Application Form

Send form/check to: Dr. Elaine Adams, Membership Secretary, University of Georgia, 210 River's Crossing, Athens, GA 30602	• Make checks payable to ACTER. • Dues outside USA should be paid in US dollars. • Membership is good for 12 months.	
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