Evaluating the Effectiveness of the Utah Career and Technical Education Introduction Course

Debra Marie Spielmaker

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EVALUATING THE EFFECTIVENESS OF THE UTAH CAREER AND TECHNICAL EDUCATION INTRODUCTION COURSE

by

Debra Marie Spielmaker

A dissertation submitted in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Education

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Logan, Utah

2013
ABSTRACT

Evaluating the Effectiveness of the Utah Career and Technical Education Introduction Course

by

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Utah State University, 2013

Major Professor: Deborah Byrnes
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This quantitative study evaluated the gains and evaluation outcomes of the compulsory Career and Technical Education (CTE) Introduction course. All Utah public school seventh-grade students are required to enroll in this school-year course. The matched-pair design used preexisting data to analyze 6,078 pre- and postsurvey responses collected at the beginning of the course and again at the end of the course during the 2011-2012 school year. The evaluation was viewed through a postpositivist lens and employed a theory-based evaluation model as the framework for analysis. The research questions addressed four student variables: career planning, career self-efficacy, career knowledge, and course evaluations. Gender differences along school counselor relationships were also evaluated as possible predictors on course evaluations.

(164 pages)
PUBLIC ABSTRACT

Evaluating the Effectiveness of the Utah Career and Technical Education Introduction Course

by

Debra Marie Spielmaker, Doctor of Philosophy
Utah State University, 2013

The Utah State Office of Education Career and Technical supported this quantitative study that evaluated the gains and outcome evaluations of the compulsory Career and Technical Education (CTE) Introduction course. All public school seventh grade students are required to enroll in this school-year course. The matched pair design used preexisting data to analyze 6,078 pre- and postsurvey responses collected at the beginning of the course and again at the end of the course during the 2011-2012 school year. The evaluation was viewed through a postpositivist lens and used a theory-based evaluation model as the framework for analysis. The research questions addressed four student variables; career planning, career self-efficacy, career knowledge, and course evaluations. Gender differences along school counselor relationships were also evaluated as possible predictors of course evaluations.

A course-specific, criterion-referenced, instrument was used to measure student differences related to state-identified expected course outcomes. Student data were collected statewide and was representative of the state demographics. The data were analyzed using standard statistical tools including t tests and multiple regression techniques, which were employed to evaluate course significance and effect sizes on these variables: career planning, career self-efficacy, career knowledge, course outcomes, gender moderation, and counselor influence.

Results indicated there were gains with small to medium effects between the pre- and postsurvey on nearly all variables. When gender was added to the model, females did statistically significantly better on the career knowledge variable relative to males. Males had slightly larger gains in relation to females on self-efficacy. Significant correlations were found between all the variables. The variables of career planning, career self-efficacy, and career knowledge all predicted course evaluation scores, with career planning explaining most of the variance. The moderator model for gender showed no significant interactions, suggesting that gender did not influence course outcomes when
combined with career planning, self-efficacy, career knowledge, or meeting with the counselor. Meeting with the school counselor had a small to medium strength effect on career planning, a nonsignificant effect on self-efficacy, and a small effect on course evaluations.

The research results suggest that the CTE introduction course may have a small to medium effect on student career planning, career self-efficacy, and career knowledge, and are positively related to course evaluations.
DEDICATION

To my husband, Rick Spielmaker, thank you for your love, support, and patience—all have made the completion of this degree possible!
ACKNOWLEDGMENTS

The successful completion of my coursework and this dissertation would not have been possible without the guidance, support, and encouragement of several individuals. I would like to thank and acknowledge the efforts of my committee chair, Dr. Deborah Byrnes. She asked me about getting this degree more than 15 years ago and I am grateful that she accepted me as her graduate student 11 years later. Her patience, guidance, sincerity, and friendship have been an inspiration to me. Dr. Byrnes’ institutional and research knowledge was an incredible asset and provided me with the confidence to do research and complete my degree. I appreciated her willingness to learn more about my research area and her help in interpreting the results. Her helpful analysis brought meaning to the study and insight to the discussion.

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acceptance committee’s approval for my entry into graduate school.

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Debra Marie Spielmaker
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CHAPTER I

INTRODUCTION

Most people would agree that an education helps one to prepare for the future. The future may include leisure activities, sports, hobbies, religious pursuits, a family, a career, and other aspirations or goals. Career choices affect our personal finances and our free time—greatly impacting and influencing how our life goals are achieved and the economic security of the state and nation.

In 2010, the unemployment rate for recent high school graduates who were not enrolled in post-secondary schooling was 33.4% (Bureau of Labor Statistics, 2011). How can schools, and more specifically, curriculum, counselors, and teachers better prepare students for their futures? Few would argue that a highly educated and skilled workforce positively affects Utah’s economy and, consequently, each Utahan’s quality of life. In Utah, every public school student is required to develop a Student Education Occupational Plan (SEOP). The SEOP reflects the students’ interests and abilities and helps guide them to potential career pathways and the necessary tools or courses that will prepare them for their future. The SEOP is initiated when students enter seventh grade and is part of a compulsory, year-long exploratory career course titled Career and Technical Education Introduction (CTE Introduction). Several states have instituted counseling and student career planning, most often in high school, however, Utah is the only state in the nation requiring every student to participate in a year-long exploratory career course to aid with the development of their SEOP (M. Shumway, personal communication, August 14, 2012).
The mission statement for the CTE Introduction course stated, “Career and Technical Education Introduction (CTE Introduction) allows students through activity-centered lessons to utilize technology, develop beginning skills, and explore careers. The curriculum provides information regarding additional courses and training related to each student’s career field of interest” (Utah State Office of Education [USOE], 2012a, p. 1). The vision of the course is to “offer every student the opportunity to experience technology used in the workplace, develop beginning life skills, and explore careers that will assist him or her in eventually choosing a career, while giving each student the encouragement to achieve his or her goals” (USOE, 2012a, p. 1). The CTE Introduction course focused on eight career areas that exposed students to more than 60 CTE college and career pathways. Teachers dedicated 15 hours of instruction to five program areas: agricultural education, economics education, health science education, information technology education, and marketing education. Teachers also committed 32 to 35 hours of instruction to business education, family and consumer sciences education, and technology and engineering education. The CTE Introduction course provided students with information about educational requirements for a variety of careers in the CTE Pathways.

The CTE Introduction course title and content was revised in 2008, but Utah has offered a career exploratory course since 1986. The course has been a public middle school requirement since 1999. The CTE Introduction course grew out of research that suggests career interventions are effective and that middle school is an appropriate time to begin career exploration. Additional research, which is discussed in the literature
review, concluded that middle-school students are developmentally ready to begin planning their career goals. The CTE Introduction course was pilot tested with 63 schools in 1999 and implemented statewide in 2000. The most recent update in 2008 was made to modify the course for relevancy reflecting technical changes and emerging career opportunities (M. Shumway, personal communication, August 14, 2012). With the knowledge that today’s students are tomorrow’s workforce, the Utah State Legislature has allocated millions of dollars to support this course since 1999. Over one million dollars for materials and equipment, or $25 per student, has been budgeted for the 2013 school year (USOE, 2012b). This funding does not reflect teacher salaries; so in reality, state expenditures are much greater. While legislative and State School Board support for the course has been steady, there has been no formal evaluation measuring student gains as a result of the course.

**Purpose of the Study**

This quantitative research project evaluated the effectiveness of the CTE Introduction course and any influences counselors may have on student course evaluations. The results provide the Utah State Legislature, State School Board, the USOE, and the Career and Technical Education director with decision making information to evaluate course expenditures and essential data to consider future course changes or improvements.
Research Questions

This evaluation research addresses the following questions.

1. Do student scores on (a) student career planning, (b) career self-efficacy, and (c) career knowledge change from course entry to exit?

2. Are there gender differences on student gain scores on (a) student career planning, (b) career self-efficacy, and (c) career knowledge from course entry to exit?

3. Is there a relationship between pre- and postsurvey student career planning, self-efficacy, and career knowledge?

4. Do postsurvey scores on (a) career planning, (b) career self-efficacy, and (c) career knowledge, along with (d) meeting with the counselor, predict career course evaluations?

   Subquestion a: Does gender moderate the association between career planning, career self-efficacy, career knowledge postsurvey scores, meeting with the school counselor and course evaluations?

5. Is there a relationship between meeting with the school counselor and postsurvey responses on career planning, career self-efficacy, or course evaluations?

Research Context

The CTE Introduction course “provides students with the direction, decision making, and planning needed to select their personal career paths” (USOE, 2012a, p. 1). The overall goal of the CTE Introduction course is to integrate three major objectives.

1. Self-Knowledge: Assessing individual interest and abilities by helping each
student understand his or her future role as a worker and a family member and become aware of those life skills necessary to be a contributing member of society.

2. Education and Occupation Exploration: Exploring the nature of work and the changing world of work. Exploring nontraditional as well as traditional roles. Experiencing broad exposure to technologies and processes found in the workplace.

3. Career Planning: Understanding the importance of education and occupational decision-making. Examining education and training that are necessary and available for various careers. Planning the future for each student through the Student Education Occupation Plan (SEOP) process, which is developed in cooperation with parents, counselors, and educators (USOE, 2012a, p. 1).

The 9-month (school year) exploratory career development course is usually taught by a team of career and technical education teachers (family and consumer science teachers, technology and engineering teachers, and business and marketing teachers) and school counselors. However, in smaller schools there may be fewer than three teachers providing instruction. The USOE requires that students receive instruction and activities in eight career pathways: agriculture, business, family and consumer science, health sciences, information technology, marketing, skilled and technical science, and technology and engineering. In addition to hands-on activities, students may participate in career fairs, field studies, and/or externships. Course standards and objectives do not specifically address the arts, recreation, or social humanitarian careers, however, counselors provide students with opportunities “to explore individual interests” (USOE, 2012a, p. 1).
Significance of the Research

This evaluation research project should provide valuable findings concerning the effectiveness (as related to the course evaluations) of the mandatory seventh-grade CTE Introduction course, which affects approximately 43,000 Utah students and costs taxpayers over $1 million annually (not including teacher salaries). In addition to evaluating the value of the course for Utah stakeholders, this research contributes to the larger body of career education research. Positive findings may encourage other states to investigate this type of course offering to their students. Negative findings may suggest further research and possible alternatives to addressing student career planning. No formal research on student outcomes has ever been conducted on this course (M. Shumway, personal communication, August 14, 2012). At the very least, the results should identify strengths and weaknesses in the course and provide decision makers with data for improvement.

Theoretical Paradigm and Framework

Philosophically, this research has been constructed from a postpositivist paradigm. Postpositivists, unlike positivists, acknowledge inherent biases in the researcher and the complexities that influence social science research. Positivists seek truth and believe there is an actual reality that can be found, measured, and defined through experimentation. However, postpositivists would argue that absolute truth, that may in fact exist, is unobtainable because of biases and human limitations. Postpositivists are continual truth seekers that prefer to triangulate multiple research findings, beyond
scientific observation, to further understanding. In other words, a postpositivist position holds there is a single reality, but that it is a “truth based on probability, rather than certainty” (Mertens, 2010, p. 12). The most widely cited explanation of postpositivism comes from Phillips and Burbules (2000):

Human knowledge is not based on unchallengeable, rock-solid foundations—it is conjectural. We have grounds, or warrants, for asserting the beliefs, or conjectures, that we hold as scientists, often very good grounds, but these grounds are not indubitable. Our warrants for accepting these things can be withdrawn in the light of further investigation. (2000, p. 26)

The CTE Introduction course is compulsory for all Utah students; it is not possible to use a truly experimental design with Utah students for this evaluation research. As a result, this social science evaluation research project employs a survey approach to analyze the outcomes of the CTE Introduction course. A theory-based evaluation model and regression analyses have been used to triangulate the data points and provide insight to further discuss the research questions.

The CTE Introduction course is theory-based—based on previously conducted research in the area of developmental maturity and the effectiveness of career interventions (Akos, Charles, Orthner, & Cooley, 2011; Baker & Popowicz, 1983; Baker & Taylor, 1998; Jepsen & Dickson, 2003; Whiston, Sexton, & Lasoff, 1998). The results of this research fueled the development and implementation of the Utah exploratory career course in 1986. Teachers involved in a course revision pilot test in 1999 responded positively and felt the course was effective (M. Shumway, personal communication, August 14, 2012).

Theory-based evaluation is an approach in which the evaluator constructs a model of how the program works using stakeholders’ theories, available social science
theory or both to guide a question formation and data gathering. (Mertens, 2010, p. 56)

Since the course developed out of two theoretical constructs, career maturity and positive meta-analytic results concerning career interventions, the theory-based evaluation (TBE) model has been used as a framework for this research project. The TBE framework requires the identification of a social problem, in this case, a need for students to be prepared for a successful future. Stakeholders, the Utah Legislature and the Utah State Board of Education (elected by the citizenry) have addressed the problem by funding and advancing a research-based career exploration and awareness course, CTE Introduction. Stakeholders guided the development of the data gathering instrument (to be discussed later) and provided the structure to develop a logic model, incorporating social science theory, to analyze the evaluation data. The TBE model is a suitable framework as the course, and previously collected data, have been developed and gathered based on the constructs of the course (Fitz-Gibbon & Morris, 1996; Weiss, 1997a), and student abilities to do career planning with their knowledge of careers.

At the core, TBE assumes that “an intervention can be expressed in terms of a phased sequence of causes and effects (i.e., a program theory)” (Weiss, 1997b, p. 501). The CTE Introduction evaluation results may be used to determine if the intervention (the CTE Introduction course) is helping students to plan for the future (a possible solution), or, provide directions for course modifications, or the results may be used for follow-up research concerning the careers students have chosen that have led to a successfully “employed” future (addressing the problem). The use of regression analysis has provided more insight into possible relationships and course variable predictors. These additional
data points have better informed the results, testing the possible causal mechanisms (Davidson, 2000) and provided stakeholders and administrators with more information to make better decisions concerning the evaluand (Bledsoe & Graham, 2005).

A logic model is a tool often used in theory-based evaluations (Mertens, 2010). The model in Figure 1 has been used to guide this research. The evaluation model addresses how well the mission and standards for the course have been met based upon student self-reported career knowledge, career planning, and career self-efficacy.

**Definition of Terms**

Prior to discussing career development research a few terms should be defined to effectively convey the concepts presented in this review of the literature. Researchers (Hughes & Karp, 2004; Maddy-Bernstein, 2000; Sears, 1982; Super, 1980) have noted that the terms “career guidance,” “career counseling,” “academic counseling,” and “career course” are oftentimes used interchangeably. To understand the modifier of each career term it would be apropos to define “career.” Donald Super, the progenitor of career maturity and development, stated:

A career is defined as the combination and sequence of roles played by a person during the course of a lifetime. These roles include those of child, pupil or student, leisurite, citizen, worker, spouse, homemaker, parent, and pensioner, positions with associated expectations that are occupied at some time by most people. (Super, 1980, p. 282)

For the purpose of this research, the word “career” is used to mean occupational career. An occupation is defined as “an activity that serves as one’s regular source of livelihood” (Occupation, 2009). Young and Valach (2008) defined career as “a central construct
The Utah State Board of Education with the support of the Utah State Legislature has mandated that all seventh grade students enroll in a career exploration and awareness course, Career and Technology Education Introduction. The course has never been evaluated for effectiveness.

- USOE funding for course material and teacher professional development training.
- USOE administrators.
- CTE Introduction Teachers

Teachers and counselors will provide instruction and mentoring to all seventh grade students through the CTE Introduction course using curriculum that addresses the following standards.

Students will:
1. Be knowledgeable about the world of work, explore career options and relate personal skills, aptitudes, and abilities to education planning and future career decision making.
2. Analyze education, training and career opportunities in various Career Pathways.
3. Students will examine workplace tasks and concepts in Agriculture.
4. Examine workplace tasks and concepts in Business.
5. Examine workplace tasks and concepts in Economics.
7. Examine workplace tasks and concepts in Health Science.
8. Examine the workplace tasks and concepts in Information Technology.
9. Examine the workplace tasks and concepts in Marketing.

1. Understand how self-knowledge (e.g., interests, abilities, and strengths) relate to career interests and selecting and achieving goals. (Research question 1)
2. Understand education and occupation exploration and planning. (Research questions 1 and 4)
3. Understand career application of subject matter through participation in Work-Based Learning experiences. (Not measured in this evaluation.)
4. Identify career information and career options available in the eight CTE pathways. (Research question 1)
5. Identify career and post-secondary education options through investigation of High School to College and Career Pathways. (Not measured in this evaluation.)
6. Demonstrate skills in processing self-knowledge in relation to CTE courses and programs, in relation to the world of work, and in relation to future planning. (Not measured in this evaluation.)

Source. (USOE, 2012a).

Figure 1. Career and technical education introduction logic model.
through which people make sense not only of specific aspects of their lives, but major
domains over extended periods of time.”

Additional career terms that are used throughout this research include the
following.

*Career awareness:* The inventory of knowledge, values, preferences, and self-
concepts that an individual uses in the course of making career-related choices (Sears,
1982, p. 139).

*Career decision making:* “The process that is designed to assist persons in making
personally satisfying decisions and that includes these components: (1) explorations and
clarification of personal values, (2) use of the data about self and the environment, and
(3) study of the decision process and strategies...to make a decision, implement the
decision, and evaluate the outcomes of a decision” (Sears, 1982, p. 140). The final step in
career decision-making is career planning, see definition below.

*Career development:* the total constellation of psychological, sociological,
educational, physical, economic and change factors that combine to influence the nature
and significance of work in the total lifespan of any given individual (Maddy-Bernstein,
2000, p. 2).

*Career education:* An effort aimed at refocusing American education and the
actions of the broader community in ways that will help individuals acquire and utilize
the knowledge, skills, and attitudes necessary for each to make work a meaningful,
productive and satisfying part of his or her way of living (Hoyt, 1981, p. 9).

*Career exploration:* One’s involvement in trying out a variety of activities, roles,
and situation in order to find out more about aptitude for, or interest in, an occupation or other career opportunities (Sears, 1982, p. 139).

*Career knowledge:* [The synthesis of career] information related to the world of work that can be useful in the process of career development (Sears, 1982, p. 139).

*Career maturity:* Reflects an individual’s readiness to make well-informed, age-appropriate career decisions (Naidoo, 1998, p. 1).

*Career planning:* The final process in career decision making, “to make a decision, implement the decision, and evaluate the outcomes of the decision” (Sears, 1982, p. 140) is career planning (Super & Hall, 1978).

*Career self-concept:* Career self-concept was defined by Sears as “Global conceptions people have of themselves, their abilities, and interests that they express through work, leisure, family, and community roles and activities” (1982, p. 141). After 1986 most researchers use the term “self-efficacy” citing Albert Bandura’s (1986) social cognitive theory as the evolution of self-concept. Career self-concept research has been cited along with the discussion of career self-efficacy research.

*Career self-efficacy:* Self-efficacy is the belief in one’s ability to succeed in specific situations (Bandura, 1997). Career self-efficacy in this study refers to a students’ belief in their abilities to select and plan for a satisfying career.

**Limitations**

The analysis and evaluation of the CTE Introduction course is based on data previously collected. The data collection was facilitated by the USOE during the 2011-
2012 school year. As data collection took place over 8 months, there may be external and internal factors that could influence the measurement of the dependent variable (the CTE Introduction course evaluations), including: student maturation, the variability among school district implementation, and/or the differences among teachers, the implementers of the intervention (course). In addition, the results of the study are only generalizable to Utah seventh grade students.

The responses in the preexisting data were self-reported by seventh graders and therefore, as with all survey data, are subject to their interpretation and personal perceptions. Additionally, the student questionnaire, which was pilot tested and evaluated for reliability, may not address all the course objectives and resulting outcomes.

Finally, the evaluand is part of a public school social science inquiry, reflecting social priorities based on political decisions and the stakeholders who have been involved in the course creation and continuation. The evaluand is intertwined with “politics and science” (Mertens, 2010, p. 53) and as a result, the course objectives, delivery, and measurement may have inherent uncontrollable biases.
CHAPTER II
LITERATURE REVIEW

If you ask people the question “Why do we educate?” you will get a variety of responses. These responses will probably not vary much from the responses presented by educational scholars. Arguably, the answer to the question “Why do we educate?” is somewhat contextual and an artifact of the politics and economics of the time when the question is posed, and to whom it is posed. In America, we educate because an educated population perpetuates our culture, builds our economy, and supports societal ideals of democracy—essentially, education forms our future. Within the societal context, we also value the rights of an individual to have equal opportunities and the freedom to live their life pursuing their goals, aspirations, and passions. While it is not always agreed upon how best to accomplish these ideals, we educate to prepare youth for their future and the future of our society. This review addresses literature relevant to planning for one’s future through an exploratory career education course—CTE Introduction.

Literature Overview

Career development and education research suggests occupational career interventions are beneficial, in that they are effective in preparing and guiding people to fulfill their future occupational career aspirations. This large body of research empirically documents the effectiveness of career education for career decision making. Numerous types of interventions and delivery methods (modalities) have been implemented and evaluated. Almost simultaneously, researchers and developmental psychologists have
tried to determine the appropriate age (career maturity) for career decision making and the effectiveness of career education interventions. Much of this research has been conducted with high school and adult populations. As an essential component of understanding career education effectiveness, researchers have also investigated the role of counselors on intervention outcomes. This literature review systematically addresses research in the following areas: career maturity, career self-efficacy, career education interventions, and counselor career education implications. Each of these areas relates to the proposed research questions. There is some overlap between career maturity, career self-efficacy, and career decision-making or planning. These concepts together may influence the course effectiveness and are implicated in all the research questions. However, these research areas will be discussed separately as they relate to career development and career education research. Career education intervention research that specifically addresses career knowledge and career planning has been reviewed, as this research informs research questions 1, 2, and 3. Finally, the role of counselors in career education interventions are discussed and used to evaluate the findings of research question 5.

**Career Maturity in Career Education**

“What do you want to be when you grow up?” This is a common question posed to children and is asked in some form until they have chosen a career or are gainfully employed. How a person answers this question is based upon their interests, their understanding of what grown-ups do, and later on, their assessment of their abilities
intertwined with societal expectations, opportunities, and constraints.

In 1953, Donald Super published *A Theory of Vocational Development* that presented ten propositions that emphasized continuity in vocational and human development and focused on the progression of “choice, entry, adjustment, and transition to new choice over the course of an entire life cycle” (Super, Savickas, & Super, 1996, p. 123). This vocational theory was named the *vocational maturity* theory and later became known as the *career maturity* theory (Patton & Lokan, 2001). This theory took a “life-span, life-space approach to career development” (Super, 1980). Super developed a progression called *The Life-Career Rainbow: Six Life Roles in the Schematic Life Space* (Patton & Lokan, 2001; Super et al., 1996) that visually depicted life-span (age) and life-space (time and space) to explain career decision making.

The life-span, or longitudinal, dimension of the rainbow depicts life stages and demarcates them to coincide with childhood, adolescence, adulthood and middlescence, and senescence. The time dimension adds a developmental perspective that focuses on how people change and make transitions as they prepare for, engage in, and reflect upon their life roles, especially the work role (Super et al., 1996, p. 126).

Super and colleagues (1996) suggested, and others (Brown & Lent, 2005; Savickas et al., 2009; Toepfer, 1994) agreed, that occupational choice should be “an unfolding process, not a point-in-time event” (Super et al., 1996, p. 122). Super identified five life-span stages and approximate ages: growth (ages 4-13), exploration (ages 14-24) establishment (age 25-44), maintenance (ages 45-65), and disengagement (over 65). An index for measuring career maturity was developed in 1965 by a student of Super’s, John
Crites. This index was later revised in 1978 and again in 1995 (Patton & Lokan, 2001).

Research in the area of career maturity is impressive. In the last six decades, career maturity measurements have been used extensively in career guidance research and education (Gottfredson, 1981; Howard & Walsh, 2009, 2011; Naidoo, 1998; Palladino Schultheiss, 2008; Patton & Creed, 2001; Patton & Lokan, 2001; Toepfer, 1994), and been included in all the published career intervention meta-analyses outcome measures to date (Baker & Popowicz, 1983; Baker & Taylor, 1998; Brown et al., 2003; Brown & Krane, 2000; Oliver & Spokane, 1988; Whiston et al., 1998). The career maturity construct has received some criticisms (Patton & Creed, 2001; Patton & Lokan, 2001; Vondracek & Reitzle, 1998) that have challenged how well the index accounts for a variety of variables, including “age and level of education, gender, socioeconomic status, and a wide spectrum of career-related variables such as vocational identity, career decision, career indecision and work role salience” (Patton & Lokan, 2001, p. 35). Super and colleagues (1996) also agreed that more research needs to be conducted with the Career Maturity Index to ensure accuracy with a complexity of variables, and Super suggested “a change in terminology from career maturity to career adaptability, would convey better the range of career-related attitudes, knowledge, and skills at the various stages and transition points in career development” (Patton & Lokan, 2001, p. 43).

Despite the criticisms, the Career Maturity Index has endured with a few modifications and enhancements—making lasting impacts in the area of career counseling (Howard & Walsh, 2009; Palladino Schultheiss & Stead, 2004; Patton & Lokan, 2001).

In an effort to evaluate Super’s career maturity theory and Gottfredson’s (1981)
circumscription theory and social cognition model for the development of occupational aspirations, Helwig (2004) conducted a 10-year longitudinal study of students from 2nd through 12th grade evaluating their career development experiences and investigating additional career education variables. The study began in 1987 with 208 second graders. The sample was similar to the general student population. The variables evaluated were occupational aspirations and expectations, gender roles, beliefs, out-of-school activities, parental involvements in career awareness, and work experiences. Beginning in the sixth grade, children were surveyed every other year using a Survey of Interests and Plans, developed by Helwig, until their senior year. Two of the variables measured were occupational aspirations and occupational expectations; both are related to the Utah CTE Introduction course outcomes (Figure 1).

In the Helwig study, occupational aspirations were measured through the question, “As an adult, if you could have any job you wanted, what job would it be?” Occupational expectations were measured through the question, “As an adult, what job do you really think you will have?” In the second grade, 50% of the students’ aspirations matched their expectations, this percentage climbed to 71 by the 12th grade (Helwig, 2004, p. 82)

The study did not employ a specific career education intervention and is not without limitations, perhaps the most glaring is experimental mortality. Of the 208 students who began the study in the second grade, only 130 students were available in the fourth grade; some had moved but were later found in high school. In the 8th grade, 123 students completed the survey, in the 10th grade, 115 completed the survey, and finally, in
the 12th grade, 103 students completed the survey. Only 75 students were available at all six data collection points. To Helwig’s credit, he did compare the data of the students who were available at all of the time points and those who were not, and found no significant difference between those groups for gender, parental age, or parental education level. There was, however, a group difference for ethnicity and single parent households. Upon conclusion of the study, Helwig supported Super’s career maturity theory and Goffredson’s theory of circumscription, agreeing self-concept or self-efficacy (see definitions, Chapter I) is linked to career decisions and this seemed to occur near the age of fourteen when “a principal determiner of occupation aspirations is internal” (Helwig, 2004, p. 55).

In their meta-analytic study of career education interventions, Whiston and colleagues (1998) found that the “effect size for career interventions with junior high students was significantly greater than for all the other groups, whereas high school and adult populations had larger effects sizes than those of elementary students” (p. 154). Oliver and Spokane (1988) found the effect size for elementary school students to be slightly negative (-.01); this statistic was computed on one study and cannot be considered conclusive. Whiston and colleagues also examined one elementary school study and found an effect of .04 or virtually no effect.

Career maturity measures are not without critics. Watts (2008) stated that “career maturity measures do not assess career development tasks and transitions,” (p. 514) however, the research evidence on interventions (to be discussed in the next section) supports developmental theories and suggests developmentally, middle school is an
appropriate time for career exploration. Middle school students, in particular, seventh grade students (the focus of this research), are on average 13 years old and would be at the end of the growth stage and at the beginning of Super’s exploration stage. At the exploration stage, students begin to consider career options. The exploration stage is “When habits of industriousness, achievement, and foresight coalesce” (Super et al., 1996, p. 132) and possible-selves and self-efficacy begin to “crystallize into a publically recognized vocational identity with corresponding preferences for a group of occupations at a particular ability level” (p. 132).

Career self-concept or as it has evolved, career self-efficacy, is a critical element in Super’s career maturity theory and Gottfredson’s (1981) theory of circumscription. Super believed, regardless of the society, the amount of education an individual received would in-turn impact their life-stage (age) and their self-concept. He proposed this self-concept would accelerate their career maturity and allow them to make career decisions earlier than less-educated people (Super et al., 1996). Gottfredson believed individuals would choose occupations beginning as early as 14, confirming Super’s life-stages premise. While the exploration stage in Super’s 60 year-old theory and Gottfredson’s 30-year-old self-concept developmental theory of circumscription both begin around age 14, perhaps beginning career exploration at the age of 13 (the approximate age of Utah seventh-grade students) in the highly structured educational setting of the 21st century is appropriate. The extensive research in the area of career maturity and life-stages is fairly conclusive and consistent despite some criticisms; the majority of the research suggests that career exploration is appropriate during the middle school years (Auger, Blackhurst,

**Career Self-Efficacy**

A Google Scholar and EBSCO education database search for “career self-efficacy” and “middle school” and “meta-analysis” netted 199 studies. The search was refined to exclude the word “math” as several of studies dealt specifically with math self-efficacy related to careers. This exclusion resulted in 42 studies that were reviewed for relevancy specific to career decision-making self-efficacy outcomes involving middle school students from the United States. An examination of the remaining research found that none of the published articles were meta-analysis; rather they all cited career intervention meta-analyses that used self-efficacy as a construct or variable. Nevertheless, eight relevant articles were discovered along with eight empirical studies related to this research and will be discussed as part of this literature review.

At the heart of Bandura’s (1997) widely cited social cognitive theory is the concept of self-efficacy. Self-efficacy refers to one’s belief in their ability to complete the necessary tasks to achieve a particular goal. Self-efficacy is based on four self-informing efficacy sources: “performance accomplishments (experiences), vicarious learning (modeling), physiological states (emotional arousal, and verbal persuasion (encouragement)” (Betz & Hackett, 2006, p. 4). These four sources of self-efficacy are related to self-concept, however self-efficacy differs from self-concept as it is more
dynamic (Brown & Lent, 2006) and changes as the domain is informed. Betz and Hackett were very specific in their seminal article, *Career Self-efficacy Theory*, that there must be a behavioral domain (Bandura, 1993) specified to measure self-efficacy. In this case, the CTE Introduction Expected Course Outcomes are the specific domain measuring career self-efficacy.

Bandura elaborated on domain self-efficacy by stating that “People who have a low sense of efficacy in a given domain shy away from difficult tasks, which they perceive as personal threats. They have low aspirations and weak commitment to the goals they choose to pursue” (Bandura, 1993, p. 144). In the context of career decision-making, it is easy to see how career knowledge could affect self-efficacy and future career planning. Conversely, Bandura acknowledged that “People with high efficacy approach difficult tasks as challenges to be mastered rather than as threats to be avoided” (p. 144).

Career planning and career decision-making are synonymous terms in career education literature. Interestingly self-efficacy is both a dependent and independent variable in studies reporting a career planning variable. Perry, Liu, and Pabian (2010) examined the roles of teachers and parents supporting secondary students (ages 11 to 19, \( N = 285 \)) in the area of career preparation using two constructs, career decision-making self-efficacy and career planning. The researchers measured student career self-efficacy with an instrument developed by Taylor and Betz (1983) and found that career preparation was significantly correlated and influenced by parents and teachers. Both parents and teachers predicted student career self-efficacy and school engagement. Taylor
and Betz also found a strong relationship between self-efficacy and career planning. However, they also reported the inverse, “students reporting less confidence in their ability to complete decision-making tasks were more undecided than those reporting higher levels of confidence” (p. 79).

Turner and Lapan (2002) examined the career interest and vocational self-efficacy of 139 middle school students and found that parents accounted for a third of the variance in student self-efficacy scores. Consistent with previous research in social cognitive career theory, career self-efficacy, career planning efficacy, and parent support predicted career interests in all types of careers. The authors concluded that their findings “highlight the importance of career planning and exploration in young adolescents’ career development” (p. 52) and the involvement of parents to increase self-efficacy and career decision-making.

Lent, Brown, and Larkin (1987) tested two competing career theories with two models, one for career interests and the other for career self-efficacy. While both models were significant predictors, the researchers found that career self-efficacy was a stronger predictor on academic achievement and, based on other research, concluded that career self-efficacy then led to career decision making. Supporting these findings, Matsui and Onglatco (1992) found that a “weak self-efficacy for career decision making is associated with anxiety over the career choice process” (Hackett, 1997, p. 224). Theoretically, career self-efficacy is vital to career decision making (Betz & Hackett, 2006), but few studies have been conducted in this area with middle school students. Most career education interventions that include career self-efficacy have been implemented and
evaluated at the high school level.

There is a growing body of research that suggests career decisions (career plans) are made long before high school and that young adolescents are capable of and do make career decisions (Betz, 2006; Brown & Lent, 2006; Hossler, Schmit, & Vesper, 1998; Lapan, Adams, & Turner, 2000; Turner & Lapan, 2002). Social cognitive theory and the premises informing career self-efficacy suggest that seventh grade domain specific content influences career self-efficacy and, regardless of age, impacts career decision making.

Finally, Hossler and colleagues (1998), in their longitudinal study, determined that students make career decisions between 8th and 10th grade. Based on this and other research, if career self-efficacy is developed through a career exploration domain, which includes career decision-making and planning, a focus on curriculum interventions and academic content to support Bandura’s four self-efficacy inputs (experiential learning, modeling, inquiry, and encouragement) may be needed to increase student career self-efficacy. It is safe to say that self-efficacy is complex, however the literature suggests that applying a specific domain, such as career exploration, should produce a specific behavior and may help to predict future behavior (Bandura, 1986).

**Career Education Interventions**

“Vocational psychologists have observed that, career planning, career decision making, self-efficacy, vocational identity, and career expectations are interrelated. In other words, these variables may be understood as indicators of an underlying construct
called career preparation” (Perry et al., 2010, p. 273). A great deal of research has been conducted concerning career preparation interventions. Several meta-analyses have evaluated multiple types of interventions, in a variety of settings, measuring a variety of constructs and variables. None of the variables to be measured in this research under study are uniquely different from the variables that have been measured previously. However, what is unique is how the evaluand is delivered, through classroom teachers and counselors, and the duration of the intervention (9 months). That said, the following meta-analyses and current research in the area evaluates critical variables and the over-all effect sizes of career interventions. These findings are essential background and will aid in interpreting the results of this study.

Briefly, a meta-analysis is a way to summarize and synthesize discipline information from a large body of research. A well done meta-analyses should provide “a relatively objective and quantitative summary of a set of research findings” (Gore & Takuya, 2008, p. 629). While the methodology of a meta-analysis may differ from one study to another, conclusions may be drawn providing that the concepts are similar and that the data has been treated equally (Glass, 1976, 1977; Gore & Takuya, 2008).

Researchers who prepare meta-analyses typically calculate effect sizes to measure and evaluate outcomes. An effect size provides a standardized mean difference and indicates the degree to which, in this case, a career intervention, modality, or practitioner efficacy, could be considered practical and effective. An effect size of .20 would be considered a small effect, .50 would be considered a medium effect, and .80 would be considered a large effect (Cohen, 1977).
One of the first career education meta-analysis, as recognized in the literature, was conducted by Baker and Popowicz (1983), who analyzed 18 empirical experimental career education intervention strategies conducted with K-12 students between 1970 and 1981. Their inclusion criteria consisted of the following: studies with experimental or quasi-experimental designs that included treatment and comparison groups; studies published in a refereed journal; research that included at least one career education intervention; and studies that included children and adolescents in grades kindergarten through grade twelve. From 18 studies, they cited 118 different effect sizes. The treatments included some form of classroom instruction raging from two hours to 13 days. The dependent variables evaluated included six measures for career maturity, four career exploration surveys, two career knowledge tests, three vocational role instruments, and three self-efficacy surveys related to career information seeking. The researchers reported an overall effect size of .50 for these career-intervention programs. Baker and Popowicz concluded there was significant evidence to suggest career education was effective. In their final analysis, they determined 83% of career interventions had a positive effect, while 17% had a negative effect.

Spokane and Oliver also published a meta-analysis in 1983 in the area of career development interventions and evaluated a variety or modalities; individual, group, and classes. These researchers included post-secondary students, and obtained a mean effect size of .85 when comparing a variety of career interventions. While Spokane and Oliver (1983) provided an effect size for a variety of career interventions and modalities, their research did not explore the characteristics or relationships between the studies making it
difficult to evaluate the different intervention modalities.

In 1988, Oliver and Spokane published perhaps the most widely cited seminal work in the area of career education, *Career-Intervention Outcome: What Contributes to Client Gain?* Oliver and Spokane reviewed 140 studies and identified 58 that met their criteria. This meta-analysis reviewed published research between 1950 and 1983 and found 240 treatment-control contrasts with a total population of 7,311 students. Oliver and Spokane defined a career intervention as

...any treatment of effort intended to enhance an individual career development or to enable the person to make better career-related decisions. This broad definition included a wide range of interventions, such as individual counseling, group activities, computer applications, and self-administered inventories (Oliver & Spokane, 1988; see also Whiston et al., 1998, p. 150).

A vocational method intervention was defined as “traditional individual or group vocational counseling, workshops, classes with career selection and development, self-help material, computer-based systems, and self-administered inventories” (Oliver & Spokane, 1988; Whiston et al., 1998, p. 150). Oliver and Spokane found an overall career intervention effect size of .82, which is considered large. The researchers chose to use Glass’s delta (Glass, 1976, 1977) for calculating effect size for standardized mean differences. They also calculated the effect size using Cohen’s $d$ (Cohen, 1977) and found a similar effect size, but chose the Glass’s estimate to make additional comparisons.

A decade later, Whiston and colleagues (1998) published a replication and extension of the Oliver and Spokane (1988) study. Whiston and colleagues reviewed published career intervention experimental design research using the Oliver and Spokane
definitions, methodology and inclusion criteria, but the researchers extended the research by evaluating studies conducted between 1983 and 1995. Whiston and colleagues identified 47 studies, which met the outlined criteria resulting in 268 treatment-control contrasts and 4,660 participants.

Both studies (Oliver & Spokane 1988; Whiston et al., 1998) included only research that involved a “career-intervention treatment group and a control group. Placebo control groups were classified as experimental groups if the activities were career related. Studies involving psychotherapy, physically handicapped participants, and education counseling were excluded” (Whiston et al., 1998, p. 151). Whiston and colleagues suggested meta-analytic techniques had evolved since the Oliver and Spokane study, and took the outliers into account when analyzing the Oliver and Spokane data. With outliers removed, the effect size (using Glass’s delta) was .65. The researchers continued to apply conservative measures weighting the effect size by sample size (Hedges, 1982) which resulted in an average weighted effect size of .48, signifying a small almost medium effect for the career interventions. Hedges’ procedure was followed by Whiston and colleagues, as she and her colleagues analyzed the 1983-1995 data.

In addition to calculating the effect size using Glass’s delta and Cohen’s $d$, Whiston, et al. computed homogeneity statistics to determine the differences or similarities between the studies. The unweighted delta (previously used by Oliver and Spokane) for the 1998 analysis was .45; the average unweighted Cohen’s $d$ was also .45. When adjusted for small sample bias, $d$ equaled .44. The direct weighing of delta by sample size resulted in an effect size of .38. When inversely weighted (Hedges & Olkin,
1985, as cited in Whiston et al., 1998), the effect size was .30 (95% CI = .27-.33), which suggests that the effect size was significantly different from zero. Using Cohen’s scale for effect sizes, this is a small effect. In the final analysis, the researchers found a “significant within-group difference and between-group differences for the number of sessions” (Whiston et al., 1998, p. 156) and that the “treatments with 9-10 sessions had the largest effect whereas those with 13 sessions had the lowest effect” (Whiston et al., 1998, p. 156). The researchers also found the majority of the studies favored treatment conditions \( (N = 41, 87\%) \) and Whiston and colleagues concluded career interventions have a positive effect.

Authors of both meta-analytic studies (Oliver & Spokane, 1988; Whiston et al. 1998) agreed “that career interventions seem to be most effective with students in junior high or middle school” (Whiston et al., 1998, p. 160). Interestingly, only seven (12%) of the studies in the Oliver and Spokane study and only two studies (4%) of the studies in the Whiston and colleagues meta-analysis were coded as interventions for middle or junior high school students. Across age groups, Oliver and Spokane found the intervention duration time averaged 7.87 hours with a range .25—30 hours, while Whiston and colleagues found an average of 7.5 in hours and a range of .78—64 hours. The variation in the duration of the treatments is significant to note as the purpose of this research is to evaluate a 9-month course where middle school students are involved in a career education exploration intervention (course) for approximately 180 days (hours), which would be considered an outlier in the data set of both meta-analyses.

In the final analysis, Oliver and Spokane (1988) felt that their meta-analytic
approach to the integration of career-intervention-outcome literature had some positive results but regretted that they could not offer practitioners more guidance based on their findings. They recommended authors, reviewers, and editors strive to ensure that published research includes information for future statistical analysis. The Whiston and colleagues (1998) replication study had the benefit of the coding parameters as outlined by Oliver and Spokane, better documented studies, and more statistically accurate analysis tools that refined the results and provided more definitive findings and recommendations for practitioners. Regardless of the Oliver and Spokane (1988) study shortcomings, Whiston and colleagues was thorough and upon final analysis supported Oliver and Spokane’s findings that career interventions were effective. The 1998 analysis estimated the overall effect sizes was somewhere between .40-.65. Table 1 summarizes the major findings from these two influential meta-analyses relevant to this evaluation research project.

In the same year that Whiston and colleagues (1998) published their study *Career-Intervention Outcome: A Replication and Extension of Oliver and Spokane (1988)*, Baker and Taylor (1998) published a literature review titled the *Effects of Career Education Interventions: A Meta-Analysis*. This meta-analysis used the same methods and inclusion criteria previously used in the Baker and Popowicz (1983) study. This meta-analysis evaluated K-12 intervention studies between 1982 and 1996, continuing the work of Baker and Popowicz. Baker and Taylor found 12 studies had been published between 1982 and 1996, and added these studies to the 18 previously evaluated to determine career intervention effectiveness over a total of 30 studies. They found an
Table 1


|---------------------------------------------------|-------------------------------------------|-------------------------------------------|
| Studies evaluating middle/junior high school students | N = 7  
   d = 1.66                                         | N = 2  
   ES = .42                                          |
| Studies using a class treatment modality           | N = 9  
   d = 2.05                                         | N = 9  
   ES = .54                                          |
| Academic performance                               | N = 9  
   d = 2.05                                         | N = 0  
   ES = .88                                          |
| Career related knowledge                           | N = 6  
   d = .88                                          | N = 2  
   ES = .88                                          |
| Career maturity                                    | N = 18  
   d = 1.05                                         | N = 16  
   ES = .88                                         |
| Self-concept changes                               | N = 10  
   d = .48                                          | N = 6  
   ES = .32                                          |
| Attitude change                                    | N = 2  
   d = .55                                          | N = 3  
   ES = .21                                          |

overall effect size of .39 and an unbiased (Glass’s delta) effect size of .34 (delta had not been used to make the 1983 calculations, where a .50 effect size had been computed). All but one of the 12 studies produced a positive average effect size, the only study that produced a negative effect size (-.05) was a 1983 study conducted by Weeks and Porter (Baker & Taylor, 1998), which employed an intervention concerning nontraditional role models and curricular materials with 48 eleventh-grade students.

It is interesting to note that of the 12 identified studies (1983-1996) in Baker and Taylor’s (1998) review, only four were included in the Whiston and colleagues analysis. Seven would have been excluded because they did not meet the criteria of measuring a “career outcome;” rather, they measured academic achievement and psychotherapy outcomes. Upon review, it is unknown why the remaining study (Taymans, Lewis, &
Ramsay, 1990) was not included by Whiston and colleagues. This study involved urban youth \((N = 40)\), ages 14-18, in an experiential learning environment during a 7-week summer course. Perhaps the outcome measures did not meet the Whiston and colleagues (1998) criteria or was simply missed.

In a synthesis of the literature, Hughes and Karp (2004) examined the research efforts of “career education meta-analyses and individual studies on comprehensive guidance programs, career courses, counseling interventions, and computer-assisted career guidance” (p. i), using the same criteria Oliver and Spokane (1988) and Whiston and colleagues (1998) used with an inclusive (youth to adult) population. However, the Hughes and Karp effort chose to focus on career advising (guidance, discussed in greater detail in the next section) and curriculum-based interventions between 1983 and 2003; they limited the scope of their research to school-based interventions.

Hughes and Karp (2004) selected research that employed experimental or quasi-experimental designs and excluded academic or career-oriented outcomes and interventions that were not school-based, relevant to this research study. Twelve articles were found to be school-based, but only three were classroom class-time interventions and only one had been conducted with middle school students. Hughes and Karp, recognizing the difficulty in evaluating these school-based courses due to the variation in teacher quality, instructional approaches, curriculum content, and the adherence to curriculum by teachers, did not report effect sizes. However, in their final analysis, Hughes and Karp agreed with other researchers (Baker & Popowicz, 1983; Baker & Taylor, 1998; Oliver & Spokane, 1988; Whiston et al., 1998) and concluded:
Students do seem to benefit, both vocationally and academically, from participation in career courses. In particular, they seem to increase their knowledge of careers and their ability to make career-related decisions. On most career-related measures, students did see increased outcomes when compared with students not enrolled in a career course. In the one study exploring academic measures, participants in a career course did improve academically. (Hughes & Karp, 2004, p. 29)

A database search was conducted to determine if any research studies on school-based courses for middle school students had been added to the literature since 2003. Google Scholar, which searches all relevant educational databases, and ProQuest, which searches 29 databases of dissertation and thesis abstracts, were used to find peer-reviewed, full-text articles, written in English. Additional terms used in the search were “middle school career intervention,” “middle school career course,” “junior high school career course,” and “high school career course.” These returns were then sorted by eliminating the terms incongruent with the research problem outlined in this study. The words excluded included “military,” “medical,” “university student,” and “immigrant.” These exclusions eliminated 2,319 studies of the 2,670 articles found using Google Scholar and when the term “experimental” was added for inclusion, the articles were cut to 68. Upon further review, only two studies were school-based career interventions with an experimental (not correlational) design considered relevant to an American middle school student population. Although this evaluation is not experimental, experimental studies were selected to be congruent with previous meta-analyses and because these research designs are considered rigorous, and cited for strong internal validity (Trochim & Donnelly, 2006).

A search in ProQuest netted 2,200 results, but when the same Google Scholar
exclusion/inclusion criteria was applied, only one study could be used for this review. These findings are consistent with the search results of other researchers (Baker & Popowicz, 1983; Baker & Taylor, 1998; Hughes & Karp, 2004; Oliver & Spokane, 1988; Spokane & Oliver, 1983; Taymans et al., 1990; Whiston et al., 1998) in that very few career intervention studies have been conducted on class interventions with middle school or junior high school students.

As only three studies met the inclusion criteria, each will be briefly described. The results should be evaluated cautiously as the sample sizes are relatively small, and the interventions and dependent variables for each study are different. Each contributes somewhat differently to the literature.

Legum and Hoare (2004) investigated the impact of a 9-week, 1 time per week (no duration noted in the article) career intervention with at-risk middle school students (sixth and seventh graders) in a pretest/posttest design to measure maturity levels, self-esteem, and academic achievement between a treatment ($N = 27$) and a nontreatment ($N = 30$) comparison group. At the end of 9 weeks, no statistically significant differences were found between the experimental and control groups on any measurement for career maturity-attitude, career maturity-competency, self-esteem, or academic achievement. In addition to a $t$-test conducted between the groups, the researchers ran an analysis of covariance on each variable to corroborate the $t$-test results, and again found no significant differences (Table 2). The researchers postulated it was possible at-risk students may have a delayed career maturity, and they “perceive the reality of their plight and the obstacles that confront them” (p. 155) affects their self-esteem to levels that could
Table 2

*Summary of Comparison Finding for Middle School Career Intervention Research: 2003-2012*

<table>
<thead>
<tr>
<th>Authors</th>
<th>N</th>
<th>Intervention</th>
<th>Significance/ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legum &amp; Hoare (2004)</td>
<td>57</td>
<td>Impact of a career intervention on at-risk middle school students</td>
<td>Career maturity-attitude, not significant&lt;br&gt;Career maturity-competency, not significant&lt;br&gt;Self-esteem, not significant&lt;br&gt;Academic achievement $d = .31$</td>
</tr>
<tr>
<td>Turner &amp; Conkel (2010)</td>
<td>142</td>
<td>Career counseling course for inner-city youth</td>
<td>Person-environment fit* $T2 &amp; C d = .49$&lt;br&gt;Social &amp; work readiness skills* $T2 &amp; C d = .51$&lt;br&gt;Efficacy/positive attributions* $T2 &amp; C d = .52$&lt;br&gt;Emotional support* $T1 &amp; T2 d = .57$ and $T2 &amp; C d = .52$&lt;br&gt;Instrumental Support* $T2 &amp; C d = .52$</td>
</tr>
<tr>
<td>Turner &amp; Lapan (2004)</td>
<td>160</td>
<td>Computer module intervention to increase non-traditional career interests and career-related self-efficacy</td>
<td>Career exploration efficacy and vocational development* $\eta^2 = .12$&lt;br&gt;Interest Inventory Scores&lt;br&gt;-Pre-post time differences* $\eta^2 = .72$&lt;br&gt;-Pre-post time by treatment differences* $\eta^2 = .22$&lt;br&gt;-Pre-Post time by gender* $\eta^2 = .27$</td>
</tr>
</tbody>
</table>

*Note.* * Indicates significant findings, $\eta^2$ effect sizes differ in scale to Cohen’s $d$. Less than .01 is a small effect, .09-.25 is a medium effect, and .25 is a large effect.

not be overcome with a once-a-week, 9-week intervention. The authors recommended a longitudinal study and the implementation of a course that met more often for a greater duration of time.

Turner and Conkel (2010) evaluated a career development intervention with inner-city adolescents to determine if this type of intervention could help students to overcome inner-city barriers such as lower graduation rates, few work experience opportunities, and lower employment options. The researchers developed a career-counseling course for 142 multiethnic seventh- and eighth-grade inner-city students at four inner-city middle schools and formed two stratified randomized samples as treatments groups ($N = 24$ and $N = 53$) and a control group ($N = 65$). Treatment 1 (T1)
used a traditional counseling model as the intervention and required students to complete two 1-hour sessions. Treatment 2 (T2) used a model that integrated career exploration skills, interest and ability skills (Person-environment fit), goal-setting skills, social skills, and work readiness skills, and required students to complete four 1-hour sessions.

Turner and Conkel (2010) used an analysis of variance (ANOVA) to determine any significant pretest variances between T1, T2, and the control (C, nontreatment) groups, and found no differences between the three groups and their understanding of career barriers. The researcher’s hypothesized T2 participants would report greater gains on a career development inventory and a proactive skills measurement as a result of the integrative approach. Posttest results were analyzed through multivariate analyses of variance (MANOVA) and showed significant differences among the three groups in interests and ability skills and social and work readiness skills. No significant differences were found in career exploration, goal setting, or self-regulated learning as measured by the proactivity skills measurement. The researchers were very thorough in reporting significance and effect sizes on 18 variables. Five variables were found to be significant with five medium effect sizes between the T2 group and the control group. There was only one significant variable, emotional support, which reported a medium effect between the T1 and the T2 group, meaning both interventions had a positive effect on the student sense of emotional support. The authors concluded traditional career counseling may not be sufficient for adolescents living in the inner city to “gain adaptive advantages in current and future labor markets” (p. 463), but the duration of the treatment should be considered as the T2 intervention doubled the duration and could be responsible for the
differences.

The results of this research demonstrate career development interventions among adolescents may be effective and lend further support to counselor involvement as this relates to emotional support, which is part the verbal support needed for self-efficacy. Again, this was a short-duration intervention, and one would expect the 9-month CTE Introduction course, which integrates all of the six skills described in the Turner and Conkel integrated model, may have equally significant comparable results.

The final career intervention study included in this review evaluated non-traditional career interests and career-related self-efficacy among 160 middle school adolescents from two ethnically diverse public middle schools (Turner & Lapan, 2005). Students were assigned to a treatment group ($N = 107$) or a delayed-treatment control comparison group ($N = 53$) using a quasi-experimental, nonequivalent group design. Using an author-developed intervention, students completed self-paced computer modules over the period of 1-week career exploration, career mapping, and career interpretation (non-traditional careers). The authors hypothesized there would be significant differences in the career interests and efficacy of adolescents at pretest as a function of gender. The authors used a previously validated, 90-item interest inventory to measure pretest score differences in a one-way ANOVA for career interests and efficacy on eight variables. The researchers found significant gender differences on three variables, “with boys reporting greater interests in realistic careers than girls, and girls reporting greater interests in social and conventional careers” (p. 525). The authors also hypothesized there would be “significant increases at posttest in career exploration
efficacy and educational and vocational development efficacy for both boys and girls in the experimental group, but not in the control group” (p. 525). Results indicated significant differences between pre-post treatment differences with a medium effect size. In a final hypothesis, the researchers stated there would be a significant increase in non-traditional career interests for both boys and girls in the experimental group, but not in the control group at posttest. The results indicated significant treatment differences with medium to large effect sizes.

Specifically, our results showed significant increases in adolescent’s career exploration efficacy, and educational and vocational development efficacy in the treatment group compared to the delayed treatment control group. Additionally, after confirming that there were gender differences in middle-school adolescents career interests (with boys having greater interests in Realistic careers, and girls having greater interests in Social and Conventional careers), our results [after treatment] showed increases in boys Artistic, Social, and Conventional career interests, and in girls Realistic, Enterprising, and Conventional career interests. (Turner & Lapan, 2005, p. 527)

If these significant and practical results can be measured after a 1-week, three-module intervention, how might a 9-month course that includes computer instruction, an integrative approach (Turner & Conkel, 2010), lessons and career measurements for career maturity and self-esteem (Legum & Hoare, 2004), career counseling, and instruction by qualified teachers compare? This larger CTE Introduction statewide study may answer this question and contribute valuable findings on career planning, career knowledge, and career self-efficacy to this body of research.

In 2005 Brown and McParland claimed, “The meta-analytic evidence on the effectiveness of career interventions in general clearly indicates that career interventions are effective, but [the effect sizes are] probably small to moderate, rather than large”
(Walsh & Savickas, 2005, p. 197). For nearly 30 years (1983 to 2012), a trend of positive effects from career interventions has emerged. Taken individually, some of the studies may not be significant or provide large effects, but evaluated and analyzed together, the research establishes reasons to investigate middle school career interventions.

**Counselor Career Education Implications**

In Utah the vision for the Comprehensive Counseling and Guidance Program is to:

Provide every student with the assistance and guidance to effectively identify, select, plan, and prepare for a career of choice, while giving each student the encouragement to achieve the goals which will enable him or her to have increased confidence when embarking on a career and/or entering the workplace (USOE, 2011).

This vision compels school counselors to work with State career guidance interventions, specifically the CTE Introduction Course (USOE, 2012c).

The previously discussed meta-analyses did not describe in any real detail the persons responsible for the delivery of the career education interventions. However, counselors were discussed as independent variables in most of the studies selected for meta-analysis. In the study conducted by Baker and Popowicz (1983) the authors required that studies be classified as “proactive career education,” (p. 179) suggesting that the interventions were not part of school subject content but were stand-alone treatments for school-age children (K-12). While not explicit, the titles reviewed support this conclusion.

Oliver and Spokane (1988) evaluated “career-counseling-outcome” (p. 448)
research, again suggesting, though not explicit, that professional career-guidance counselors were delivering the career intervention treatments. The career interventions included in this meta-analysis identified the treatments as either involving counselors or as intervention treatments that were “counselor-free” (involving computer programs). The researchers reported that workshops provided by counselors and group counseling studies had the largest effect size on career outcomes. Interestingly these researchers acknowledged that 180 research studies could be considered a small number for a meta-analysis, but “because career counseling has been so definitively demonstrated to have positive results [they] seriously doubt[ed] that many studies averaging null results have been conducted” (Oliver & Spokane, 1988, p. 455).

In the follow up meta-analysis conducted by Whiston and colleagues (1998), the researchers found that the majority of the studies (54%) investigated counselor-free interventions. The research being evaluated in this meta-analysis (1983-1995) would have coincided with widespread distribution of desktop computers and perhaps resulted in research that could implement computer interventions/instruction and lower career-guidance costs. However, the remaining studies (46%) involved interventions by trained (28%) or in-training (18%) counselors. Among the interventions conducted by counselors, post hoc analysis indicated that counselors-in-training had effect sizes significantly larger than those of experience counselors, and experienced counselors had effect sizes larger than those of counselor-free treatments. These findings would corroborate the findings of the previous meta-analyses research that counselors are crucial to the success of career education interventions.
Baker and Taylor (1998), replicating the work of Baker and Popowicz (1983), did not discuss how the K-12 studies they evaluated were delivered. However, again by evaluating the treatment titles, it appears that of the 30 studies evaluated, most would implicate a counselor-led intervention. It is unclear as to the counseling credentials each treatment represents. None of the titles suggest classroom educators as facilitators of the treatments. The authors concluded that in their analysis “career education interventions seem to have modest effects” (Baker & Taylor, 1998, p. 382) and viewed the results as encouraging.

Brown and Krane (2000); Lapan, Adams, Turner, and Hinkelman (2000); Whiston, Brecheisen, and Stephens (2003); and Hughes and Karp (2004) investigated career intervention modality through meta-analyses in relation to career counseling and found interventions that involved counselors were more effective than interventions that did not include a counselor. One of the studies evaluated by Hughes and Karp involved a Utah counselor-led intervention (of particular interest to this evaluand). This study demonstrated a positive relationship between an implemented comprehensive guidance program and student career development. In the Utah study (Nelson & Gardner, 1999), schools that implemented the comprehensive counseling guidance program (SEOP), found that students were completely satisfied with the guidance services provided. These findings were significant when compared to students’ reported perceptions concerning career development in school where the program was not implemented. In their final analysis, Hughes and Karp (2004) stated, “Counseling interventions were the most effective type [of intervention]” (p. 18).
Utah middle school counselors are required to take an active role in delivering the CTE Introduction course. It is anticipated that the findings noted in this section will be supported by this research.

**Summary**

There is research support for a career exploration course in Utah middle schools. Brown and Krane (2000) and Brown and colleagues (2003) found five critical ingredients that should be included within career interventions to improve career education effectiveness outcomes: “(1) written exercises, (2) individualized interpretations, (3) occupational information exploration, (4) modeling, and (5) attention to building support” (2003, p. 416). In addition, computer instruction (Turner & Lapan, 2005), integrative approaches (Turner & Conkel, 2010), lessons and career measurements for career maturity and self-esteem (Legum & Hoare, 2004), career counseling (Whiston et al., 2003), and instruction by qualified teachers (Klassen, Tze, Betts, & Gordon, 2010) are all part of the CTE Introduction course model, which suggests the course should produce positive outcomes.

The meta-analyses discussed in this review and the three studies conducted with middle school students since 2003 support the need to evaluate the Utah CTE Introduction course. A structured class or structured group modality (Brown et al., 2003; Oliver & Spokane, 1988; Whiston et al., 2003) has been found to have small to medium effect sizes and career preparation interventions have been at least moderately effective among young adolescents (Baker & Popowicz, 1983; Baker & Taylor, 1998; Brown &
Lent, 2005; Brown et al., 2003; Hughes & Karp, 2004; Walsh & Savickas, 2005; Whiston et al., 1998). This research study contributed to this body of research through variable evaluation in two unique ways: (a) larger or smaller effect size outcomes may be seen as a result of course delivery (primarily by content-based classroom teachers), and (b) larger or smaller effect sizes on outcomes or impacts may be evaluated as they relate to the duration (9 months) of the comprehensive career guidance intervention.

The CTE Introduction course evaluated in this research study has been designed to assist students with career decision making through exploration and awareness. The outcome of this evaluation provides the state, districts, teachers, students, and parents with valuable decision making information concerning course funding and any changes, if necessary, which should be made to the course or teacher preparation. If the course has a positive outcome students should possess the skills necessary to consider and evaluate their career aspirations early enough to make appropriate choices in future course selections and possibly adjust their study habits to reach their career goals. High school course selections are predicated on middle school courses and achievements. Success in high school courses is a prerequisite for college or entry-level careers. Students and parents unaware of this continuum may be unable to adjust course work and required competencies in a timely manner, potentially resulting in unemployed people who don’t know what they want to do or be when they grow up. Does the CTE Introduction course achieve its intended outcomes and result in helping middle school students to prepare for the future? This research study has been designed to answer this question.
CHAPTER III
METHODOLOGY

This chapter discusses the methodology for evaluating the effectiveness of the CTE Introduction career exploration course from previously collected data. The data being analyzed came from matched pre- and postsurvey results gathered from approximately 14% of the entire 2011-2012 Utah seventh grade public school population. This chapter details the participants (sample), instrumentation, data collection, and data analysis procedures. The research questions are reviewed below:

This evaluation research addressed the following research questions.

1. Do student scores on (a) student career planning, (b) career self-efficacy, and (c) career knowledge change from course entry to exit?

2. Are there gender differences on student gain scores on (a) student career planning, (b) career self-efficacy, and (c) career knowledge from course entry to exit?

3. Is there a relationship between pre- and postsurvey student career planning, self-efficacy, and career knowledge?

4. Do postsurvey scores on (a) career planning, (b) career self-efficacy, and (c) career knowledge, along with (d) meeting with the counselor, predict career course evaluations?

Subquestion a: Does gender moderate the association between career planning, career self-efficacy, career knowledge postsurvey scores, meeting with the school counselor and course evaluations?

5. Is there a relationship between meeting with the school counselor and
postsurvey responses on career planning, career self-efficacy, or course evaluations?

Participants

In August of 2011, District CTE directors statewide were emailed an invitation from the USOE CTE Introduction Specialist asking if their district would like to participate in an optional evaluation of the CTE Introduction course. The district directors then contacted their district CTE Introduction teachers and strongly encouraged them to participate by allowing their students to complete an online pre- and postsurvey during class time. The number of student presurveys returned in the fall equaled 11,347, while 9,956 postsurveys were collected in the spring. For this matched pre-post design (discussed later in this chapter), only the matched responses \( N = 6,078 \) were considered for analysis. The total population of seventh grade students enrolled in the CTE Introduction course during the 2011-12 school-year was 42,582 (USOE, 2012d). This means that approximately 14% of the matched pair seventh grade student population participated in the pre- and postsurvey. Of the 41 school districts in Utah, 11, or 27% of the districts participated. They represented small, medium, and large school districts. School districts sizes were categorized by natural breaks in student numbers (Table 3). Small school districts represent 6% of the Utah school population. Matched small school districts represented 4% in the participant sample. Medium school districts represent 21% of the Utah school population. Matched medium school districts represented 16% in the participant sample. Large school districts account for 73% of the Utah school population. Matched large school districts represented 80% in the participant
Table 3

*Utah Public School Districts (2012) Enrollments 2010-2011 Divided by Small, Medium, and Large*

<table>
<thead>
<tr>
<th>District and size classification</th>
<th>District enrollment</th>
<th>Number of “matched pair” students participating in evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small enrollment districts</td>
<td>31,078</td>
<td>238</td>
</tr>
<tr>
<td>Daggett District</td>
<td>168</td>
<td>0</td>
</tr>
<tr>
<td>Tintic District</td>
<td>220</td>
<td>0</td>
</tr>
<tr>
<td>Piute District</td>
<td>305</td>
<td>0</td>
</tr>
<tr>
<td>Rich District</td>
<td>484</td>
<td>0</td>
</tr>
<tr>
<td>Wayne District</td>
<td>567</td>
<td>0</td>
</tr>
<tr>
<td>Garfield District *</td>
<td>931</td>
<td>34</td>
</tr>
<tr>
<td>North Summit District</td>
<td>979</td>
<td>0</td>
</tr>
<tr>
<td>Kane District *</td>
<td>1,176</td>
<td>48</td>
</tr>
<tr>
<td>South Summit District</td>
<td>1,433</td>
<td>0</td>
</tr>
<tr>
<td>Grand District</td>
<td>1,510</td>
<td>0</td>
</tr>
<tr>
<td>Beaver District *</td>
<td>1,566</td>
<td>11</td>
</tr>
<tr>
<td>Juab District</td>
<td>2,286</td>
<td>0</td>
</tr>
<tr>
<td>Emery District</td>
<td>2,360</td>
<td>0</td>
</tr>
<tr>
<td>North Sanpete District</td>
<td>2,420</td>
<td>0</td>
</tr>
<tr>
<td>Morgan District *</td>
<td>2,437</td>
<td>145</td>
</tr>
<tr>
<td>Millard District</td>
<td>2,827</td>
<td>0</td>
</tr>
<tr>
<td>San Juan District</td>
<td>2,912</td>
<td>0</td>
</tr>
<tr>
<td>South Sanpete District</td>
<td>3,038</td>
<td>0</td>
</tr>
<tr>
<td>Carbon District</td>
<td>3,459</td>
<td>0</td>
</tr>
<tr>
<td>Medium enrollment districts</td>
<td>112,203</td>
<td>973</td>
</tr>
<tr>
<td>Park City District</td>
<td>4,351</td>
<td>0</td>
</tr>
<tr>
<td>Duchesne District</td>
<td>4,449</td>
<td>0</td>
</tr>
<tr>
<td>Sevier District</td>
<td>4,533</td>
<td>0</td>
</tr>
<tr>
<td>Wasatch District *</td>
<td>5,089</td>
<td>57</td>
</tr>
<tr>
<td>Logan District</td>
<td>6,133</td>
<td>0</td>
</tr>
<tr>
<td>Murray District</td>
<td>6,500</td>
<td>0</td>
</tr>
<tr>
<td>Uintah District</td>
<td>6,684</td>
<td>0</td>
</tr>
<tr>
<td>Iron District</td>
<td>8,485</td>
<td>0</td>
</tr>
<tr>
<td>Box Elder District</td>
<td>11,187</td>
<td>0</td>
</tr>
</tbody>
</table>

*(table continues)*
### Table 1: District and size classification

<table>
<thead>
<tr>
<th>District and size classification</th>
<th>District enrollment</th>
<th>Number of “matched pair” students participating in evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ogden District</td>
<td>12,568</td>
<td>0</td>
</tr>
<tr>
<td>Provo District</td>
<td>13,376</td>
<td>0</td>
</tr>
<tr>
<td>Tooele District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13,439</td>
<td>488</td>
</tr>
<tr>
<td>Cache District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15,409</td>
<td>428</td>
</tr>
<tr>
<td>Large enrollment districts</td>
<td>392,832</td>
<td>4,867</td>
</tr>
<tr>
<td>Salt Lake District</td>
<td>23,965</td>
<td>0</td>
</tr>
<tr>
<td>Washington District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>25,673</td>
<td>904</td>
</tr>
<tr>
<td>Nebo District</td>
<td>29,137</td>
<td>0</td>
</tr>
<tr>
<td>Weber District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>30,350</td>
<td>1,032</td>
</tr>
<tr>
<td>Canyons District</td>
<td>33,469</td>
<td>0</td>
</tr>
<tr>
<td>Jordan District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>49,730</td>
<td>1,086</td>
</tr>
<tr>
<td>Alpine District</td>
<td>66,045</td>
<td>0</td>
</tr>
<tr>
<td>Davis District&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66,071</td>
<td>1,845</td>
</tr>
<tr>
<td>Granite District</td>
<td>68,392</td>
<td>0</td>
</tr>
<tr>
<td><strong>District totals</strong></td>
<td><strong>536,113</strong></td>
<td><strong>6,078</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Districts that participated in the research (USOE, 2012e).

sample. Although large school districts are slightly overrepresented in this sample, the school district ratios suggest a sufficient representation of the overall state population for generalizability.

Further review of the participant data revealed that two schools in Cache County participated in the postsurvey in January because their 9-month course is compressed into a trimester schedule. Students received the same number of instructional hours, but the hours were compressed into 6 months, these students completed their course in January. Because students completed the course with the same mandatory content and expectations, their responses have been used to analyze research questions 1, 2, and 3. The evaluation questions on the postsurvey were (related to research questions 4 and 5) were added in February; as a result, 141 students from the Cache School District have
missing data and will not contribute to the analysis.

Setting

In most Utah schools (as recommended by USOE), the year-long (9 months) CTE Introduction course is delivered by an educator team composed of an endorsed CTE business teacher, family and consumer science teacher, technology teacher, and a school counselor. In large schools more than three teachers may implement the course to accommodate a larger number of students, and each student interacts with three teachers and a counselor throughout the course. In contrast, small schools, with fewer faculty, may have only one teacher and a counselor available to deliver the mandatory course.

Student Survey Instrument Development

A pilot study to validate the instrument with educational experts and test the reliability of the survey instrument was conducted in the spring of 2011. The survey questions were developed using the course standards, as a criterion reference, and the Expected Course Outcomes (USOE, 2010). In this case, it was determined that the CTE Introduction course effectiveness would be measured by criterion referenced career knowledge, career planning, and career self-efficacy questions reflected in the stated expected course outcomes (content validity). After the pilot questions were developed, and core standard indicators for each question identified, a panel of 12 experts (CTE teachers, State Office of Education CTE staff, school counselors, and Utah State University CTE researchers) evaluated the survey for vocabulary, structural difficulty,
and answer accuracy. The instrument validity met the postpositivist assumption of “multiple sources of evidence” (Mertens, 2010, p. 384).

A class from three different sized school districts was selected by the State Office of Education to participate. This stratification was used to ensure geographical variation and to make the results more generalizable to the population of Utah seventh-grade students. Three seventh-grade classes (N = 75 students) completed the survey the second week of April 2011, as part of one of their regularly scheduled CTE Introduction courses. Pilot tested students responded to a paper-based questionnaire that provided enough space for them to comment on the questions, noting any questions they had difficulty answering or understanding, or had not discussed in class yet. At each school site, students were informed that the survey would measure what they had learned that year in the CTE Introduction course, and how the instrument would be used the following year in a pre- postsurvey of CTE Introduction students.

Teachers at pilot sites were also asked to evaluate survey questions and comment on the difficulty, vocabulary, and if students had received instruction on topics related to the questions. In addition to the feedback gathered on the instrument, start and end times in each class were documented to determine approximately how much time the survey would take to complete. Based on class bell-schedules, the students needed to complete the survey in 40 minutes or less; most students completed the survey in 25 minutes.

Using the Statistical Package for Social Sciences (SPSS, Version 20), Cronbach’s alpha was used to measure the internal consistency or reliability of the survey instrument. Overall, the pilot subjects responded to all items (individual career knowledge, career
planning, and career self-efficacy questions) with a level of consistency somewhat lower than expected. In retrospect, individual career knowledge, career planning, and career self-efficacy items should have been analyzed as subgroups in the pilot test.

Based on feedback received from students and teachers, and in an effort to increase the reliability, the pilot survey response section was modified. To allow for specific career knowledge responses, open-ended career knowledge questions in the pilot test were changed to a check list. This change also facilitated data analysis. After the modifications, the USOE approved the use of the instrument statewide to measure the effectiveness of the CTE Introduction course statewide during the 2011-2012 school-year.

Pre-Postsurvey Instrumentation Variables, Reliability, and Scales

The pre- and postsurvey (Appendices A and B, respectively) included four demographic questions that were used to determine gender, match pairs, and determine school and district representation. The dependent variable for this study was created by summing four items included only on the postsurvey to create the Course Evaluation Scale. The major independent variables were formed by creating three scales representing the following three areas: career planning, career self-efficacy, and career knowledge (see Table 4 for specific items). As indicated below, Alpha reliability coefficients were computed on each question to be included in the scale. Only data that met statistical assumptions and rigor were used in the data analysis. Questions that are not part of the analysis are reported descriptively (Appendix C).
Table 4

Survey Question Variable Groupings and Scales

<table>
<thead>
<tr>
<th>Variables (denoted by survey questions), and reliability scores</th>
<th>Type of variable</th>
<th>Scale or points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career planning—dependent variable</td>
<td>Add ratings to create a Likert-type scale 0-12</td>
<td></td>
</tr>
<tr>
<td>alpha reliability of presurvey items: .63, interitem correlation mean .36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. My understanding of how my interest, ability, and strengths relate to my future career goals.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>2. My understanding that classroom performance relates to success in school and in life.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>3. My ability to use a Student Education Occupation Plan (SEOP) to plan my future career or college goals.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>Career self-efficacy —dependent variable</td>
<td>Add ratings to create a Likert-type scale 0-12</td>
<td></td>
</tr>
<tr>
<td>alpha reliability of .61, interitem correlation mean .3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. My understanding of how technology affects my quality of life.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>5. My ability to use a spreadsheet (such as Excel) in a business career.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>6. My ability to complete a job application.</td>
<td>Interval</td>
<td>0 (none) - 4 (high)</td>
</tr>
<tr>
<td>Career knowledge —dependent variable</td>
<td>Add scores from questions 19-24 to create a continuous variable 0 - 144</td>
<td></td>
</tr>
<tr>
<td>alpha reliability of presurvey items: .88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Which of the following would be considered agricultural or natural resource related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
<tr>
<td>20. Which of the following would be considered business, economic, and marketing related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
<tr>
<td>21. Which of the following would be family and consumer science related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
<tr>
<td>22. Which of the following would be health science related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
<tr>
<td>23. Which of the following would be information technology related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
</tbody>
</table>

*(table continues)*
Variables (denoted by survey questions), and reliability scores

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type of variable</th>
<th>Scale or points</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Which of the following would be engineering technology related careers?</td>
<td>Continuous</td>
<td>0 to 24 points</td>
</tr>
<tr>
<td>Course evaluation (postsurvey only)—dependent variable</td>
<td>Continuous</td>
<td>Add scores from questions 27-30 (omitting question 31) to create a continuous Likert-type scale 0-16</td>
</tr>
<tr>
<td>Alpha reliability of .67 (omitting question 31) interitem correlation mean .26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. As a result of my experiences in the CTE Introduction course, I am aware of more careers than when I began the course.</td>
<td>Interval</td>
<td>0 (strongly disagree)—4 (strongly agree)</td>
</tr>
<tr>
<td>28. The CTE Introduction course has helped me to narrow my career interests</td>
<td>Interval</td>
<td>0 (strongly disagree)—4 (strongly agree)</td>
</tr>
<tr>
<td>29. As a result of my experiences in the CTE Introduction course, I have a better understanding of the courses I need to take in the future to prepare me for a career or college.</td>
<td>Interval</td>
<td>0 (strongly disagree)—4 (strongly agree)</td>
</tr>
<tr>
<td>30. As a result of my experiences in the CTE Introduction course, I am planning to adjust my course schedule to pursue my career goals.</td>
<td>Interval</td>
<td>0 (strongly disagree)—4 (strongly agree)</td>
</tr>
<tr>
<td>Counselor participation—independent variables</td>
<td>Dichotomous</td>
<td>Questions 32 - 33 0 = no or, 1 = yes</td>
</tr>
</tbody>
</table>

**Career Planning Scale**

Survey questions 1-3 asked students to rate their career planning abilities. Career planning is the “The process of establishing career objectives and determining appropriate educational and developmental programs to further develop the skills required to achieve short- or long-term career objectives” (Human Resources IQ, 2012).

These three questions met the definition of career planning and were analyzed together to
determine their reliably as a career planning variable. Cronbach’s alpha was used to measure the internal reliability of these questions. The alpha score for these questions was .63, which is considered low. However, Briggs and Cheek (1986) suggested that it may be more appropriate to report the interitem correlation mean when using fewer than 10 items, and recommend that the interitem mean should fall between .2 and .4. The interitem correlation mean for the career planning questions was .36. It was determined that questions 1-3 could be used for the career planning variable to address the research questions. The survey questions asked students to rate their ability on a 5-point Likert-type interval scale with 0 = none, 1 = low, 2 = average, 3 = above average, and 4 = high. As a result of the reliability score for these questions, each student rating has been added to create a continuous 0-12 score. The most prototypical question, related to the literature in this grouping was survey question 1, “My understanding of how my interest, ability, and strengths relate to my future career goals.” All of the questions required a response on the survey and were available to the students (on trimesters) who completed the survey early; there is no missing data on these questions.

**Career Self-Efficacy Scale**

“Self-efficacy is a cognitive appraisal or judgment of future performance capabilities” (Betz & Hackett, 2006, p. 6), as such, career self-efficacy needs to be measured by an expectation of career behavior (Bandura, 1997). Survey questions 4-6 were grouped and evaluated as career self-efficacy questions as they asked students to rate their abilities to perform very basic career-related tasks. Cronbach’s alpha was used to determine the internal reliability of these three questions to measure career self-
efficacy. The alpha score for these three questions was .61, however the interitem
correlation mean was .3, suggesting these three questions could be used to evaluate
student career self-efficacy. The most prototypical question, related to the literature in
this grouping was survey question 6, “My ability to complete a job application.” The
questions in this scale were perhaps the weakest and in the survey as they were more
related to specific technical skills, not what the literature would consider career
confidence skills. These questions asked students to rate their ability on a 5-point Likert-
type interval scale with 0 = none, 1 = low, 2 = average, 3 = above average, and 4 = high.
As a result of the reliability score for these questions, each student rating was added to
create a continuous 0-12 score. These questions required a response on the survey and
were available to the students (on trimesters) who completed the survey early; there is no
missing data on these questions.

**Career Knowledge Scale**

Survey questions 8-26 were developed directly from the CTE Introduction course
standards and objectives as outlined in the instrument pilot testing section. These
criterion referenced questions “provide a measure of performance that is interpretable in
terms of a clearly defined and delimited domain of learning tasks” (Linn & Gronlund,
2001, p. 42). All the questions in this scale were related to knowledge questions
concerning the CTE pathways, for example, “Which of the following would be family
and consumer science related careers?” This type of question was repeated for each
pathway. The career knowledge questions were analyzed for reliability using Cronbach’s
alpha. The alpha score for these 19 questions together was .81. However, upon closer
examination, questions 8-18 were multiple choice with only one correct answer, and
questions 14-18 were unique in that they measured career content knowledge, making
scaling with the multiple select career knowledge questions, 19-24, incompatible. When
these questions were removed from the Career Knowledge Scale the Cronbach’s alpha
score increased to .88. As a result of this analysis, questions 19-24 have been used to
measure career knowledge. Pre- and postsurvey questions, 8-18, are reported
descriptively in Appendix C.

Responses to questions 19-24 were made into one continuous variable. These
questions were also analyzed to ensure reliability. If a student had a career selected that
should have been selected, they received one point. If they had a career unselected and it
should have been unselected, they received one point. Conversely if a student had a
career unselected that should have been selected or vice-versa, one point was subtracted.
This made a -12 to 12-point scale for this variable. To simplify the analysis, 12 points
were added to each score making the final scale 0-24 for each item and a total scale for
the variable 0 to 114. These questions required a response on the survey and were
available to the students (on trimesters) who completed the survey early; there is no
missing data on these questions.

**Course Evaluation Scale**

Eight additional questions were asked on the postsurvey to further measure the
state-specific expected course outcomes. These questions would not have been sensible to
ask on the presurvey as they directly evaluated the course and asked students about future
plans as a result of the course. These questions asked students to rate their course
experience on a 5-point Likert-type interval scale with 0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, and 4 = strongly agree. The most prototypical question, related to the literature in this grouping was survey question 27, “As a result of my experiences in the CTE Introduction course, I am aware of more careers than when I began the course.” Questions 27-31 were analyzed to determine variable reliability. The Cronbach’s alpha for these five questions was .59 and the interitem correlation mean was .19. Based on these reliability results, question 31, “There are many careers that I think are only for women or only for men,” was eliminated from the reliability analysis, as it had the lowest correlation. With question 31 omitted, an alpha of .76 and an interitem correlation mean score of .26 was obtained on the remaining seven questions. The overall course evaluation variable was comprised of these four questions. Missing data was removed from this analysis.

**Counselor Variable**

Two questions on the postsurvey (32 and 33) were asked regarding students meeting with their counselor to plan future courses and consider future career options. The State Implementation Plan (USOE, 2012c) requires that students receive some instruction in the CTE Introduction course from counselors, but meeting individually is optional. Students could select “yes,” “no,” or “I don’t remember.” The Cronbach’s alpha for these questions was .79 and these two questions made up the counselor variable. If a student responded “yes” on either item his or her score was coded as a one (yes), if they said “no,” or “I don’t remember” on both items, their score was recorded as a 0 (no). Missing data was excluded from the analysis.
Research Design

This study analyzes previously collected survey data provided by seventh grade students enrolled in the CTE Introduction course during the 2011-2012 school year. The CTE Introduction course is mandatory statewide making it nearly impossible to find a control group within the state and use an experimental design. With a large number of districts and students agreeing to be part of the study, “the best method available to the social researcher who is interested in collecting original data or describing a population too large to observe directly” (Babbie, 2012, p. 253) is a survey research design.

Surveys are useful when trying to gather data from a large population, but there are limitations concerning validity in that “surveys rely on [an] individuals’ self-report of their knowledge, attitudes, or behaviors” (Mertens, 2010, p. 173). This means the information obtained by these participants is dependent upon the honesty of the individuals, in this case, seventh grade students.

This research quantitatively analyzes matched student pre- and postsurveys on the defined independent variables to determine the effectiveness of the 9-month CTE Introduction course. Course effectiveness has been determined by the participants’ ability to achieve defined expected course outcomes. The research questions partially support this specific purpose. The surveys were based on the theory-based evaluation (TBE) model. The course theories (career maturity and positive intervention results) defined the Expected Course Outcomes, and the major stakeholders (the USOE staff, CTE teachers, and students) shaped the survey instrument, sample selection, and data collection methods. The second part of the TBE model requires the researcher to apply social
science theory and methods to compile and analyze the data.

Data Collection

The presurvey (Appendix A) and postsurvey (Appendix B) data were collected online through the Utah Futures website, a Career and Technical Education teaching tool, that was linked to a Utah State University server per an Institutional Review Board (IRB) approval. A complete “Letter of Information” was provided to the teachers and made available to parents online before and during data collection. The presurvey was accessible between August 29, 2011 and September 9, 2011. During this period of time, students, under the direction of their teachers and during class time, accessed the survey using their Statewide Student Identifier (SSID) numbers. These numbers authenticated them as a seventh grade student in the public school system on record with the USOE and Utah Futures. SSID numbers are assigned to students as part of the CTE Introduction course and Student Education Occupational Plan (SEOP).

The postsurvey, again under the direction of their teachers and during class time, was accessible to students May 4, 2012 through May 18, 2012. To ensure the student pre- postsurvey data would be accurately matched, the SSID number was asked for a second time at the end of the pre- and postsurvey. All of the data was saved for retrieval on a Utah State University server and all questions required a response to help combat the issue of missing data. The student presurvey had 11,347 responses, the postsurvey, 9,956. Upon further examination, 6,078 pre- postsurveys could be matched by SSID. It is unknown why students who participated in the presurvey did not participate in the
postsurvey. Perhaps teachers did not understand the importance of the matched research design, became busy with other end of the year activities, or simply forgot. But for the purpose of this research, unmatched surveys were not considered for analysis.

**Data Analysis Procedures**

All of the data has been analyzed using the Statistical Package for Social Sciences (SPSS, Version 20). Student SSIDs were matched for the analysis; unmatched student SSIDs were excluded. The survey questions for career planning (1-3), career self-efficacy (4-6), and career knowledge (19-24) are identical on the pre- and postsurvey. These three variable scales were used in the analyses of the research questions. Null hypotheses, described for each research question below, have been tested to address each research question. Significant findings, along with effect sizes to evaluate practical significance, have been included in each analysis.

**Research Question 1**

$H_{01}$: There will be no difference in the CTE Introduction exploratory scores on (a) career planning, (b) career self-efficacy, or (c) career knowledge from course entry to exit.

I used a matched-pairs $t$ statistic to test the hypotheses. This statistical tool meets the test assumptions; evaluating changes over time with the same individuals, each treatment condition was independent, and the large sample size ($N > 30$) suggested a normal distribution (Gravetter & Wallnau, 2010). This was confirmed with a histogram of the descriptive data. This type of design reduces problems that may be due to
individual differences and detects differences between measurement one (presurvey) and measurement two (postsurvey). Descriptive statistics have been presented along with significant findings and effect sizes. To test for significance, this hypothesis test used the difference scores from the data to evaluate the overall sample mean differences.

**Research Question 2**

H$_{02}$: There will be no gender differences between the pre- and postsurvey gain scores on student (a) career planning, (b) career self-efficacy, and (c) career knowledge.

To detect possible gender differences between the pre- and postsurvey on career planning, career self-efficacy, and career knowledge, three lagged regression analyses were conducted using these three variables as dependent variables along with the corresponding presurvey variable and gender. Specifically, the postsurvey scores for career planning (dependent variable) were regressed onto the presurvey score for career planning (independent variable) along with the gender (independent) variable. This same procedure was used to evaluate career self-efficacy and career knowledge along with gender. The cutoff for significance on these regressions was set at .05. I have reported the descriptive statistics and the magnitude of the statistically significant findings.

**Research Question 3**

H$_{03}$: There will be no relationships between pre- and postsurvey student career planning, career self-efficacy, and career knowledge.

I have used the calculated scale scores, to run a Pearson product-moment
correlation analysis to determine if pre- and postsurvey career planning, career self-efficacy, and career knowledge scores are related. Significant relationships at the .05 level and correlations strengths, using Cohen’s (Cohen, 1988) guidelines for these values, have been reported. Correlations with an \( r = .10 \) to \( .29 \) have been considered to have a small or low correlation strength, \( r = .30 \) to \( .49 \) has been considered medium strength relationship, and a relationship \( r = .50 \) to \( 1.0 \), has been considered a large strength correlation. Coefficients of determination (variance) have also been calculated to discuss how much variance each variable shares. Significant relationships found between the identified variables from this analysis have been used to evaluate the null (H03) hypothesis.

**Research Question 4**

H04: Postsurvey scores on (a) career planning, (b) career self-efficacy, (c) career knowledge, and (d) meeting with the school counselor do not predict course evaluations.

H05: Gender does not moderate the relationship between (a) career planning, (b) career self-efficacy, (c) career knowledge postsurvey scores, and (d) meeting with the school counselor and course evaluations.

I ran two regressions to evaluate research question 4. In the first model, I mean centered the scale scores from career planning, career self-efficacy, and career knowledge, along with meeting the school counselor to evaluate the main effects of these variables to predict course evaluations (H04). I used this same model along with interaction terms to determine if gender moderated the relationship between the variables...
and course evaluations (H05). Specifically, the second regression model (an interactive model) sought to determine if there were any significant gender interactions with the career variables on the course evaluations. To evaluate H05, the postsurvey variables (career planning, career self-efficacy, career knowledge, and the meeting with the school counselor) were all mean centered and regressed on course evaluations. H05 was evaluated using the mean centered variable numbers where gender served as the interactive variable. In the data set, males were coded as zeros and females as one. Using gender data from students that completed the postsurvey questions on course evaluations (N = 5,937), slightly more females (n = 3,001) and fewer males (n = 2,936) resulted in a mean of .51. To evaluate the gender interaction, this variable was also mean centered. Statistically significant findings, at an alpha level of .05, were used to evaluate H04 and H05. Effect sizes in terms of standardized coefficients are noted as $R^2$, have also been reported.

**Research Question 5**

H06: There is no relationship between meeting with the school counselor and student career planning, career self-efficacy, or course evaluations.

Three multiple regression analyses were performed to evaluate this hypotheses.

The postsurvey student career planning, career self-efficacy and course evaluation scores were selected as dependent variables. To explain the relationships, the first analysis regressed meeting with the school counselor and presurvey career planning on the course evaluation variable. The presurvey scores for career planning were added to the model to control for pre-level knowledge and discuss more accurately how the
independent variables affected the course evaluation (dependent) variable. The second regression model evaluated postsurvey career self-efficacy as a dependent variable with the counselor independent variable while controlling for presurvey career self-efficacy. The third analysis regressed the meeting with the counselor variable (independent variable) on career course evaluations (dependent variable). The presurvey career planning and presurvey career self-efficacy (independent) variables were added to this model to control for presurvey variance.

A significant relationship at the .05 level for this hypothesis was set to evaluate the null hypotheses and discuss the coefficients of determination (variance) between each variable and model. Significant relationships between the identified variables from this analysis have been used to evaluate the null hypotheses in this research question. Descriptive statistics along with relationship strengths and effect sizes, noted as beta ($\beta$), have also been reported.

**Summary**

This chapter has explained the methodology; instrumentation, sample, research design, and data analysis procedures that were used to examine the effectiveness of the CTE Introduction course. The analytical procedures are congruent with the postpositivist approach to research and a theory-based evaluation framework. In the following chapters, the results of the data analysis will be used to answer and discuss the dissertation research questions.
CHAPTER IV

RESULTS

The purpose of this research study was to quantitatively evaluate the effectiveness of the CTE Introduction course. Five research questions are discussed in this section, evaluating six null hypotheses. In an effort to assess student responses and report results, four scales, and one dichotomous variable were created by combining survey questions. These scales have been used to evaluate the null hypotheses and test for statistically significant differences at \( p < .05 \). This \( p \)-value means that the probability of observing each obtained value by chance is less than 5%. Findings evaluating the null hypotheses are discussed and evaluated individually. Effect size scores have been used to determine the impact or the magnitude of any statistically significant differences. The descriptive data for each question response comprised in the career course scales can be found in Appendix C.

The study participants were seventh-grade students statewide from 11 school districts. Data were collected on a pre- and postsurvey at the beginning of the school year (August-September) and again near the end (April-May) of the school year. The survey questions were identical between the pre- and postsurvey except for the final course evaluation questions which appeared only on the postsurvey. Only students that responded to the survey at the beginning and ending of the course have been included in the analysis. Data analysis of Statewide Student Identifier (SSID) numbers revealed that there were 6,078 matched pairs.

The results provide stakeholders and decision-makers at state and local levels
with information to better evaluate course expenditures and future course changes or improvements. The results add to the career education literature in multiple ways (to be discussed in the next chapter), and the findings may help to further research and aid other states as they evaluate their career education efforts.

**Research Question 1**

The first research question was “Do student scores on (a) student career planning, (b) career self-efficacy, and (c) career knowledge change from course entry to exit?” To analyze this question, three matched \( t \) tests were conducted using the pre- and postscores for each of the three survey scales (Career Planning Scale, Career Self-Efficacy Scale, and Career Knowledge Scale). My null hypotheses, \( H_{01} \), stated there would be no difference in the CTE Introduction exploratory scores on (a) career planning, (b) career self-efficacy, or (c) career knowledge from course entry to exit. The matched pair \( t \) test found statistically significant differences in scores from pre- to postsurvey on all three variable pairs (see Table 5). Cohen’s \( d \) for repeated measures was calculated to measure effect sizes and discuss practical significance. Because this is a matched pairs design, the original standard deviations were used to compute the effect size (Dunlap, Cortina, Vaslow, & Burke, 1996). In this analysis, conforming to Cohen’s scale, a mean difference around a 0.2 standard deviation, \( d = 0.2 \), has been considered a small effect, a \( d = 0.5 \) has been considered a medium effect size, and a \( d = 0.8 \) has been considered as a large effect size (Cohen, 1988). The effect size for each comparison will be discussed in the next few sections.
Table 5

Pre- and Postsurvey Difference Scores on Career Planning, Career Self-Efficacy, and Career Knowledge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Mean differences</th>
<th>t(6077)</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Career planning</td>
<td>8.30</td>
<td>2.21</td>
<td>9.08</td>
<td>2.00</td>
<td>.78</td>
</tr>
<tr>
<td>Career self-efficacy</td>
<td>7.60</td>
<td>2.40</td>
<td>8.88</td>
<td>2.04</td>
<td>1.28</td>
</tr>
<tr>
<td>Career knowledge</td>
<td>93.98</td>
<td>22.02</td>
<td>101.01</td>
<td>21.08</td>
<td>7.03</td>
</tr>
</tbody>
</table>

Note. N = 6,078; all matched-pairs in the sample completed these questions. * p < .001.

Student Career Planning

The student Career Planning Scale consisted of three questions that when totaled resulted in a 0-12 score. These questions asked student to evaluate their understanding of career planning linked to their interests, abilities, and strengths (item 1), their understanding of school performance as it related to success in school and in life (item 2), and their ability to use a Student Education Occupation Plan (SEOP) to plan for their future career or college goals (item 3). The survey questions asked students to rate their ability on a 5-point Likert-type interval scale with 0 = none, 1 = low, 2 = average, 3 = above average, and 4 = high.

The matched-pairs t test, evaluating the impact of the CTE Introduction course on student career planning, yielded a statistically significant point gain of .78 from the presurvey (M = 8.30, SD = 2.21) to the postsurvey (M = 9.08, SD = 2.00), resulting in a t(6077) = 25.56, and a p < .001 (two-tailed). This mean increase yielded a small to medium effect size (d = .35).
To further evaluate these differences, $t$ tests were performed on each of the survey items within the Career Planning Scale (Table 6); all were found to be statistically significant. The greatest effect size, which is considered small, was found on item 3 regarding the student’s ability to use a Student Education Occupation Plan.

**Student Career Self-efficacy**

The Career Self-Efficacy Scale score was based on responses to three survey items. The total score for each student ranged from 0-12. These items asked students to rate their ability on a 5-point Likert-type interval scale with 0 = none, 1 = low, 2 = average, 3 = above average, and 4 = high. Each student rating was added to create a continuous 0-12 score. The career self-efficacy questions asked students to rate their abilities to perform very basic CTE career-related tasks such as: their understanding of technology as it affects their life (item 4), specifically concerning their ability to use a spreadsheet (item 5, identified as an important self-efficacy skill according to the USOE),

**Table 6**

*Pre- and Postsurvey Differences for the Career Planning Scale Questions*

<table>
<thead>
<tr>
<th>Career planning questions, 1-3: Likert-type scale, 0 (none) - 4 (high)</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Mean differences</th>
<th>$t(6077)$</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My understanding of how my interest, ability, and strengths relate to my future career goals.</td>
<td>2.75</td>
<td>9.34</td>
<td>3.10</td>
<td>8.63</td>
<td>0.35</td>
</tr>
<tr>
<td>2. My understanding that classroom performance relates to success in school and in life.</td>
<td>3.18</td>
<td>8.79</td>
<td>3.33</td>
<td>8.15</td>
<td>0.15</td>
</tr>
<tr>
<td>3. My ability to use a Student Education Occupation Plan (SEOP) to plan my future career or college goals.</td>
<td>2.36</td>
<td>1.10</td>
<td>2.65</td>
<td>0.92</td>
<td>0.29</td>
</tr>
</tbody>
</table>

*p < .001.*
and their ability to complete a job application (item 6). These self-efficacy questions are linked to the Expected Course Outcomes (Chapter I, Figure 1).

Career Self-Efficacy Scale scores increased on the survey from pre \((M = 7.60, SD = 2.40)\) to post \((M = 8.88, SD = 2.04)\), with a difference score of 1.28 (see Table 5). I obtained a statistically significant \(t\) statistic, \(t(6077) = 38.02\), and a \(p < .001\) (two-tailed). The calculated effect size was \(d = .53\), signifying a moderate effect for practical significance. To further investigate these findings, a \(t\)-test was conducted on the items making up the Career Self-Efficacy Scale (Table 7). Statistically significant differences were found on all of the questions from pre- to postsurvey with the largest gain and an medium effect on the student’s ability to use spreadsheets, \(d = .55\). The other two questions in the scale had a equal effect size of .32.

**Student Career Knowledge**

The Career Knowledge Scale score was calculated from six CTE Pathway questions, creating a continuous variable score from 0 to 144. Questions 19-24 asked

<table>
<thead>
<tr>
<th>Career Self-Efficacy, Questions 4-6: Likert-type scale, 0 (none) - 4 (high)</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Mean differences</th>
<th>(t(6077))</th>
<th>Cohen’s (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. My understanding of how technology affects my quality of life.</td>
<td>(2.85 .99)</td>
<td>(3.17 .87)</td>
<td>(.32)</td>
<td>(22.51^*)</td>
<td>(.32)</td>
</tr>
<tr>
<td>5. My ability to use a spreadsheet (such as Excel) in a business career.</td>
<td>(2.06 1.11)</td>
<td>(2.67 .98)</td>
<td>(.61)</td>
<td>(35.48^*)</td>
<td>(.55)</td>
</tr>
<tr>
<td>6. My ability to complete a job application.</td>
<td>(2.69 1.10)</td>
<td>(3.04 .87)</td>
<td>(.35)</td>
<td>(22.79^*)</td>
<td>(.32)</td>
</tr>
</tbody>
</table>

\(^* p < .001.\)
students to: identify agricultural or natural resource related careers; business, economic, and marketing related careers; family and consumer science related careers; health science related careers; information technology related careers; and engineering technology related careers. If a student selected a career in the correct pathway, they received one point. If they had a career unselected and it should have been unselected, they received one point. Conversely if a student had a career unselected that should have been selected or vice versa one point was subtracted. This made a -12 to 12-point scale for this variable. To simplify the analysis, I added 12 points to each score making the final scale 0-24 for each item. The scale for the variable ranged from 0 to 144.

Scores on the student Career Knowledge Scale increased (Table 5) from the presurvey ($M = 93.98, SD = 22.01$) to the postsurvey ($M = 101.01, SD = 21.08$) resulting in a mean difference of 7.03. The calculated $t(6077) = 23.92$, was also statistically significant at $p < .001$ (two-tailed). The effect size on this variable was small to medium ($d = .32$).

To provide greater insight to this scale, a $t$-test was performed on each survey question composing the scale (Table 8). All the questions had statistically significant differences pre- to postsurvey. The highest $t$ value obtained, $t(6077) = 28.60$, with a small to moderate effect ($d = .43$) was found on student knowledge concerning family and consumer science careers. Students showed the second largest gain, with a small effect ($d = .32$) on the business career knowledge question. The question showing the smallest significant difference, and the smallest effect, asked students about careers in information technology, $d = .10$. 
Table 8

Pre- and Postsurvey Differences for Career Knowledge Scale Questions

<table>
<thead>
<tr>
<th>Career knowledge Items 19-24: 0-24 points</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>19. Which of the following would be considered agricultural or natural resource related careers?</td>
<td>16.81</td>
<td>5.23</td>
<td>70</td>
</tr>
<tr>
<td>20. Which of the following would be considered business, economic, and marketing related careers?</td>
<td>15.15</td>
<td>3.96</td>
<td>63</td>
</tr>
<tr>
<td>21. Which of the following would be family and consumer science related careers?</td>
<td>12.99</td>
<td>3.72</td>
<td>54</td>
</tr>
<tr>
<td>22. Which of the following would be health science related careers?</td>
<td>16.30</td>
<td>4.66</td>
<td>68</td>
</tr>
<tr>
<td>23. Which of the following would be information technology related careers?</td>
<td>16.87</td>
<td>5.27</td>
<td>70</td>
</tr>
<tr>
<td>24. Which of the following would be engineering technology related careers?</td>
<td>15.85</td>
<td>4.67</td>
<td>66</td>
</tr>
</tbody>
</table>

* $p < .001.$

Based upon the statistically significant findings for the Career Planning, Career Self-efficacy, and Career Knowledge Scales, I have rejected the null hypotheses (H01). In terms of practical significance, there was a small to moderate effect on each variable.

**Research Question 2**

The second research question looked at gender gain score differences on career planning, career self-efficacy, and career knowledge by regressing postsurvey scale scores (dependent variables) onto presurvey scale scores for each variable along with
gender. From the analysis of the descriptive data in research question one it was obvious that overall students had gains on the Career Planning Scale, Career Self-Efficacy Scale, and the Career Knowledge Scale. Research question two sought to evaluate the differences in the scores on these three variables among males and females. The null hypothesis (H₀₂) stated that there would be no gender differences for gains on career planning, self-efficacy, or career knowledge from course entry to exit. I performed three lagged regressions (Table 9) which revealed no significant differences by gender on the pre- postsurvey Career Planning Scale. Significant gender differences were found between the pre- and postsurvey on the Career Self-Efficacy and Career Knowledge Scales, $F(2, 6075) = 302.14, p < .001$ and $F(2, 6075) = 714.80, p < .001$, respectively.

Table 9

Effect of Gender on Career Planning, Career Self-Efficacy, and Career Knowledge

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Model 1 Postcareer planning</th>
<th>Model 2 Postcareer self-efficacy</th>
<th>Model 3 Postcareer knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.48 (.10)</td>
<td>7.11 (.09)</td>
<td>61.25 (1.09)</td>
</tr>
<tr>
<td>Presurvey career planning</td>
<td>.31 (.01)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Presurvey career self-efficacy</td>
<td>-</td>
<td>.25 (.01)</td>
<td>-</td>
</tr>
<tr>
<td>Presurvey career knowledge</td>
<td>-</td>
<td>-</td>
<td>.42 (.01)</td>
</tr>
<tr>
<td>Gender</td>
<td>-.02 (.05)</td>
<td>-.21 (.05)</td>
<td>1.14 (.49)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.12</td>
<td>.09</td>
<td>.19</td>
</tr>
<tr>
<td>$F$</td>
<td>413.17*</td>
<td>302.14*</td>
<td>714.80*</td>
</tr>
</tbody>
</table>

$N = 6,078$. Males were coded 0 and females were coded as 1.

* $p < .001$.

** $p = .02$. 
Self-Efficacy and Gender

On the Self-Efficacy Scale, males gained slightly more relative to female gains on career self-efficacy ($b = -.21$) pre- to postsurvey. Presurvey self-efficacy scores were a better predictor of the Postcareer Self-Efficacy scores ($\beta = .29$), when compared to gender ($\beta = -.05$). However, only 9% of the variance was explained in this model and gender realized a very small standardized beta or effect of -.05.

Additional descriptive statistics were calculated (Table 10) on the Self-Efficacy Scale to investigate the results concerning the small gains for males in relationship to females. The results showed that girls had fractional increases on the survey questions. However, the face-value mean gains were considered along with the standard deviations in the regression analysis resulting in males edging by females in a relatively small way on self-efficacy. The largest mean difference score for both males and females concerned their ability to use a spreadsheet.

Table 10

**Pre- and Postsurvey Differences for Gender on Career Self-Efficacy Scale Questions**

<table>
<thead>
<tr>
<th>Career knowledge Items 4-6: 0-12 points</th>
<th>Male presurvey/postsurvey</th>
<th>Female presurvey/postsurvey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre $M$</td>
<td>Pre $SD$</td>
</tr>
<tr>
<td>4. My understanding of how technology affects my quality of life.</td>
<td>3.00</td>
<td>.96</td>
</tr>
<tr>
<td>5. My ability to use a spreadsheet (such as Excel) in a business career.</td>
<td>2.15</td>
<td>1.09</td>
</tr>
<tr>
<td>6. My ability to complete a job application.</td>
<td>2.70</td>
<td>1.09</td>
</tr>
</tbody>
</table>

$N = 6,078$
Career Knowledge and Gender

Females improved their career knowledge scores relative to males from course entry to course exit, but presurvey career knowledge was a better predictor ($\beta = .44$) than gender ($\beta = .03$). In this model, gender and presurvey career knowledge accounted for 19% of the variance on postsurvey career knowledge, but precareer knowledge was a better predictor for scores on the postsurvey career knowledge questions. Holding precareer knowledge constant, this matched pair analysis resulted in females having a 1.14 relative gain in career knowledge from pre to postsurvey as compared to males. In the regression analysis, the standardized Beta equaled .03, noting a very small effect.

To further explore this significant finding, descriptive data for males and females on the Career Knowledge Scale questions were computed and can be seen in Table 11. These mean score differences help to explain the findings. Both genders had gains, but female gains are slightly greater on all the questions when compared to males.

The nonsignificant findings for gender on the postsurvey Career Planning Scale, the statistically significant and small effect size found on the Self-Efficacy Scale, and the statistically significant small effect finding for gender on the Career Knowledge Scale suggests the $H_{02}$ null hypotheses should be partially retained for career planning, but be rejected per the significant findings on gender and career self-efficacy, and for gender on career knowledge.

**Research Question 3**

The third question sought to determine if there was a relationship between pre-
Table 11

Pre- and Postsurvey Differences for Gender on Career Knowledge Scale Questions

<table>
<thead>
<tr>
<th>Career knowledge, Questions 19-24: 0-24 points</th>
<th>Male presurvey/postsurvey</th>
<th>Female presurvey/postsurvey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre M</td>
<td>Pre SD</td>
</tr>
<tr>
<td>19. Which of the following would be considered agricultural or natural resource related careers?</td>
<td>16.84</td>
<td>5.36</td>
</tr>
<tr>
<td>20. Which of the following would be considered business, economic, and marketing related careers?</td>
<td>15.17</td>
<td>4.09</td>
</tr>
<tr>
<td>21. Which of the following would be family and consumer science related careers?</td>
<td>12.79</td>
<td>3.35</td>
</tr>
<tr>
<td>22. Which of the following would be health science related careers?</td>
<td>16.20</td>
<td>4.75</td>
</tr>
<tr>
<td>23. Which of the following would be information technology related careers?</td>
<td>16.97</td>
<td>5.36</td>
</tr>
<tr>
<td>24. Which of the following would be engineering technology related careers?</td>
<td>15.91</td>
<td>4.70</td>
</tr>
</tbody>
</table>

\( N = 6,078 \).

and postsurvey student career planning, self-efficacy, and career knowledge variables.

The null hypotheses, \( H_{03} \), stated there would be no relationship among the variables.

Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The correlation analysis showed significant positive correlations, at a \( p < .05 \), among all the variables, pre- and postsurvey.

Presurvey Correlations

When comparing the strength of relationships (Table 12) in the presurvey, the
Table 12

Correlations Between Presurvey Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Presurvey correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Career planning</td>
</tr>
<tr>
<td>1. Precareer planning</td>
<td>-</td>
</tr>
<tr>
<td>2. Precareer self-efficacy</td>
<td>.60*</td>
</tr>
<tr>
<td>3. Precareer knowledge</td>
<td>.09*</td>
</tr>
</tbody>
</table>

*N = 6,078 for all correlations.

* All variables were significant at *p* < .001.

The strongest relationship was between presurvey career planning and career self-efficacy (*r* = .60). This correlation is considered large. These variables share 36% of the variance.

The second strongest relationship on the presurvey was between career planning and career knowledge, *r* = .09. This correlation is considered small and accounts for less than 1% of the variance. Clearly the presurvey career planning and presurvey self-efficacy relationship stands out as the strongest and most significant relationship on the presurvey.

**Postsurvey Correlations**

The strongest postsurvey correlation was also observed between career planning and career self-efficacy, *r* = .55 (Table 13). While this was a smaller *r* value from what was found on the presurvey, this correlation is still considered large; greater than .50. This correlation accounted for 30% of the variance between these two variables. Like the presurvey results, the second largest correlation on the postsurvey was between career planning and career knowledge, *r* = .17. This correlation was larger than what was found on the presurvey, but is still considered small correlation falling between .10 and .29. This *r* value accounted for only 3% of the variance in the correlation.
Table 13

*Correlations Between Postsurvey Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Career planning</th>
<th>Self-efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Postcareer planning</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2. Postcareer self-efficacy</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td>3. Postcareer knowledge</td>
<td>.17</td>
<td>.16</td>
</tr>
</tbody>
</table>

*Note.* $N = 6,078$ for all correlations. All variables were significant at $p < .001$.

**Pre- Postsurvey Correlation Summary**

On both the pre- and postsurvey there was a strong correlation between career planning and career self-efficacy. This was a positive correlation indicating that students who scored high in career planning also scored high in self-efficacy. While the other correlations were positive and significant, they were very small. The small relationships on both the pre- and postsurvey for career planning and career knowledge, and career self-efficacy and career knowledge; and the significant moderate effect found on both the pre- and postsurvey regarding career planning and career self-efficacy are sufficient to reject $H_{03}$.

**Research Question 4**

A regression analysis was conducted to evaluate research question four to determine if course evaluation scores could be predicted by the postsurvey scores on (a) career planning, (b) career self-efficacy, (c) career knowledge, and (d) meeting with the school counselor ($H_{04}$). The course evaluation scale was composed of four questions that
were completed by students at the end of the course, postsurvey only. The questions within the scale asked students if they thought they knew more about careers since beginning the course; if the course had helped them to narrow their career interests; if they thought they had a better understanding of courses they need to prepare for a career or college; and, if they consider adjusting their course schedule to pursue their career goals as a result of the CTE Introduction course. All the items were scored on a Likert-type scale: 0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, and 4 = strongly agree. Gender was also evaluated in the model as an interaction to determine if being male or female significantly moderated course evaluations along with the other variables (H05). The results of the regression can be viewed in Table 14. For descriptive data on each of the four questions comprising this scale, see Appendix C.

I began this analysis by testing a main effects model, with mean centered variables, for career planning, career self-efficacy, career knowledge, and the occurrence of meeting with the school counselor. In the next step, I added the interaction terms between these variables and gender to the model. All four variables used in the interaction analysis were mean centered.

The main effects model resulted in significant findings for all four mean centered variables on course evaluations. Based on the value of the standardized coefficient, these findings revealed that career planning, career self-efficacy, career knowledge and meeting with the counselor do predict course evaluations, with career planning having the greatest relationship. The variables in this main effects model accounted for 16% or a moderate amount of the variance predicting course evaluations. In this model, career
Table 14

Postsurvey Predictors of Course Evaluations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>β</td>
<td></td>
<td>b</td>
<td>SE</td>
<td>β</td>
</tr>
<tr>
<td>Constant</td>
<td>11.78</td>
<td>.032</td>
<td>11.73</td>
<td>.032</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career planning</td>
<td>.36</td>
<td>.019</td>
<td>.27*</td>
<td>.36</td>
<td>.019</td>
<td>.26*</td>
<td></td>
</tr>
<tr>
<td>Career self-efficacy</td>
<td>.18</td>
<td>.019</td>
<td>.14*</td>
<td>.18</td>
<td>.140</td>
<td>.15*</td>
<td></td>
</tr>
<tr>
<td>Career knowledge</td>
<td>.01</td>
<td>.002</td>
<td>.05*</td>
<td>.01</td>
<td>.002</td>
<td>.05*</td>
<td></td>
</tr>
<tr>
<td>Counselor</td>
<td>.47</td>
<td>.064</td>
<td>.09*</td>
<td>.47</td>
<td>.064</td>
<td>.09*</td>
<td></td>
</tr>
<tr>
<td>Interaction 1 (gender by planning)</td>
<td></td>
<td></td>
<td></td>
<td>-.03</td>
<td>.038</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>Interaction 2 (gender by self-efficacy)</td>
<td></td>
<td></td>
<td></td>
<td>-.03</td>
<td>.038</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>Interaction 3 (gender by knowledge)</td>
<td></td>
<td></td>
<td></td>
<td>-.001</td>
<td>.003</td>
<td>-.006</td>
<td></td>
</tr>
<tr>
<td>Interaction 4 (gender by counselor)</td>
<td></td>
<td></td>
<td></td>
<td>-.021</td>
<td>.128</td>
<td>-.002</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>.16</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>281.43</td>
<td></td>
<td>141.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. $N = 5,859$, is smaller than previous $N$'s because not all students reported responses on the counselor variable.

* $p < .001$. 

planning was the best predictor variable on course evaluation scores ($\beta = .27$), followed by career self-efficacy ($\beta = .14$), meeting with the counselor ($\beta = .09$), and career knowledge ($\beta = .05$). These results indicate that career planning makes the strongest, most unique contribution to this model, explaining most of the variance on course evaluations while controlling for the other variables. The $R^2$ result of .16 demonstrates a medium effect in terms of practical significance (Gravetter & Wallnau, 2010). The null hypothesis, $H_0$, is rejected, as career planning, career self-efficacy, career knowledge, and meeting with the school counselor significantly predicted course evaluations.
When the interaction for gender and each mean centered variable was added to the model, the analysis resulted in no significant interaction between genders on the variables concerning planning, self-efficacy, career knowledge, or meeting with the counselor on course evaluations. In other words, gender did not moderate the variables on course evaluations. H$_{05}$ is retained.

**Research Question 5**

To evaluate research question five concerning possible relationships between meeting with the school counselor and postsurvey scores on the student Career Planning Scale, Career Self-Efficacy Scale, and the Course Evaluation Scale, three multiple regression analyses were performed. The postsurvey Career Planning Scale score, the Career Self-Efficacy Scale score, and the Course Evaluation Scale score served as dependent variables while meeting with the counselor served as the independent variable for each analysis. For control purposes, presurvey scores for career planning and career self-efficacy were added to each model. Significant relationships at $p < .05$ have been identified and used to evaluate the null (H$_{06}$) hypothesis (Table 15).

The first regression model evaluated the effect of meeting with the school counselor on postsurvey career planning while controlling for presurvey career planning variance. This analysis resulted in a statistically significant finding, $F(2,5936) = 430.03$, $p < .001$, with a standardized beta coefficient of .10, resulting in a very small effect for practical significance. Only 13% of the variance in career planning was explained in this model.
Table 15

Meeting with the School Counselor as a Predictor for Career Planning, Career Self-Efficacy, and Course Evaluations

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Model 1: Postcareer planning (df = 2)</th>
<th>Model 2: Postcareer self-efficacy (df = 2)</th>
<th>Model 3: Course evaluations (df = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>β</td>
</tr>
<tr>
<td>Constant</td>
<td>6.38</td>
<td>.095</td>
<td>6.99</td>
</tr>
<tr>
<td>Presurvey career planning</td>
<td>.30</td>
<td>.011</td>
<td>.34*</td>
</tr>
<tr>
<td>Presurvey career self-efficacy</td>
<td>.25</td>
<td>.011</td>
<td>.29*</td>
</tr>
<tr>
<td>Meeting with counselor</td>
<td>.39</td>
<td>.049</td>
<td>.10*</td>
</tr>
<tr>
<td>R²</td>
<td>.13</td>
<td>.09</td>
<td>.04</td>
</tr>
<tr>
<td>F</td>
<td>430.03*</td>
<td>278.99*</td>
<td>80.65*</td>
</tr>
</tbody>
</table>

N = 5,859.
* p < .001.

To determine if career self-efficacy was associated with meeting the school counselor a second linear regression was performed that included the presurvey self-efficacy score. In this model, meeting with the counselor was not a significant predictor for student career self-efficacy.

In the third regression, meeting with the counselor was regressed on the course evaluation (dependent) variable along with presurvey career planning, and presurvey career self-efficacy (independent variables) to control for presurvey score variance. Meeting with the counselor was statistically significant and was the second best predictor of the Course Evaluation Scale score. Presurvey career planning was a better predictor of the Course Evaluation Scale score. In this model, the standardized beta resulted in a small effect size of .12. This analysis indicates that meeting with the counselor had a very small effect on student course evaluation scores.
The hypothesis for research question (H06), regarding the relationship of meeting with the school counselor and postsurvey career planning, career self-efficacy and course evaluations, is partially rejected. There was a significant relationship between meeting with the school counselor and student career planning scores, and course evaluation scores, but not on the career self-efficacy scores.

**Summary of Results**

The purpose of this research was to evaluate the effectiveness of the CTE Introduction course. In this chapter the results of the statistical analysis for five course related research questions have been shared. Research Question 1 found there were significant differences on career planning, career self-efficacy, and career knowledge from course entry to course exit. In terms of practical significance, this matched-pairs analysis (N = 6,078) yielded small to medium effect sizes for career planning and career knowledge, and a medium to large effect size for career self-efficacy. H01 was rejected. These findings indicate that students’ perceptions of their career planning abilities, their reports of self-efficacy regarding life skills related to career development, and their knowledge of various careers all increased after completing the CTE Introduction course.

To evaluate gender differences (Research Question 2), gender was regressed with career planning, career self-efficacy, and career knowledge to determine if male or female students performed differently on each variable. There were no significant gender difference found on career planning, but there were significant gender effects on career self-efficacy, and career knowledge. On the career self-efficacy variable, both males and
females improved, but males showed a statistically significant increase relative to female
gains from course entry to exit. This effect was small ($\beta = -.05$). Overall, males and
females had increased career knowledge scores. Females made greater gains relative to
males in the area of career knowledge, netting a statistically significant 1.14 point
predicted increase between the presurvey and postsurvey on career knowledge, which
resulted in a small effect of $\beta = .03$. H$_{02}$ was partially rejected as gender was found to be
statistically different on career self-efficacy and career knowledge, but not on or career
planning.

Research Question 3 sought to determine if there was a relationship between pre-
and postsurvey student Career Planning, Self-Efficacy, and Career Knowledge Scale
scores. Notably, career planning and self-efficacy showed the largest correlation on both
the pre- and postsurvey, ($r = .60$ and $r = .55$, respectively), meaning that student students
who rated themselves highly on career planning also tended to rate themselves highly on
career self-efficacy. The other variables were also significantly correlated; however the
relationships were fairly small. As a result of the significance test, H$_{03}$ was rejected as
there were significant correlations among the Career Planning, Career Self-Efficacy, and
Career Knowledge Scale scores.

Research Question 4 sought to determine if course evaluation scores could be
predicted by postsurvey career planning, career self-efficacy, career knowledge, or
meeting with the counselor. In addition to this main effect model, gender was analyzed as
a moderator variable. The main effect model found that all the variables predicted course
evaluation scores with career planning, explaining most of the variance. H$_{04}$ was rejected;
course evaluation scores were predicted by the course variables. The moderator model for gender showed no significant interactions, suggesting that gender did not influence course evaluation scores when combined with career planning, self-efficacy, career knowledge, or meeting with the counselor. There were no significant interactions concerning gender differences on the variables predicting course evaluation scores, H05 was retained.

The final research question (Research Question 5) evaluated the relationship between meeting with the school counselor and scores on the Career Planning, Career Self-Efficacy, and Course Evaluation Scales. Because course content, related to career knowledge, is delivered by teachers, career knowledge was not included in this final research question analysis. Meeting with the school counselor was statistically significant on the career planning and course evaluation variables. Meeting with the counselor had a small effect on career planning resulting in a standardized beta coefficient of .10. On the Course Evaluation Scale scores, meeting with the counselor had a standardized beta of .12. This would indicate meeting with the counselor had a very small effect.
CHAPTER V
DISCUSSION

This study sought to determine the effectiveness of the CTE Introduction course through a survey evaluation of matched pair participants. The year-long CTE Introduction course is compulsory for seventh grade students attending public school in Utah. In this chapter I will discuss the research questions, the related the findings to the appropriate expected outcomes (USOE, 2012a, p. 1), implications, limitations, and recommendations.

Research Questions

Research Question 1

Research Question 1 measured the difference in scores of students, pre-post, on career planning, self-efficacy, and career knowledge, and found significant differences on all three variables. Three survey items made up the Career Planning Scale, and three items made up the career Self-Efficacy Scale. The Likert-type scale terms—none, low, average, above average, and high—may have minimized gains in the scores for career planning and self-efficacy if students were comparing themselves to the growth of their peers.

The three questions comprising the Career Planning Scale asked students about their perceived understanding concerning how their interests, abilities, strengths, and classroom performance related to future career goals; how their school performance related to their success in school and in life; and about their ability to use the Student
Education Occupational Plan (Chapter IV, Table 6). Overall students showed statistically significant gains on these questions from the pre to postsurvey. At the end of the course, students rated themselves, on average, 3.10, meaning that their understanding concerning their interests, ability, and strengths related to their future career goals was “above average.” This was statistically significantly higher than their presurvey response of 2.75; a difference of .35. The question regarding the SEOP netted the second highest difference score in the Career Planning Scale, .29. This increase in ability went from a 2.36 to a 2.65 mean, indicating that students felt only somewhere between “average” and “above average” in their ability to use the SEOP to plan their future career or college goals. The small to medium effect size on the Career Planning Scale may be a result of the course, but other factors such as student maturity, the rating scale sensitivity, and the reliability of the instrument need to be considered (all will be discussed in the Limitations Revisited section of this chapter). The ability of students to plan for a future career has been identified as an Expected Course Outcome; these findings suggest that from course entry to course exit students increased their abilities in relationship to career planning.

There were statistically significant increases on the Career Self-Efficacy Scale, pre- to postsurvey, resulting in a medium effect for practical significance. Three questions comprised this scale and asked students to rate themselves in terms of their understanding about how technology affects their quality of life; their ability to use a spreadsheet; and their ability to complete a job application (Chapter IV, Table 7). The developers of the instrument had identified these understandings as important and these survey items, somewhat based on the literature, informed career self-efficacy. In
reference to the literature, Bandura (1997) suggested that self-efficacy refers to one’s belief in their ability to complete the necessary tasks to achieve a particular goal and that there must be a behavioral domain (Bandura, 1993). The results of this measure suggest the course may be influencing student self-efficacy to (at the very least) learn more about how to use a spreadsheet as it relates to their future career, and how to complete a job application; both being important to a specific behavioral domain (Bandura, 1993).

A review of the descriptive data for the items making up this scale showed that on average students scored themselves 2.67, or between “average” and “above average” upon course completion for their ability to use a spreadsheet. Interestingly, this item was the lowest rated item in the scale on the postsurvey, but showed the greatest gains (.61) from pre- to postsurvey. The item concerning student understanding about how technology affected “their quality of life” was given the highest rating on the Career Self-Efficacy Scale, but showed the smallest gains. The postsurvey score of 3.17 or “above average” was computed and resulted in a .32 increase on this item. While these survey items were a reliable measure for self-efficacy and showed a moderate effect size, they did not completely address self-efficacy measures as defined by the literature and only tangentially addressed the expected course outcomes. These results are probably a product of the CTE Introduction curriculum which focuses on career related skills and experiential learning. The nature of the Likert-type scales may also not accurately measure the gains as students may be making inaccurate comparisons between themselves and their peers. Response options of average and above average suggest comparison with one’s peer group, all of whom have also taken the course. That said,
students did rate themselves more positively at the end of the course. The medium effects reached on this scale are encouraging as the items making up this scale have a direct relationship to the course content as outlined in the expected course outcomes and the course inputs (Chapter I, Figure 1). The limitations of the instrument, as it relates to self-efficacy and student maturation, should be considered and will be discussed in the limitations and recommendations section of this chapter. Several standardized instruments are available for evaluating career self-efficacy and should be considered in the future research.

The Career Knowledge Scale score was developed from six survey questions regarding student understanding of careers related to the eight Career and Technology Education Pathways (agriculture and natural resources; business; marketing; economics; family and consumer science; health science; information technology; engineering technology). It was not the intent of this research to focus on the Pathways; however, as the course curriculum and standards are organized by Pathway, the survey developers organized the career knowledge questions by Pathway. Essentially, students were asked to correctly match careers or occupations in each Pathway in an effort to measure their career knowledge. This approach may not have adequately measured student gains, as it required them to know all the occupations on the survey so that they could match them with the correct pathway. Perhaps not all the occupations they knew going into the course, or the occupation they learned as a result of the course, were identified as occupational items on the survey. The limitations of collecting data on every student unique understanding of occupations for more than 6,000 respondents needs to be
addressed in future research. It may be sensible to survey a smaller number of students to determine career knowledge gains. While the results of this scale were found to be significant, the effect was small to moderate ($d = .33$), suggesting a marginal increase in career knowledge.

Of the six questions that comprised the Career Knowledge Scale (Chapter IV, Table 8), students scored best on the postsurvey agricultural and natural resources career identification question, yielding a 75% correct response score. The lowest score was obtained on the family and consumer science career identification question, 61% correct. Interestingly, students showed the greatest gains on the family and consumer science related careers, a 1.61 point gain on a 24-point scale, resulting in a 7% increase from course entry to course exit. The smallest gain was found on the question regarding information technology related careers, a .53 increase on a 24-point scale, resulting in only a 3% increase. This small gain may be attributed to tech savvy students who come into the course well versed in information technology (Lenhart, 2012a, 2012b; Project Tomorrow, 2012; Purcell et al., 2012; Zickuhr, 2010). The remaining six pathway careers, identified by the four remaining career knowledge questions, all netted a 5% increase.

These small increases in the students’ ability to identify careers resulted in significant findings on the Career Knowledge Scale along with a small to moderate effect, but State leaders may want to interpret this significance cautiously as these increases could have been much larger considering the 24-point scale.

Without a closer examination of the actual CTE Introduction curriculum, (not part
of this study) it is difficult to discuss the reasons for the gains on career planning, self-efficacy, and career knowledge. These constructs are all part of the Expected Course Outcomes and the curriculum inputs may be related to the construct increases.

**Research Question 2**

There were no gender differences detected on career planning. However, on the Self-Efficacy Scale, males gained a bit more (an unstandardized coefficient change of $b = -0.21$, males were coded as 0) relative to female gains, pre- to postsurvey. However, on the Career Knowledge Scale, females had slightly higher gains ($b = 1.14$) relative to male gains. These findings should be interpreted cautiously and evaluated based on the scales. The Career Planning and Self-Efficacy Scale had 12 points each and the Career Knowledge Scale 144 points. Both females and males had gains; the analysis produced *relative* gains. There may be several reasons for the differences in gains on both the career knowledge and Self-Efficacy Scale.

Interestingly, the gender results are similar to findings in recent research and confirm a trend in career education interventions among adolescents. Prior to the 1990s it was common to find greater differences among the genders regarding self-efficacy (Betz & Hackett, 1986; Blustein, 1989; Lent & Hackett, 1987; Meece, 1987; Sears, 1982); more often, males reported greater self-efficacy. However, more recent studies indicate a shift or improvement in self-efficacy among females resulting in no significant differences between genders (Hackett, 1997; Hirschi & Läge, 2007; McWhirter, Crothers, & Rasheed, 2000; Paa & McWhirter, 2000).
Research Questions 3

Statistically significant relationships were found between the Career Planning, Career Self-Efficacy, and Career Knowledge Scales on both the pre- and postsurveys. The correlation coefficients for the Career Planning Scale and Career Knowledge Scale were small but statistically significant at both course entry and course exit. This finding demonstrates that students who felt they understood the importance of career planning also tended to have more knowledge about occupations. An increase in the relationship was seen on the postsurvey but still resulted in a small effect of \( r = .17 \).

The relationship between the Career Planning Scale and Career Self-Efficacy Scale was strong on both the presurvey \( (r = .60) \) and postsurvey \( (r = .55) \). This strong correlation means that students who ranked their abilities highly on the Career Planning Scale also tended to rank themselves highly on the Career Self-Efficacy Scale. Or, conversely, those who marked themselves low on the Career Planning Scale also tended to rank themselves low on the Career Self-Efficacy Scale. This result was not congruent with the literature where career knowledge tends to correlate more highly with career self-efficacy, not career planning (Baker & Taylor, 1998; Medina, 2010; Oliver & Spokane, 1988; Whiston et al., 1998). However, this differing outcome may be a result of instrumentation. The Career Knowledge Scale in this study was very specific, in retrospect, the questions only evaluated the students’ ability to match careers with the corresponding career Pathway, and perhaps did not measure their actual knowledge about careers. Instruments used by other researchers (not shared in their journal articles) may have included some of the elements that in this study were part of Career Planning Scale.
resulting in a different interpretation of the career knowledge variable.

**Research Questions 4**

Research Question 4 sought to determine if the course evaluations could be predicted by the postsurvey variable scale scores for career planning, career self-efficacy, career knowledge, and meeting with the school counselor. Additionally, the preexisting data included gender information that could be included in the analysis of this question. Two regression models were constructed to conduct the analysis. In the first model (without the interaction of gender), the results indicated that all of the postsurvey variables significantly predicted course evaluations. In model two (with the gender interaction), no significant interactions were found on any of the variables, resulting in predictors that were consistent with model one.

Career planning emerged as the most significant scale predicting course evaluations \( (\beta = .26) \). The other variables were significant, but very weak predictors for course evaluations. This relationship may be rooted in survey questions themselves. The questions making up both Scales were related to their interests and awareness. There was also overlap in the concepts of self-efficacy and how school and career choices are related. A strong interest in career planning suggests students have made some career decisions and are thinking about their futures.

The Career Knowledge Scale was the smallest predictor of course evaluations \( (\beta = .05) \), followed closely by meeting with the school counselor \( (\beta = .09) \). Overall, the four variables moderately predicted \( (R^2 = .16) \) course evaluations. This model resulted in a moderate effect for practical significance, and while career knowledge did not contribute
as much to the course evaluations, an important Expected Course Outcome (Chapter I, Figure 1) for the course, career planning, another important Expected Course Outcome made a significant contribution. Interestingly, research suggests that students that have more career knowledge will be better planners (Patton & Creed, 2001; Super et al., 1996; Toepfer, 1994; Turner & Lapan, 2005); however, in this study, career knowledge did not predict career planning. This finding may be a result of an instrument that did not sufficiently measure career knowledge.

**Research Questions 5**

The analysis of Research Question 5 provided insight into the students’ perceived self-efficacy, their ability to plan for a career, and their responses related to course evaluations, in relationship to meeting with the school counselor. The literature suggests that counselor involvement should positively influence career intervention outcomes. It should be noted that nearly all interventions reviewed in the literature were delivered by counselors. The Utah CTE Introduction course is delivered by the Business, Family and Consumer Science, and Technology teachers. Counselors typically provide only six of the 180 hours of instruction in the course. In addition, counselors are encouraged, but not required, to meet with students in a face-to-face meeting to review their career plans and future course work. This is a large resource investment. Therefore, this final research question sought to determine if meeting with the school counselor had an effect on career planning, career self-efficacy, and course evaluations.

This research question, and resulting analysis, used the yes/no data derived from the students on meeting with the school counselor. Only 39% of the students said they
met with their counselor to plan future courses and slightly less, 37%, said they met with their counselor to consider career options (Appendix C). Statistically, meeting with the school counselor did not predict student career self-efficacy, but did predict (with presurvey career planning) postsurvey career planning and (with presurvey career planning and self-efficacy) on the course evaluations. This was somewhat different from what was found in the literature, where meeting with the counselor had a greater influence (usually a medium effect) on career education course outcomes, including self-efficacy (Brown et al., 2003; Nelson & Gardner, 1999; Whiston et al., 2003). It should be noted that in the studies I reviewed, counselors led the career education interventions, so “meeting with the counselor” may have had a different meaning in this research. The results of this analysis suggest that counselors may have a small effect on career planning and course evaluations.

**USOE Expected Course Outcomes**

Using the theoretical framework of theory-based evaluation, I created a logic model (Chapter I, Figure 1) utilizing the standards and expected course outcomes that were developed by a team of educators at the USOE (2012a). The Expected Course Outcomes are what State leader’s use to evaluate course effectiveness (USOE, 2012a). This data set does not provide enough data to evaluate all the expected course outcomes, but it does provide findings that partially addressed three of the six expected course outcomes. Each of the Outcomes will be discussed as they relate to the research findings.
Outcome One

Outcome one states that students should “Understand how self-knowledge (e.g., interests, abilities, and strengths) relate to career interests and selecting and achieving goals.” This outcome was partially measured by Research Question 1 as it relates to the Career Planning and Self-Efficacy Scales. The results of this research found significant differences from course entry to exit on both Scales with a small effect detected on career planning, which relates to their career goals, and a medium effect on self-efficacy which address their self-knowledge. This finding is subject to the limitations discussed in this chapter, and while it cannot be said that the findings are a result of the course, the results do signify student gains from course entry to exit.

Outcome Two

Outcome two states that as students complete the course they should “Understand education and occupation exploration and planning.” To some extent Research Questions 1 and 4 evaluated this outcome. Research Question 1 directly measured career planning, finding a statistically significant small effect. The Career Planning Scale included three questions that specifically addressed planning and future career goals; along with the relationship of classroom performance and a successful future; and their ability to create a Student Education Occupation Plan. All of the questions within this scale obtained statistically significant differences.

Research Question 4 further measured career planning as it related to the final course evaluations. This analysis found that career planning, career knowledge, career self-efficacy, and meeting with the counselor, positively predicted course evaluations.
Career planning was the largest statistically significant predictor, meaning that student scores on career planning, high and low, predicted their final course evaluation scores. Expected course outcome two is only partially addressed by this data, but the data does demonstrate that in the final evaluation of the course, student perceptions of career planning played a role in their understanding of career education (as measured by their experiences in the course (survey questions 27-30, see Appendix C). The exploratory portion of this outcome was limited by the scope of the instrument, but should be investigated in future research as the State curriculum is defined by exploratory experiences.

**Outcome Four**

State-expected outcome 4 to “Identify career information and career options available in the eight CTE Pathways” was evaluated partially by the Career Knowledge Scale within Research Question 1. A statically significant difference, with a small to medium effect, was found from course entry to course completion. The pre- and postsurvey asked students to match careers to the correct pathway. Mean differences were tested on the career knowledge questions and all were found to be statistically significant with positive gains (see Table 8, Chapter IV). As noted in this chapter under Research Question 1, this approach had a limited scope and may not have adequately measured student gains in the area of career knowledge. However these data suggest a small increase in student abilities to identify careers in the CTE Pathways, a result that would be difficult to obtain from another source outside of the course.
Research Implications

At its core, the CTE Introduction Course is a career exploration course designed to provide students with career information, skills, and “encouragement to achieve his or her goals” (USOE, 2012a, p. 1). The overall goal of the course is to improve self-knowledge (self-efficacy), explore the nature of work, and to educate students about the importance of career planning and decision making (USOE, 2012a). Significant findings on course evaluations were found.

This study has contributed to the career education literature in several ways. The CTE Introduction course is a career education intervention lasting 9 months; a school-year course. This evaluation measured student change from course entry to course exit, a period of over 8 months, or equal to approximately 160 hours of instruction. Even with all the interruptions to the school day (snow days, assemblies, etc.) the course realized many more hours beyond typical career education interventions. Most of the previous studies, as noted in the review of the literature, had much shorter intervention durations. In fact no year-long classroom-intervention studies were found. In their related meta-analyses, Oliver and Spokane (1988) found an average intervention of 7.87 hours (range .25-30 hours), resulting in a medium effect for practical significance, Whiston and colleagues (1998) found an average of 7.5 hours (range .78-64 hours), reporting a small to medium effect. Turner and Conkel (2010) evaluated career development intervention with inner-city adolescents in a 4-hour intervention and found only one significant difference in self-efficacy, which resulted in a medium effect. Finally, Turner and Lapan (2005) conducted a 1-week career education intervention and found a medium effect.
Helwig’s (2004) longitudinal study followed 75 students over 10 years measuring their occupational aspiration changes, but no specific intervention was implemented. The results of this CTE Introduction evaluation concur with previous research; when significant findings were found, most were found to be small to medium in magnitude. However, these results call into question the need for a year-long course. That said, the scope of this research was limited by the preexisting data collected. In all likelihood only a very small percentage of what occurs in the course was actually measured.

In the career education literature (Betz & Hackett, 2006; Brown & Lent, 2005; Patton & Creed, 2001; Patton & Lokan, 2001; Super et al., 1996; Toepfer, 1994), self-efficacy has shown a strong relationship with career knowledge. In this study, career knowledge showed a statistically significant relationship on the pre- and postsurvey scores for self-efficacy. However, these small correlations were overshadowed by the strong relationships between presurvey career self-efficacy and precareer planning and postsurvey career self-efficacy and postsurvey career planning correlations. Interestingly, some researchers (Hackett, 1997; Lapan et al., 2000; Perry et al., 2010; Super, 1980) suggest that career knowledge is highly correlated and predicts career planning or decision making. It is evident from this research that career planning, self-efficacy, and career knowledge are significantly related.

Most of the previous career education studies (Baker & Popowicz, 1983; Baker & Taylor, 1998; Brown et al., 2003; Hughes & Karp, 2004; Maddy-Bernstein, 2000; Oliver & Spokane, 1988; Spokane & Oliver, 1983; Whiston et al., 1998), approximately 90% of them, evaluated high school students, college students, or adults. The implementation of
this course with middle school students adds to a small but growing body of research on
career education with this age group. Because of the middle school setting, the small to
medium effects with this age group may have greater significance. Making a difference
with younger students is important as it allows them more time for career exploration and
decision making as it relates to course work and training.

The fact that significant findings with a medium effect were found on career
planning related to course evaluations is encouraging and perhaps particularly meaningful
as the results confirm the findings of others and add to the small number of studies
conducted with this age group. While some studies found higher effects with junior high
and middle school students (Hughes & Karp, 2004; Oliver & Spokane, 1988; Whiston et
al., 1998), some (Oliver & Spokane, 1988; Whiston et al., 1998) found small effects or no
significant findings with this age group, and negative effects with elementary school-age
children. Middle school students are younger than junior high school students and the
duration of the CTE Introduction course may have resulted in larger effects than what
was found in some of the previous studies. Additional experimental studies are needed to
tease out the effects of age and the optimum duration for the course.

The results of this study may be used to inform members of the Utah State
Legislature, the State School Board, the USOE, local district leaders, and teachers about
the perceptions and knowledge of Utah students on some of the Expected Course
Outcomes for this course. These results could also be used to shape more targeted
research to further understand the effects of course duration, content, and delivery.
Specifically, the small to medium effects found in this study are equal to the small and
medium effects found by other interventions and this is a positive endorsement. However, other interventions were shorter duration, meaning Utah course could be shortened and possibly achieve similar gains. The State may want to consider a pilot test to shorten the course and focus more on bolstering career self-efficacy as it relates to career knowledge.

The literature suggests increasing career knowledge increases self-efficacy and, as a result, career planning (decision making). The results of this research showed a small but significant relationship between career knowledge and self-efficacy, but a larger correlation between postcareer self-efficacy and career planning. The meaning of career knowledge may need some discussion. Career knowledge encompasses the necessary education and skills required for the ever-changing workforce. Currently, the CTE Introduction course career knowledge content is exploratory and experiential in terms of hands-on activities wrapped around fairly traditional Career and Technical Education career pathways. The Career Knowledge Scale in this study was limited to career identification and matching in the pathways, which undoubtedly missed some student career knowledge. Going forward, the career knowledge variable will need continual evaluation as it relates to the changing workforce. Additionally, better tools for measuring career knowledge will be required.

Less than half of the students in this study met face-to-face with their counselor to discuss their future courses or career options. In this study, meeting with the counselor had a small positive relationship on career planning and the course evaluation scores. The literature also documents that students who meet with their counselor have even greater gains related to the implemented career interventions. These two results suggest that
students should meet with their counselors as counselors could have more of an impact. This may be especially true considering that counselors routinely guide students to courses they need to better prepare them to achieve their career aspirations. Counselor understanding of pathways and knowledge about how to find the education and training requirements for specific occupations needs to be considered for counselor professional development.

Middle school transcripts are not part of a student’s academic record submitted to higher education institutions, however, the successful completion of core academic disciplines are prerequisites for courses that students may need to take in high school to meet college entrance requirements and achieve acceptable scores on college entrance exams. For example, successfully completing one or two courses in algebra in middle school determines the math courses a student is eligible to take in high school. If the student didn’t perform well in middle school on any of the core disciplines, they have the difficult task of catching up in high school as they are placed in more remedial courses and, as a result, might reduce their chances to reach their career goals. Counselors may need professional development to keep themselves current with the required course work for specific careers. This would help them to better advise students concerning their specific career goals and may result in a larger counselor effect in future research.

Finally, these evaluation findings may assist other states who may be considering a career exploration course in middle school to improve their state’s economic situation. Students in this course did show statistically significant increases in career planning, career self-efficacy, and career knowledge. In addition, students generally reported
positive overall evaluations for the course. Certainly not all course gains were measured by this limited survey. However, the aspects of the course that were measured in this study suggest that middle school students are capable of gaining an understanding and greater knowledge related to important career education objectives.

Limitations Revisited

All research has limitations. Some of the limitations related to this study were discussed in the Introduction chapter but should be revisited in light of the findings and recommendations. Perhaps the greatest limitation in this study was the survey instrument. This study used preexisting survey data where a considerable number of items had to be excluded because they lowered the reliability of the scales that I created. These excluded questions were primarily focused on career pathway knowledge, not career education research. In addition, some of the questions I would have liked to have asked, given the research literature, could not be asked because the data had been collected. Nevertheless, I considered the prospect of exploring this large and unique career education data set an opportunity.

Related to the course instrument limitations was the amount of time students had to complete the survey. The survey had to be completed within 40 minutes, which included student time logging into the online data collection system. This amount of time limited the length of the instrument and students not knowing the length of the survey may have felt rushed students to complete the questions that were presented to them.

Surveys by nature measure self-reported data. The data in this study were self-
reported by seventh graders, and, like all self-reported data, subject to misinterpretation, or, in the case of seventh graders, not taken very seriously.

Threats to internal validity should also be considered. This study spanned 8 months and some gains could have been the result of maturation where student gains occurred naturally between measurements. An additional experimental design study would need to be conducted with a control group not receiving any instruction in order to ascertain how much effect maturation has on the dependent variables used in this study.

This theory-based evaluation attempted to evaluate the CTE Introduction course as a causal mechanism for student change. However, the unmeasured differences in course content and delivery should be considered a limitation in this study where teachers are in reality the mediator variable. Covering the course standards is all that is required by the State; teachers have the flexibility to develop their own curriculum, provided that it meets or exceeds the standards. In addition, pedagogical differences, years teaching, and the efficacy among teachers to deliver the course content were not considered and these differences may have impacted student outcomes. As Reynolds (1988) cautioned, “Inferences about treatment are largely dependent on the validity of the program theory” (p. 19). In this case, the teacher variability was not considered in the evaluation logic model and this variable may have helped to explain student differences and perhaps causality.

**Recommendations**

Through a postpositivist lens, this study quantitatively analyzed the effectiveness
of the CTE Introduction course using a self-report survey form. This type of data collection may have missed some of the more complex interactions among teachers, students, and the course activities, that would have provided greater insight into student perceptions, especially regarding course evaluations. A qualitative analysis that includes student, teacher, and counselor interviews may expose personal experiences that contribute to the variability in career planning, career self-efficacy, and career knowledge. The self-efficacy variable may be especially vulnerable to quantitative error as “self-efficacy beliefs are the product of a complex process of self-persuasion that relies on cognitive processing of diverse sources of efficacy information conveyed enactively, vicariously, socially and physiologically” (Bandura, 1986). The qualitative data, analyzed with quantitative findings, may identify problematic issues in the course and provide a more richly detailed evaluation of the course.

In order to make more accurate comparisons with other research studies, this study could be replicated with a sample of Utah students using time-tested standardized career inventory and decision making instruments. While it would be difficult to conduct an experimental design evaluating the CTE Introduction course in Utah, it would be possible to measure students from another state, similar to Utah’s student population, who have not experienced a career exploration course using the same instruments. In addition, if stakeholders would like to know more about career pathways (related to career options) and the impacts of the CTE Introduction course, a separate instrument should be developed and tested for reliability. This instrument would need to accurately measure the gains in Pathway knowledge and how career exploration has led students to
understand a larger number of career options. These two recommendations would make the course evaluation results more reliable and consequently make course improvement and funding decisions easier to evaluate.

Future research should address course content and teacher delivery. Not that each teacher has to conform to the exact curriculum or have the exact number of years teaching, rather, future research should control for these variables to help explain variability. Some data that should be captured and analyzed are teacher self-efficacy for teaching the content standards, years of experience, area of certification, their perceived need for professional development, teaching location, and gender.

In the final analysis, based on the data provided, it appears that the CTE Introduction course has small to medium effects and partially achieves the Expected Course Outcomes. Perhaps the most essential question is: Do the course gains outweigh the course cost? In 2012, Utah appropriated a $2,607 (USOE, 2012f) for each CTE student (weighted pupil unit). The CTE Introduction course occupies about one sixth of a student’s school-year, making the actual cost, (including teacher salaries and $25 per student classroom materials) about $460 per student annually. This calculation does not account for efficiencies resulting from the other courses taught by CTE Introduction teachers, but does provide a rough estimate for evaluating funding and effect size. Small effect sizes may be practical when the treatment is inexpensive, but by Utah student spending standards, is $460 per student expensive? Or posed another way, are the course outcomes important to the state, and if they are, is $460 per student sufficient? In addition, the state would not save money by eliminating this course as the same amount
of money would need to be spent on another course to round out student required school hours.

Based on the limitations of the survey instrument and the obtained effect sizes (small to medium), spending about 17% of the weighted pupil unit per student may be reasonable, but additional research should be conducted to validate the effect size in relation to course duration and the expected course outcomes. If the course is meeting the expected course outcomes, with small to medium effects, not measured in this evaluation, then the allocated funding may be considered well spent. The literature is dominated by career interventions that were much shorter in duration and achieved similar effects. But these interventions did not include the time intensive exploratory activities related to career skills or the pathway knowledge deemed as essential by the Utah CTE Introduction expected course outcomes, nor were these constructs and their impact measured in this study.

There are opportunity costs to a year-long course, especially in this era of high stakes testing and the push to increased achievement in other core academic areas. Before assuming the course is longer than it needs to be, more research should be conducted with improved instrumentation to determine if greater gains are being achieved in the year-long course then were captured by this study. Future research could then also be conducted to evaluate if compressing the course into a shorter time frame; spending less time on hands-on activities and more time on the education and skills required for a larger number of careers, would net the same gains and effects.

Finally, while counselor effects were small in this study, the literature suggests
that counselors could exert a greater influence on course evaluations and expected course outcomes. State leaders may want to consider greater emphasis on counselors meeting with students to: (a) assist them with career planning, (b) help them to become more aware of their career options, and (c) direct them toward courses they need to take in the future to meet their career goals.

Concluding Thoughts

There are few other decisions that exert as profound an influence on people’s lives as the choice of a field of work or career. Not only do most people spend considerably more time on the job than in any other single activity (save, arguably, sleep), but choice of occupation significantly affects one’s lifestyle. Work adjustment is intimately associated with mental health and physical well-being. (Hackett, 1997, p. 232)

The ever-changing workforce demands of the 21st century require flexibility among lawmakers, state school leaders, teachers, students, and parents. Student learning should be supported to allow them to achieve their occupational goals, helping them to full-fill their other life goals. It is up to the citizenry to determine what they are willing to spend to educate students about career options and planning.

The CTE Introduction Course has demonstrated potential as student gains did occur. It has been nearly 15 years since the state piloted the CTE Introduction course and, moving forward, the findings in this study should be tested and used to conduct future research related to course content, course duration and delivery, to specifically address all of the expected course outcomes and help students to prepare for their futures.
REFERENCES


Appendix A

Presurvey
Online Student Presurvey: Screen 1

CTE Introduction Fall (Pre) Student Survey

Please Read! Welcome to the CTE Introduction Student Fall Survey! The questions you are about to complete will provide important information to improve the content and teaching of this course. Your responses to the questions will be anonymous, meaning your individual responses will not be viewed by your teachers, will not be graded, and won’t determine your future school course options. You will take this survey again in the spring to see how much your opinions and knowledge have changed over the school year. Be sure to know your seven digit SSID number, as your name will not be used for the survey. If you don’t know your SSID Number, ask your teacher to help you. The survey will take 25-30 minutes.

Start Survey

Online Student Presurvey: Screen 2

CTE Introduction Fall (Pre) Student Survey

<table>
<thead>
<tr>
<th>SECTION 1: Rate the following items.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My understanding of how my interest, ability, and strengths relate to my future career goals. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>2. My understanding that classroom performance relates to success in school and in life. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>3. My ability to use a Student Educator Occupation Plan (SEOP) to plan my future career or college goals. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>4. My understanding of how technology affects my quality of life. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>5. My ability to use a spreadsheet (such as Excel) in a business career. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>6. My ability to complete a job application. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
<tr>
<td>7. My understanding of eating a nutritionally balanced diet. *</td>
</tr>
<tr>
<td>- none</td>
</tr>
</tbody>
</table>
SECTION 2: Choose the best answer for the following questions.

8. Which list includes only agriculture or natural resource careers? *
   - greenhouse manager; computer scientist; forester
   - veterinarian; plant scientist; soil scientist
   - wildlife manager; soil scientist; architect
   - architect; civil engineer; agronomist

9. Which list includes only business, economic, and marketing careers? *
   - secretary; hydrologist; marketing specialist
   - marketing specialist; human resource manager; dietician
   - marketing specialist; economist; accountant
   - banker; civil engineer; statistician

10. Which list includes only family and consumer science careers? *
    - social worker; chef; allergist
    - family therapist; secretary food service worker
    - web developer; child care worker; financial counselor
    - dietician; interior designer; apparel designer

11. Which list includes only health science careers? *
    - pharmacy technician; allergist; nurse
    - radiation therapist; emergency medical technician; surveyor
    - dental hygienist; geneticist; hydrologist
    - anesthesiologist; machinist; radiation therapist

12. Which list includes only information technology careers? *
    - database manager; economist; computer engineer
    - software programmer; mobile applications designer; web developer
    - network administrator; civil engineer; database manager
    - digital media technician; electrician; economist

13. Which list includes only engineering technology careers? *
    - mechanic; construction worker; greenhouse manager
    - economist; electrical engineer; electrician
    - aerospace engineer; machinist; electrical engineer
    - civil engineer; computer engineer; pharmacist
14. Which of the following lists best describes what agriculture provides for people? *

- food; fabric; forest products (shelter); and flowers
- fuel; fabric; fossils and fams
- produce; prices; promotion and placement
- fish; sat; leather and food

15. Which of the following is an example of scarcity? *

- there are 5 mini pizzas and 5 students who would like one
- there are 0 mini pizzas and 0 students who would like one
- there are 5 mini pizzas and 3 students who would like one
- there are 3 mini pizzas and 5 students who would like one

16. Which of the following are three economic resources? *

- natural resources; human resources; waste resources
- human resources; capital resources; natural resources
- capital resources; natural resources; product resources
- water resources; product resources; natural resources

17. Which list below identifies the four principles of marketing? *

- produce; produce; prices; and promotion
- produce; prices; promotion and placement
- produce; prices; promotion; and placement
- purpose; prices; produce; and padding

18. What is the correct sequence for the Five Step Problem Solving Method? *

- 1) Look back and evaluate; 2) Brainstorm possible solutions; 3) Explore possible solutions; 4) Identify the problem; 5) Make a decision and act on it
- 1) Identify the problem; 2) Brainstorm possible solutions; 3) Explore possible solutions; 4) Make a decision and act on it; 5) Look back and evaluate
- 1) Brainstorm possible solutions; 2) Look back and evaluate; 3) Make a decision and act on it; 4) Explore possible solutions; 5) Identify the problem
- 1) Identify the problem; 2) Brainstorm possible solutions; 3) Make a decision and act on it; 4) Look back and evaluate; 5) Explore possible solutions
Online Student Presurvey: Screen 5

SECTION 3: Mark all answers that apply.

19. Which of the following would be considered agricultural or natural resource related careers?
- plant scientist
- veterinarian
- biologist
- architect
- soil scientist
- environmental scientist
- database programmer
- forester
- wildlife manager
- computer scientist
- greenhouse manager
- civil engineer

20. Which of the following would be considered business, economic and marketing related careers?
- architect
- accountant
- economist
- banker
- dietitian
- social worker
- marketing specialist
- secretary
- hydrologist
- office manager
- statistician
- human resource manager

21. Which of the following would be family and consumer science related careers?
- plumber
- dietitian
- dental hygienist
- interior designer
- child care worker
- financial counselor
- food service worker
- website developer
- social worker
- family therapist
- plant scientist
- apparel designer
Online Student Presurvey: Screen 6

22. Which of the following would be health science related careers?
- dental hygienist
- surveyor
- wildlife manager
- allergist
- anesthesiologist
- nurse
- pharmacy technologist
- architect
- hydrologist
- emergency medical technician
- radiation therapist
- geneticist

23. Which of the following would be information technology related careers?
- surveyor
- database manager
- chemist
- digital media technician
- network administrator
- network security specialist
- web developer
- software programmer
- computer engineer
- mobile applications designer
- economist
- public relations manager

24. Which of the following would be engineering technology related careers?
- banker
- aerospace engineer
- statistician
- construction worker
- electrical engineer
- radiation therapist
- machinist
- mechanic
- plumber
- chemical engineer
- electrician
- health inspector
Online Student Presurvey: Screen 7

25. Which of the following website(s) uses a database to display information? *
- [ ] eBay
- [ ] Google Maps
- [ ] Amazon
- [ ] Facebook
- [ ] YouTube
- [ ] Utah Futures

26. Which of the following are renewable energy sources? *
- [ ] fossil fuels
- [ ] biodiesel
- [ ] ethanol
- [ ] biomas

SECTION 4: Demographics

27. What school do you attend? (Choose from the alphabetical list.) *

Select an option

28. What is the name of the school district where you attend school? (Ask your teacher if you are unsure.) *

Select an option

29. Your Gender/Sex: *

Select an option

30. What is your seven digit UtahFutures login ID number? (If you are unsure ask your teacher.) *

Submit Survey
Appendix B

Postsurvey
Online Student Postsurvey: Screen 1

CTE Introduction Spring (Post) Student Survey

Please Read  Welcome to the CTE Introduction Student Post Survey! The questions you are about to complete will provide important information to improve the content and teaching of this course. Your responses to the questions will be anonymous, meaning your individual responses will not be viewed by your teachers or your school, and will determine your future school course options. See how much your opinions and knowledge have changed over the school year. Be sure to know your seven digit UtahFutures login (SSID) number, as your name will not be used for the survey. If you don’t know your SSID Number, ask your teacher to help you. The survey will take 25-30 minutes.

Start Survey

Online Student Postsurvey: Screen 2

CTE Introduction Spring (Post) Student Survey

SECTION 1: Rate the following items.

1. My understanding of how my interest, ability, and strengths relate to my future career goals. *
   - none
   - low
   - average
   - above average
   - high

2. My understanding that classroom performance relates to success in school and in life. *
   - none
   - low
   - average
   - above average
   - high

3. My ability to use a Student Education Occupation Plan (SEOP) to plan my future career or college goals. none low average above average high
   - none
   - low
   - average
   - above average
   - high

4. My understanding of how technology affects my quality of life. *
   - none
   - low
   - average
   - above average
   - high

5. My ability to use a spreadsheet (such as Excel) in a business career. *
   - none
   - low
   - average
   - above average
   - high

6. My ability to complete a job application. *
   - none
   - low
   - average
   - above average
   - high

7. My understanding of eating a nutritionally balanced diet. *
   - none
   - low
   - average
   - above average
   - high
**Online Student Postsurvey: Screen 3**

**SECTION 2: Choose the best answer for the following questions.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Which list includes only agriculture or natural resource careers? *</td>
<td>- greenhouse manager; computer scientist; forester</td>
</tr>
<tr>
<td></td>
<td>- veterinarian; plant scientist; soil scientist</td>
</tr>
<tr>
<td></td>
<td>- wildlife manager; soil scientist; architect</td>
</tr>
<tr>
<td></td>
<td>- architect; civil engineer; agronomist</td>
</tr>
<tr>
<td>9. Which list includes only business, economic, and marketing careers? *</td>
<td>- secretary; hydrologist; marketing specialist</td>
</tr>
<tr>
<td></td>
<td>- marketing specialist; human resource manager; dietician</td>
</tr>
<tr>
<td></td>
<td>- marketing specialist; economist; accountant</td>
</tr>
<tr>
<td></td>
<td>- banker; civil engineer; statistician</td>
</tr>
<tr>
<td>10. Which list includes only family and consumer science careers? *</td>
<td>- social worker; chef; allergist</td>
</tr>
<tr>
<td></td>
<td>- family therapist; secretary food service worker</td>
</tr>
<tr>
<td></td>
<td>- web developer; child care worker; financial counselor</td>
</tr>
<tr>
<td></td>
<td>- dietician; interior designer; apparel designer</td>
</tr>
<tr>
<td>11. Which list includes only health science careers? *</td>
<td>- pharmacy technician; allergist; nurse</td>
</tr>
<tr>
<td></td>
<td>- radiation therapist; emergency medical technician; surveyor</td>
</tr>
<tr>
<td></td>
<td>- dental hygienist; geneticist; hydrologist</td>
</tr>
<tr>
<td></td>
<td>- anesthesiologist; machinist; radiation therapist</td>
</tr>
<tr>
<td>12. Which list includes only information technology careers? *</td>
<td>- database manager; economist; computer engineer</td>
</tr>
<tr>
<td></td>
<td>- software programmer; mobile applications designer; web developer</td>
</tr>
<tr>
<td></td>
<td>- network administrator; civil engineer; database manager</td>
</tr>
<tr>
<td></td>
<td>- digital media technician; electrician; economist</td>
</tr>
<tr>
<td>13. Which list includes only engineering technology careers? *</td>
<td>- mechanic; construction worker; greenhouse manager</td>
</tr>
<tr>
<td></td>
<td>- economist; electrical engineer; electrician</td>
</tr>
<tr>
<td></td>
<td>- aerospace engineer; machinist; electrical engineer</td>
</tr>
<tr>
<td></td>
<td>- civil engineer; computer engineer; pharmacist</td>
</tr>
</tbody>
</table>
14. Which of the following lists best describes what agriculture provides for people? *
   - food; fabric; forest products (shelter); and flowers
   - fuel; fabric; fossils and farms
   - produce; prices; promotion and placement
   - fish; sat; leather and food

15. Which of the following is an example of scarcity? *
   - there are 5 mini pizzas and 5 students who would like one
   - there are 0 mini pizzas and 0 students who would like one
   - there are 5 mini pizzas and 3 students who would like one
   - there are 3 mini pizzas and 5 students who would like one

16. Which of the following are three economic resources? *
   - natural resources; human resources; waste resources
   - human resources; capital resources; natural resources
   - capital resources; natural resources; product resources
   - water resources; product resources; natural resources

17. Which list below identifies the four principles of marketing? *
   - produce; produce; prices; and promotion
   - produce; prices; promotion and placement
   - produce; prices; promotion; and placement
   - purpose; prices; produce; and padding

18. What is the correct sequence for the Five Step Problem Solving Method? *
   - 1) Look back and evaluate 2) Brainstorm possible solutions; 3) Explore possible solutions; 4) Identify the problem; 5) Make a decision and act on it
   - 1) Identify the problem; 2) Brainstorm possible solutions; 3) Explore possible solutions; 4) Make a decision and act on it; 5) Look back and evaluate
   - 1) Brainstorm possible solutions; 2) Look back and evaluate; 3) Make a decision and act on it; 4) Explore possible solutions; 5) Identify the problem
   - 1) Identify the problem; 2) Brainstorm possible solutions; 3) Make a decision and act on it; 4) Look back and evaluate; 5) Explore possible solutions
Online Student Postsurvey: Screen 5

SECTION 3: Mark all answers that apply.

19. Which of the following would be considered agricultural or natural resource related careers?
- plant scientist
- veterinarian
- biologist
- architect
- soil scientist
- environmental scientist
- database programmer
- forester
- wildlife manager
- computer scientist
- greenhouse manager
- civil engineer

20. Which of the following would be considered business, economic and marketing related careers?
- architect
- accountant
- economist
- banker
- dietician
- social worker
- marketing specialist
- secretary
- hydrologist
- office manager
- statistician
- human resource manager

21. Which of the following would be family and consumer science related careers?
- plumber
- dietician
- dental hygienist
- interior designer
- child care worker
- financial counselor
- food service worker
- website developer
- social worker
- family therapist
- plant scientist
- apparel designer
Online Student Postsurvey: Screen 6

22. Which of the following would be health science related careers? *
- dental hygienist
- surveyo
- wildlife manager
- allergist
- anesthesiologist
- nurse
- pharmacy technologist
- architect
- hydrologist
- emergency medical technician
- radiation therapist
- geneticist

23. Which of the following would be information technology related careers? *
- surveyo
- database manager
- chemist
- digital media technician
- network administrator
- network security specialist
- web developer
- software programmer
- computer engineer
- mobile applications designer
- economist
- public relations manager

24. Which of the following would be engineering technology related careers? *
- banker
- aerospace engineer
- statistician
- construction worker
- electrical engineer
- radiation therapist
- machinist
- mechanic
- plumber
- chemical engineer
- electrician
- health inspector
Online Student Postsurvey: Screen 7

25. Which of the following website(s) uses a database to display information? *
- [ ] eBay
- [ ] Google Flaps
- [ ] Amazon
- [ ] Facebook
- [ ] YouTube
- [ ] Utah Futures

26. Which of the following are renewable energy sources? *
- [ ] fossil fuels
- [ ] biodiesel
- [ ] ethanol
- [ ] biomass
### Online Student Postsurvey: Screen 8

**SECTION 4: Future Plans & Outcomes**

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. As a result of my experiences in the CTE Introduction course, I am aware of more careers than when I began the course.</td>
<td>strongly agree/agree/neutral/disagree/strongly disagree</td>
</tr>
<tr>
<td>28. The CTE Introduction course has helped me to narrow my career interests.</td>
<td>strongly agree/agree/neutral/disagree/strongly disagree</td>
</tr>
<tr>
<td>29. As a result of my experiences in the CTE Introduction course, I have a better understanding of the courses I need to take in the future to prepare me for a career or college.</td>
<td>strongly agree/agree/neutral/disagree/strongly disagree</td>
</tr>
<tr>
<td>30. As a result of my experiences in the CTE Introduction course, I am planning to adjust my course schedule to pursue my career goals.</td>
<td>strongly agree/agree/neutral/disagree/strongly disagree</td>
</tr>
<tr>
<td>31. There are many careers that I think are only for women or only for men.</td>
<td>strongly agree/agree/neutral/disagree/strongly disagree</td>
</tr>
<tr>
<td>32. I have met with my counselor this past year to plan my future courses.</td>
<td>Yes/No/I don’t remember</td>
</tr>
<tr>
<td>33. I have met with my counselor this past year to consider career options.</td>
<td>Yes/No/I don’t remember</td>
</tr>
<tr>
<td>34. At this time I am considering a career as a (please list your top three choices):</td>
<td></td>
</tr>
</tbody>
</table>
Online Student Postsurvey: Screen 9

SECTION 5: Demographics

35. What school do you attend? (Choose from the alphabetical list.) *
   
   Select an option ▼ Other:  

36. What is the name of the school district where you attend school? (Ask your teacher if you are unsure.) *
   
   Select an option ▼ Other:  

37. Your Gender/Sex: *
   
   Select an option ▼  

38. What is your seven digit UtahFutures login ID number? (If you are unsure ask your teacher.) *
   
   Submit Survey
Appendix C

Additional Descriptive Statistics
Table C1

*Pre- and Postsurvey Descriptive Statistics*

<table>
<thead>
<tr>
<th>Survey questions</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Difference scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>% of correct responses</td>
</tr>
<tr>
<td>Career planning questions, 1-3: Likert-type scale, 0 (none) - 4 (high)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. My understanding of how my interest, ability, and strengths relate to my future career goals.</td>
<td>2.75</td>
<td>9.34</td>
<td>-</td>
</tr>
<tr>
<td>2. My understanding that classroom performance relates to success in school and in life.</td>
<td>3.18</td>
<td>8.79</td>
<td>-</td>
</tr>
<tr>
<td>3. My ability to use a Student Education Occupation Plan (SEOP) to plan my future career or college goals.</td>
<td>2.36</td>
<td>1.10</td>
<td>-</td>
</tr>
<tr>
<td>Career Self-Efficacy, Questions 4-7: Likert-type scale, 0 (none) - 4 (high)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. My understanding of how technology affects my quality of life.</td>
<td>2.85</td>
<td>.99</td>
<td>-</td>
</tr>
<tr>
<td>5. My ability to use a spreadsheet (such as Excel) in a business career.</td>
<td>2.06</td>
<td>1.11</td>
<td>-</td>
</tr>
<tr>
<td>6. My ability to complete a job application.</td>
<td>2.69</td>
<td>1.10</td>
<td>-</td>
</tr>
<tr>
<td>Questions not analyzed as part of dissertation 8-18, multiple choice response 0 = incorrect 1 = correct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. My understanding of eating a nutritionally balanced diet:</td>
<td>2.88</td>
<td>.98</td>
<td>-</td>
</tr>
<tr>
<td>8. Which list includes only agricultural or natural resource careers?</td>
<td>-</td>
<td>-</td>
<td>45</td>
</tr>
<tr>
<td>10. Which list includes only family and consumer science careers?</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>11. Which list includes only health science careers?</td>
<td>-</td>
<td>-</td>
<td>63</td>
</tr>
<tr>
<td>12. Which list includes only information technology careers?</td>
<td>-</td>
<td>-</td>
<td>69</td>
</tr>
<tr>
<td>13. Which list includes only engineering technology careers?</td>
<td>-</td>
<td>-</td>
<td>56</td>
</tr>
</tbody>
</table>

*(table continues)*
<table>
<thead>
<tr>
<th>Survey questions</th>
<th>Presurvey</th>
<th>Postsurvey</th>
<th>Difference scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Which of the following lists best describes what agriculture provides for people?</td>
<td>M</td>
<td>SD</td>
<td>% of correct responses</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>58</td>
</tr>
<tr>
<td>15. Which of the following is an example of scarcity?</td>
<td>-</td>
<td>-</td>
<td>60</td>
</tr>
<tr>
<td>16. Which of the following are three economic resources?</td>
<td>-</td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>17. Which list below identifies the four principles of marketing?</td>
<td>-</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>18. What is the correct sequence for the Five Step Problem Solving Method?</td>
<td>-</td>
<td>-</td>
<td>61</td>
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<tr>
<td>Career knowledge, questions 19-24: 0 - 24 points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Which of the following would be considered business, economic, and marketing related careers?</td>
<td>15.15</td>
<td>3.96</td>
<td>63</td>
</tr>
<tr>
<td>21. Which of the following would be family and consumer science related careers?</td>
<td>12.99</td>
<td>3.72</td>
<td>54</td>
</tr>
<tr>
<td>22. Which of the following would be health science related careers?</td>
<td>16.30</td>
<td>4.66</td>
<td>68</td>
</tr>
<tr>
<td>23. Which of the following would be information technology related careers?</td>
<td>16.87</td>
<td>5.27</td>
<td>70</td>
</tr>
<tr>
<td>24. Which of the following would be engineering technology related careers?</td>
<td>15.85</td>
<td>4.67</td>
<td>66</td>
</tr>
<tr>
<td>Questions not analyzed as part of dissertation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26: 0 - 8 points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Evaluation and future planning, questions 27-30, (postsurvey only) Likert-type scale, 0 (strongly disagree) - 4 (strongly agree)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(table continues)*
<table>
<thead>
<tr>
<th>Survey questions</th>
<th>Presurvey</th>
<th></th>
<th>Postsurvey</th>
<th></th>
<th>Difference scores</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>% of correct responses</td>
<td>M</td>
<td>SD</td>
<td>% of correct responses</td>
</tr>
<tr>
<td>28. The CTE Introduction course has helped me to narrow my career interests.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.80</td>
<td>.94</td>
<td>-</td>
</tr>
<tr>
<td>29. As a result of my experiences in the CTE Introduction course, I have a better understanding of the courses I need to take in the future to prepare me for a career or college.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.01</td>
<td>.86</td>
<td>-</td>
</tr>
<tr>
<td>30. As a result of my experiences in the CTE Introduction course, I am planning to adjust my course schedule to pursue my career goals.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.83</td>
<td>.88</td>
<td>-</td>
</tr>
<tr>
<td>Question not analyzed as part of dissertation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Likert-type scale, 0 (strongly disagree) - 4 (strongly agree)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>31. There are many careers that I think are only for women or only for men.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.37</td>
<td>1.19</td>
<td>-</td>
</tr>
<tr>
<td>Counselor participation, questions 32-33, (postsurvey only)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>39% said yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>32. I have met with my counselor this past year to plan my future courses.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>33. I have met with my counselor this past year to consider career options.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Question not analyzed as part of dissertation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>34. At this time I am considering a career as a (please list your top three choices):</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Open-end responses</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* For questions 1-26 \(N = 6,078\). Overall course evaluation and future planning questions (27-34) were only asked on the postsurvey, \(N = 5,937\).
CURRICULUM VITAE

DEBRA SPIELMAKER

Extension Associate Professor, Utah State University
P: 435-213-5562
debra.spielmaker@usu.edu

Education and Endorsements

2013 Doctor of Philosophy, Education, Curriculum and Instruction: Emphasis, Instructional Technology—Utah State University
1989 Utah Biology Teacher Certification—Utah State University
1985 Master of Science, Agricultural Education—Utah State University
1984 Bachelor of Science, Agricultural Education, Minor, Plant Science—Utah State University

Current Work Experience
Director of Utah Agriculture in the Classroom: 1994 to present
Cooperative Extension, Utah State University, Logan, Utah
Responsible for the statewide development of research-based instructional agricultural literacy resources that meet state K-12 standards for life science, nutrition, social studies and Career and Technical Education, and to deliver innovative onsite and e-learning teacher training programs.

Prior Work Experience
• Lecturer: 1992-2003
  Agricultural Systems Technology and Education (ASTE), Utah State University, Logan, Utah
  Provided quality instruction to undergraduates in ASTE courses including: Compact Equipment, Preventive Maintenance of Farm Equipment, Agricultural Sales and Service, FFA (Leadership) and Supervised Agricultural Experience.
• Science and Applied Technology (Agricultural) Educator: 1990-1992
  Thomas Moore School, Emigrant, Montana
  Provided instruction in middle school agriculture, science, and business (word processing) classes.
• Agricultural Educator and FFA Advisor: 1984-1989
  Layton High School, Layton, Utah
  Developed curriculum and provided instruction in agricultural mechanics, plant science, horticulture, floriculture, animal science, natural resources, and leadership.

Awards and Honors

<table>
<thead>
<tr>
<th>Year</th>
<th>Awards / Honors</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>First Place Poster: InterAgtion and Curriculum Mapping for Agricultural Literacy</td>
<td>Western Region American Association for Agricultural Education</td>
</tr>
<tr>
<td>2011</td>
<td>Utah State University Extension Nominee for Excellence in Extension Award</td>
<td>Association of Public and Land Grant Universities</td>
</tr>
<tr>
<td>Year</td>
<td>Awards / Honors</td>
<td>Organization</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>2011</td>
<td>Co-Chair of Agricultural Literacy Standards Summit</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>2010</td>
<td>Arch of Fame Award</td>
<td>Utah Association of Family and Consumer Science Teachers</td>
</tr>
<tr>
<td>2007</td>
<td>Honorary State FFA Degree</td>
<td>Utah FFA Association</td>
</tr>
<tr>
<td>2006</td>
<td>Distinguished Achievement Award for Growing a Nation: The Story of American Agriculture</td>
<td>The Association of Educational Publishers</td>
</tr>
<tr>
<td>2006</td>
<td>Service to the Industry Award</td>
<td>Dairy Farmers of Utah</td>
</tr>
<tr>
<td>2004</td>
<td>E.G. Peterson Award for Extension Excellence</td>
<td>Utah State University</td>
</tr>
<tr>
<td>2004</td>
<td>Outstanding Service to Agriculture Award</td>
<td>Cache County Farm Bureau</td>
</tr>
<tr>
<td>2004</td>
<td>Outstanding Food Land and People Program Leadership Award</td>
<td>Food, Land &amp; People</td>
</tr>
<tr>
<td>2003</td>
<td>Endorsement from USDA, Agriculture in the Classroom website</td>
<td>American Association for the Advancement of Science</td>
</tr>
<tr>
<td>2003</td>
<td>Aggie Blue Pride Light Honoree</td>
<td>Utah State University</td>
</tr>
<tr>
<td>2002</td>
<td>Outstanding Food, Land &amp; People Program</td>
<td>Food, Land &amp; People USA</td>
</tr>
<tr>
<td>2001</td>
<td>Taggart-Ballard Award of Excellence</td>
<td>Utah State University Extension</td>
</tr>
<tr>
<td>2000</td>
<td>National Agriculture Initiative Award, Winner</td>
<td>Agriculture in the Classroom Consortium</td>
</tr>
<tr>
<td>2000</td>
<td>Taggart-Ballard Award of Excellence</td>
<td>Utah State University Extension</td>
</tr>
<tr>
<td>1999</td>
<td>President of Agriculture in the Classroom Consortium</td>
<td>Agriculture in the Classroom Consortium</td>
</tr>
<tr>
<td>1999</td>
<td>Friend of Agriculture Award</td>
<td>Utah Farm Bureau Federation</td>
</tr>
<tr>
<td>1999</td>
<td>National Agriculture Initiative Award, Finalist</td>
<td>Agriculture in the Classroom Consortium</td>
</tr>
<tr>
<td>1999</td>
<td>President-Elect of Agriculture in the Classroom Consortium</td>
<td>Agriculture in the Classroom Consortium</td>
</tr>
<tr>
<td>1998</td>
<td>President’s Service Award</td>
<td>Utah Association of Conservation Districts</td>
</tr>
</tbody>
</table>

Research, Scholarship and Creative Activities

Contracts, Grants and Sponsored Research:

**Principal Investigator - Funded Contracts: $3,388,544**

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Title and Sponsor</th>
<th>Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>Agriculture in the Classroom Capacity Building. Sponsored by USDA-NIFA, Federal.</td>
<td>$436,975</td>
</tr>
<tr>
<td>1994-2013</td>
<td>Utah Foundation for Agriculture in the Classroom. Sponsored by Utah Foundation for Agriculture in the Classroom, Private.</td>
<td>$2,160,599</td>
</tr>
<tr>
<td>2003-2012</td>
<td>Agriculture in the Classroom Excellence Grants (ACE). Sponsored by USDA, Federal.</td>
<td>$1,075,000</td>
</tr>
<tr>
<td>2003-2012</td>
<td>Agriculture in the Classroom Consortium Website. Sponsored by AITC Consortium, Private.</td>
<td>$21,500</td>
</tr>
<tr>
<td>1999-2012</td>
<td>E-Resources. Sponsored by USDA, Federal.</td>
<td>$659,970</td>
</tr>
<tr>
<td>1999-2000</td>
<td>National Agriculture in the Classroom Conference, National Teacher</td>
<td>$34,500</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Title and Sponsor</td>
<td>Funded</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1997</td>
<td><em>Dirt: Secrets in the Soil Instructional Unit.</em> Sponsored by Utah Board of Education.</td>
<td>$19,000</td>
</tr>
<tr>
<td>1998</td>
<td><em>Food, Land &amp; People Reader.</em> Sponsored by Food, Land &amp; People, Inc., Private.</td>
<td>$4,500</td>
</tr>
<tr>
<td>1999</td>
<td><em>Educational Training of UACD Staff and Web Page Development.</em> Sponsored by Utah Association of Conservation Districts, Private.</td>
<td>$6,060</td>
</tr>
<tr>
<td>1999</td>
<td><em>Development of Dirt: Secrets in the Soil Video.</em> Sponsored by KUTV Channel 2, Private.</td>
<td>$38,000</td>
</tr>
<tr>
<td>2000</td>
<td><em>Technology, Life and Careers Summer Agricultural Institute.</em> Sponsored by USOE, State.</td>
<td>$6,000</td>
</tr>
<tr>
<td>2001</td>
<td><em>Food, Land &amp; People Reader.</em> Sponsored by Food, Land &amp; People, Inc., Private.</td>
<td>$4,500</td>
</tr>
<tr>
<td>2002</td>
<td><em>Western Region Annual Meeting Coordination.</em> Sponsored by AITC Consortium, Private.</td>
<td>$2,500</td>
</tr>
<tr>
<td>2003</td>
<td><em>School Garden Development.</em> Sponsored by Utah State University Extension, State.</td>
<td>$7,000</td>
</tr>
<tr>
<td>2003</td>
<td><em>National Resource Directory Promotion.</em> Sponsored by Cornell Extension, State.</td>
<td>$15,000</td>
</tr>
<tr>
<td>2003</td>
<td><em>Development of Utah FFA website, <a href="http://www.utahffa.org">www.utahffa.org</a>.</em> Sponsored by USOE, State.</td>
<td>$3,000</td>
</tr>
<tr>
<td>2002</td>
<td><em>Development of elementary teacher online in-service course.</em> Sponsored by Utah Department of Agriculture and Food, State.</td>
<td>$50,000</td>
</tr>
<tr>
<td>2002</td>
<td><em>Changes and Challenges: A Century of Utah Agriculture.</em> Sponsored by USOE, State.</td>
<td>$5,000</td>
</tr>
<tr>
<td>2003</td>
<td><em>Utah Agriculture in the Classroom Educational Exhibits.</em> Sponsored by Utah State University Extension, State.</td>
<td>$5,000</td>
</tr>
<tr>
<td>2004</td>
<td><em>Summer Agricultural Institute.</em> Sponsored by USOE, State.</td>
<td>$12,300</td>
</tr>
<tr>
<td>2005</td>
<td><em>5-Fs of Agriculture Posters.</em> Sponsored by USOE, State.</td>
<td>$5,000</td>
</tr>
<tr>
<td>2007</td>
<td><em>Science in Your Shopping Cart WebQuest and Instructional Unit.</em> Sponsored by Utah State University Extension, State.</td>
<td>$10,000</td>
</tr>
<tr>
<td>2007</td>
<td><em>Career and Technology AgQuest and Agademics Knowledge.</em> Sponsored by USOE, State.</td>
<td>$5,000</td>
</tr>
<tr>
<td>2008</td>
<td><em>Gardening for Nutrition: Linking School Gardens to Nutrition and MyPyramid.</em> Sponsored by Utah State University Extension, State.</td>
<td>$6,000</td>
</tr>
<tr>
<td>2010</td>
<td><em>Western Region Annual Meeting Coordination.</em> Sponsored by AITC Consortium, Private.</td>
<td>$3,500</td>
</tr>
<tr>
<td>2009</td>
<td><em>Exploring Agriscience and Agribusiness through Integrated Science and Career and Technical Education.</em> Sponsored by USDA, Federal.</td>
<td>$25,752</td>
</tr>
<tr>
<td>2010</td>
<td><em>Development of integrated e-Learning website.</em> Sponsored by Utah State University Extension, State.</td>
<td>$10,000</td>
</tr>
<tr>
<td>2002</td>
<td><em>Western Region Annual Meeting Coordination.</em> Sponsored by AITC Consortium, Private.</td>
<td>$2,500</td>
</tr>
<tr>
<td>1998</td>
<td><em>Development of Dirt: Secrets in the Soil Video.</em> Sponsored by KUTV Channel 2, Private.</td>
<td>$38,000</td>
</tr>
<tr>
<td>1997</td>
<td><em>Dirt: Secrets in the Soil Instructional Unit.</em> Sponsored by Utah Board of Education.</td>
<td>$19,000</td>
</tr>
</tbody>
</table>

**Principal Investigator - Funded Grants:** $499,164

**Total** $4,388,544
<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Title and Sponsor</th>
<th>Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-1998</td>
<td>Development of Soil Video. Sponsored by Utah Soil Commission &amp; Districts, State.</td>
<td>$14,000</td>
</tr>
<tr>
<td>1997</td>
<td>Livestock Tours &amp; Educational Display. Sponsored by Utah State Fair Park, State.</td>
<td>$6,645</td>
</tr>
<tr>
<td>1996-1997</td>
<td>Touch Screen Educational Kiosk. Sponsored by Thanksgiving Point Institute, Private.</td>
<td>$9,700</td>
</tr>
<tr>
<td>1996</td>
<td>Livestock Tours. Sponsored by Utah State Fair Park, State.</td>
<td>$6,635</td>
</tr>
<tr>
<td>1995</td>
<td>Development of materials for Living with Wildlife campaign. USDA, Federal.</td>
<td>$5,000</td>
</tr>
<tr>
<td>1995</td>
<td>Livestock Tours. Sponsored by Utah State Fair Park, State.</td>
<td>$7,250</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>$499,164</td>
</tr>
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</table>

Co-Principal Investigator - Funded Grants: $70,666

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Title and Sponsor</th>
<th>Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>Rapid beef finishing on birdsfoot trefoil pastures for sustainable mitigation of climate change. Sponsored by Utah Agricultural Experiment Station, State.</td>
<td>$35,666</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Rapid beef finishing on birdsfoot trefoil pastures for sustainable mitigation of climate change. Sponsored by Utah State University SPARC, Utah State University.</td>
<td>$35,000</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>$70,666</td>
</tr>
</tbody>
</table>

Presentations


**Posters**


Spielmaker, D. S. (Designer and Presenter) *An online course for agricultural literacy*. Western Region American Association for Agricultural Education Conference, Honolulu, HI. (April 2004) Poster presentation awarded Western Region AAAE 1st Place Outstanding Research Poster Presentation.

**Peer Reviewed Articles**


Spielmaker, D. (2000). *Pay dirt* (Utah Science: Vol. 60, No. 2). Logan, UT; Utah State University, Utah Agricultural Experiment Station.


**Peer Reviewed Curriculum and Instructional Materials**


**Non-Refereed Articles and Collaborations**


\[ \text{Extension Programming, Presentations, and Projects—Designed, Developed and Implemented} \]

\textbf{Educator Presentations}

\textbf{Pre-service Teacher Programs}
\textbf{Participants: 12,780}

Approximately 700 student teachers trained annually, 1995 to present

Develop and present at undergraduate education colleges and/or universities statewide each semester.

Approximately 800 pre-service teachers (elementary and secondary students) are trained annually at Utah State University (including branch campuses), Utah Valley University, Weber State University, Westminster College, Southern Utah University, Brigham Young University, and the University of Utah.

Presentations times range from 1.5—3 hours in the content areas of science, social studies, and math and evaluation scores range from 4.7 - 5 on a five-point scale.

\textbf{Online Courses - Academic Instruction}
\textbf{Participants: 565}

Approximately 50 teachers enrolled annually, 2003 to present

The Food, Land and People (FLP) course was designed and developed to provide K-12 teachers with an opportunity to earn USOE or Utah State University credit, by teaching agricultural related lessons. FLP was developed to increase elementary and secondary teacher/student knowledge about agriculture (farm to fork) and the environment using research-based teaching strategies while meeting statewide mandatory core curriculum standards in the areas of science, social studies, geography, nutrition, and career and technical education. Teachers use the classroom resources including lesson plans, kits, bulletin boards, DVDs/videos, books, software, maps, and PowerPoint presentations on the course website to meet requirements. In addition to meeting state core curriculum guidelines, the resources were designed to promote environmental awareness, critical thinking, problem-solving skills, cooperative attitudes, and an appreciation for cultural differences. Meaningful activities and well-defined objectives enhance teaching skills, instructional strategies, and content knowledge concerning science, technology, and society as
these subjects relate to food, land, and people. The course was redesigned and integrated with our e-Store resources in 2011 providing teachers with a dynamic database to develop district required curriculum maps.

**Teacher In-service Programs and Courses: Developer and Presenter**  
**Participants: 16,378**

**1995 to present**

The following teacher in-service training programs were developed and delivered in a face-to-face setting. Several courses have been part of mandatory statewide training and have resulted in large participation numbers. All courses meet state standards and objectives. Experiential learning and inquiry strategies are used to explore “real world” examples and activities for implementation by K-12 classroom teachers.

**Food, Land & People: Workshops—Grades K-6**  
**Participants: 875**

Participants learn how to integrate the concepts of food, land, and people into their curriculum. Science and social studies along with nutrition are integrated into a variety of themes such as: indoor and outdoor school gardening, technology, geography, embryology, and water. (2009-Present)

**Heredity...A Link to Your Past—Grade 5**  
**Participants: 1,300**

This presentation addresses the heredity section of the Utah Science Core Curriculum. Activities are centered on inherited traits that are passed from a parent to its offspring and the effective demonstration to students of these concepts through agricultural examples. (2001-Present)

**Microorganisms in the Macrocosm—Grade 6**  
**Participants: 1,080**

Participants receive instruction on “good guy” bacteria used in food processing and learn how to grow microorganisms, good and bad. “Bad” bacteria are discussed in the context of food spoilage and safety. (2001-Present)

**Dirt: Secrets in the Soil—Grade 4**  
**Participants: 2,800**

This workshop uses the *Dirt: Secrets in the Soil* instructional unit and engages participants in hands-on activities and models instructional strategies for the classroom. (1999-Present)

**Changes and Challenges: A Century of Utah Agriculture—Grade 7**  
**Participants: 1,020**

Teachers learn how to use the developed lesson plans and accompanying interactive multimedia program within their Utah Studies course. (2000-Present)

**Career & Technical Education (CTE) Introduction—Grade 7**  
**Participants: 2,240**

This workshop provides teachers with agricultural lesson plans and activities to enhance the CTE Introduction course as an exploratory Applied Technology Education Core Curriculum required by the Utah State Legislature for middle/junior high school students. The workshop provides FACS, Business, and Technology teachers with students centered lessons, which use technology, develop beginning skills, and explore careers. (1998-Present)

**Culture of the Land—Grade 8**  
**Participants: 1,560**

This training focused on the culture and issues of our early agrarian nation and the development of technology as it related to the production and the processing of agricultural products. (2001-Present)

**The Effect of Geography on Agri-Culture—Grade 9**  
**Participants: 1,840**

Geography has determined where agriculture and civilizations thrive. Geography and food along with cultural development are explored in this workshop. Geographical requirements for
agriculture, world trade, and the foods of different cultures are discussed and various classroom activities are demonstrated. (2001-Present)

Ancient and Ageless Agriculture—Grade 10  
Participants: 1,558
Participants learn how agriculture has influenced the development of societies and cultures around the world. Geography, soils, longitude, and latitude help to determine where civilizations begin and agriculture determines whether how the societies flourished to further study world civilizations. (2001-Present)

Growing a Nation: the Story of American Agriculture—Grade 11  
Participants: 3,245
This workshop explores early America 1877 to present day and how agriculture has change our society and culture more than any other in the world. Two hundred years ago we were a country with 97% (a total country population of 5 million) farming. Today 5 million still farm, but that is less than 2% of our population; feeding the U.S. and the world! What changes have taken place to cause such a change in our country’s workforce and economy? (2003-Present)

Non-Educator Presentations  
Participants: 82,339
1995 to present
The following programs and presentations were developed and delivered in a face-to-face setting to non-educator audiences. Several presentations are requested annually, years requested are noted.

Resources for Agricultural Literacy—Utah Farm Bureau  
Participants: 1,320
Annual presentation to showcase Utah AITC resources and how they can be implemented in the Classroom by volunteers. (1995-Present)

Agricultural Careers—Middle School Students  
Participants: 2,204
This presentation exposes middle and high school students to agricultural careers and emphasizes science, technology, engineering and math (STEM) studies. (2004-Present)

Farm Field Days—Elementary School Students  
Participants: 39,700
Coordinated and presented at numerous Farm Field Days, statewide. (1995-Present)

Utah State Fair Tours—General Audience  
Participants: 39,000

Importance of Agricultural Literacy—Utah State Legislature  
Participants: 115
Presentation to secure funding for Utah Agriculture in the Classroom. (2006-2008)

Creative Project and Innovations Developed and Maintained

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Project/Program</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Online Course Instructional Videos</td>
<td>Created three videos to help teachers navigate our online course</td>
</tr>
<tr>
<td>2012</td>
<td>Agricultural Wikis</td>
<td>Developed a local food wiki for students and a Web 2.0 wiki for teachers and colleagues</td>
</tr>
<tr>
<td>2012</td>
<td>Agriculture in the Classroom Social Networking Sites</td>
<td>Initiated the development of a Facebook, Twitter, and Edmodo website for teacher discussions.</td>
</tr>
<tr>
<td>2012</td>
<td>Agriculture in the Classroom</td>
<td>Converted several agricultural movies into digital media</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Project/Program</td>
<td>Scope</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2011</td>
<td>Discover Agriculture Poster</td>
<td>Career poster designed for middle school students.</td>
</tr>
<tr>
<td>2011</td>
<td>Agricultural Career Movies</td>
<td>Created 22 two-minute YouTube movies on agricultural careers for middle school students.</td>
</tr>
<tr>
<td>2011</td>
<td>Career Trek Game and Lesson Plan</td>
<td>Board game on agricultural careers designed for cooperative learning groups.</td>
</tr>
<tr>
<td>2011</td>
<td>InterAgtion Bookmarks</td>
<td>Creative project to promote resources among volunteers, teachers, and students.</td>
</tr>
<tr>
<td>2009-</td>
<td>Chick Embryology Website</td>
<td>Developed a website and classroom resources for teachers to conduct embryology projects in their classrooms.</td>
</tr>
<tr>
<td>Present</td>
<td>Strawberry DNA Necklace Kit</td>
<td>Developed a hands-on kit for secondary student to explore DNA.</td>
</tr>
<tr>
<td>2009-</td>
<td>At Home on the Range, Utah Studies Kit</td>
<td>Developed a Utah Studies lesson plan that incorporated state standards, cooperative learning groups, and an integrated science hands-on activity.</td>
</tr>
<tr>
<td>Present</td>
<td>The Buzz About Bees Website and Poster</td>
<td>Developed a native bee website with classroom and student resources.</td>
</tr>
<tr>
<td>2008-</td>
<td>Garden Network Website</td>
<td>Developed a website complete with classroom-ready resources for leaders of school and youth garden projects.</td>
</tr>
<tr>
<td>Present</td>
<td>AgroWorld, E-Zine for Secondary Teachers</td>
<td>Electronic newsletter published for secondary teacher’s nationwide (circulation 2,300), four times a year. Content areas: science, technology, and society.</td>
</tr>
<tr>
<td>2003-</td>
<td>Online Professional Development Course: Food, Land &amp; People</td>
<td>Developed in 2002, launched in 2003, and revised in 2011. Educators can create their own portfolio and curriculum maps from this dynamic database or create an e-learning opportunity for professional development. <a href="http://utah.agclassroom.org">utah.agclassroom.org</a></td>
</tr>
<tr>
<td>Present</td>
<td>Online E-Store</td>
<td>Developed and continue to maintain an online e-store where teachers can download lesson plans and order classroom resources.</td>
</tr>
<tr>
<td>2001-</td>
<td>Utah Agriculture in the Classroom Website</td>
<td>Comprehensive classroom resource website for Utah K-12 teachers (Administrator and Designer).</td>
</tr>
<tr>
<td>Present</td>
<td>USDA Agriculture in the Classroom E-Resources</td>
<td>Designed and developed the USDA Agriculture in the Classroom e-Resources includes state, teacher, and student, and a maintained national resource directory.</td>
</tr>
<tr>
<td>1998-</td>
<td>Food for America Award Program</td>
<td>This competitive program involves high school agricultural education programs each year with local middle schools to present agricultural literacy lessons.</td>
</tr>
<tr>
<td>Present</td>
<td>Utah Agricultural Products Map</td>
<td>Utah Map for 4th and 7th grade students to study the counties and the agricultural products of Utah. Revised every 2 years.</td>
</tr>
<tr>
<td>1994-</td>
<td>Agriculture in the Classroom Bee-line</td>
<td>Newsletter for teachers three issues per year (8 pp.) Includes lesson plan, classroom resources, and teaching strategies.</td>
</tr>
<tr>
<td>Present</td>
<td>Art and Science in the Garden</td>
<td>Three lessons plans were created to demonstrate how...</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Project/Program</td>
<td>Scope</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>2004</td>
<td>Lesson Plans</td>
<td>science using a garden can be integrated into art core standards.</td>
</tr>
<tr>
<td>2010</td>
<td>AgQuest</td>
<td>Developed “brain-teaser” career and agricultural fact cards. 43 pp.</td>
</tr>
<tr>
<td>2010</td>
<td>Career and Technical Education (CTE) Introduction Lesson Plans</td>
<td>Six lesson plans were created and distributed statewide to CTE Introduction teachers to meet agricultural career instruction requirements.</td>
</tr>
<tr>
<td>2002-</td>
<td>Food, Land &amp; People, Deseret Morning News, Newspapers in Education</td>
<td>Content and graphics for an annual issue of this 12-page tabloid publication developed with the Deseret Morning News for use in grades 3-12, approximate distribution each year: 300,000 copies.</td>
</tr>
<tr>
<td>2008</td>
<td>Developed Secondary Social Studies PowerPoint presentations for Utah Studies, U.S. Studies, Geography, and World Civilizations</td>
<td>Used by 90 teachers with 750 students as part of the Granite, Jordan, and Alpine School District History Academies funded by the U.S. Department of Education. The presentations are available for viewing or downloading from the Utah AITC website and are part of the secondary online courses.</td>
</tr>
<tr>
<td>2007</td>
<td>Science in Your Shopping Cart, WebQuest</td>
<td>Instructional Unit, 24 pp.</td>
</tr>
<tr>
<td>2007</td>
<td>History on the Map: Geography, History and Agriculture CD</td>
<td>Lesson Plan CD for secondary social studies teachers.</td>
</tr>
<tr>
<td>2006</td>
<td>Technology and Edutainment Flash Program: AgOverload, Range Rambler, From Seed to Shelf</td>
<td>Developed interactive educational software that Utah middle school students use to explore agricultural careers.</td>
</tr>
<tr>
<td>2007</td>
<td>Grains of the World</td>
<td>Crop seed identification classroom activity.</td>
</tr>
<tr>
<td>2006</td>
<td>Agriculture and Natural Resources Careers</td>
<td>Instructional Unit, 56 pp.</td>
</tr>
<tr>
<td>2003-</td>
<td>Utah History Teacher Academy Training CD</td>
<td>Lesson Plan CD for secondary social studies teachers.</td>
</tr>
<tr>
<td>2006</td>
<td>Farm to Fork: Lunchroom Promotions CD</td>
<td>Agricultural information for school lunch menus.</td>
</tr>
<tr>
<td>2005</td>
<td>What is Agriculture? (Poster)</td>
<td>This poster focuses on the 5-Fs of agriculture, complete with text defining the 5-Fs: farming, food, fabric, flowers, and forestry.</td>
</tr>
<tr>
<td>2004</td>
<td>Where does Ag fit in the Secondary Utah Core Curriculum?</td>
<td>This document addresses specific Utah Core Curriculum Standards and the correlates them with secondary agricultural literacy standards</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Project/Program</td>
<td>Scope</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>2004</td>
<td>Agricultural Exhibits/Bulletin Boards</td>
<td>Developed four interactive exhibits/bulletin boards: “How long does it take to make a pizza?”, “Who makes the best hamburger?” “My choices” (an interactive exhibit that illustrates how food choices make a healthy difference) and “What is biotech” (a bulletin board about genetically modified organisms).</td>
</tr>
<tr>
<td>2002</td>
<td>Microorganisms: Standard V</td>
<td>Instructional Unit for mandatory state core curriculum, 45 pp.</td>
</tr>
<tr>
<td>2002</td>
<td>Heredity: A Link to Your Past</td>
<td>Instructional Unit for mandatory state core curriculum, 39 pp.</td>
</tr>
<tr>
<td>2001-2002</td>
<td>Food, Land &amp; People Reader for Grades 3-5</td>
<td>This reader (magazine) was designed for students to learn more about the factual issues concerning Food, Land &amp; People. Three issues were completed, Spring 2001, addressing the issues of soil; Winter, 2002 addressing food production historically and today; Fall 2002, weather and farming.</td>
</tr>
<tr>
<td>1995-2002</td>
<td>Agriculture in the Classroom Bulletin</td>
<td>Three newsletters (8 pp.) published for teachers each school year: Includes lesson plans, classroom resources, and core curriculum tips. Published twenty-four unique issues.</td>
</tr>
<tr>
<td>2001</td>
<td>Living Necklace Kit</td>
<td>Kit to make a “living” necklace.</td>
</tr>
<tr>
<td>2000</td>
<td>About Farm Animals Mini Kit</td>
<td>Classroom kit.</td>
</tr>
<tr>
<td>2000</td>
<td>Technology, Life &amp; Careers—Food and Consumer Science</td>
<td>Instructional Unit for mandatory state core curriculum, 36 pp.</td>
</tr>
<tr>
<td>2000</td>
<td>Technology, Life &amp; Careers—Technology</td>
<td>Instructional Unit for mandatory state core curriculum, 18 pp.</td>
</tr>
<tr>
<td>1999</td>
<td>Microorganisms in the Macrocosm</td>
<td>Instructional Unit, 56 pp.</td>
</tr>
<tr>
<td>1999</td>
<td>Biotech Cheese Kit</td>
<td>Kit to make biotech cheese.</td>
</tr>
<tr>
<td>1998</td>
<td>Wool Spinning Kit</td>
<td>Kit for classroom wool spinning.</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Project/Program</td>
<td>Scope</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>-------</td>
</tr>
<tr>
<td>1996</td>
<td>Thanksgiving Point Educational Kiosk Video (Script and Executive Producer)</td>
<td>Short educational videos on nine different commodities as part of a “touch-screen” educational kiosk for Thanksgiving Point’s Animal Park. This kiosk system is used for school groups and the general public.</td>
</tr>
<tr>
<td>1996</td>
<td>Opportunities to teach agriculture in the Utah Core Curriculum</td>
<td>Booklet 19 pp.</td>
</tr>
<tr>
<td>1996</td>
<td>AgVenture</td>
<td>Game for Middle School Students.</td>
</tr>
<tr>
<td>1995</td>
<td>Strategies for a Successful Farm Field Day</td>
<td>Informational booklet for farm field day organizers.</td>
</tr>
<tr>
<td>1995</td>
<td>Historical Ag Bingo</td>
<td>Game.</td>
</tr>
</tbody>
</table>

**Service**

*Professional/Public Service*

- Secretary, Multi-State Agricultural Literacy Research Committee (2006-2013)
- Western Region Representative, Agriculture in the Classroom Consortium (2010-2012)
- Committee Co-chair, Agriculture in the Classroom Consortium Agricultural Literacy Standards Committee (2010-2011)
- USDA-NIFA Grant Reviewer, Secondary Education, Two-Year Postsecondary Education and Agriculture in the Classroom Challenge (SPECA) Grants (2010)
- Western Region Representative, Agriculture in the Classroom Consortium (1997-1998)

*Off-Campus Committee Memberships*

- American Association of Agricultural Educators (2012)
- Association for Supervision and Curriculum Development (2004-2012)
- National Science Teachers Association (2003-2012)
- USDA National Agriculture in the Classroom Conference Planning Committee (1998-2004)

*On-Campus Committee Memberships*

- Promotion and Tenure Committee Member—Mark Larese-Casanova and Kelsey Hall (2012)
- Search Committee Member—Utah State University Family and Consumer Science Faculty Member (2012)
- Search Committee Member—Utah State University Science Technology, Mathematics, and Engineering Center Director (2011)
- Global Student Education Mentor and Coordinator for Agricultural Education (2011)
- Search Committee Member - Utah State University Agricultural Communications Faculty Member (2011)
- Search Committee Member - Utah State University Director, Science, Technology, Engineering and Mathematics Center (2011-2012)
- Committee Member - Utah State University - Science, Technology, Engineering and Mathematics
Other Service Activities

- Western Region Agriculture in the Classroom Annual Meeting Coordinator (2010)
- Western Region Agriculture in the Classroom Annual Meeting Coordinator (2002)

Impacts of the Agriculture in the Classroom Program

- Each year a minimum 160,000 students are taught with AITC created and statewide mandatory instructional units in soils (fourth grade), heredity (fifth grade), microorganisms (sixth grade), and Career Technology and Education Introduction (7th grade).
- The research project, *A causal-comparative model for the examination of an online teacher professional development program for an elementary agricultural literacy curriculum* (2008), found that the Food, Land & People online course materials continued to be used by teachers at least 3 years after they completed course requirements.
- Research, conducted by Oklahoma State University (2002), revealed that Utah students whose teachers had been trained with Utah AITC/FLP materials were significantly more agriculturally literate than teachers who had not been trained.
- The science instructional unit “Dirt: Secrets in the Soil” developed for 4th grade increased state test scores on soils by nearly 23% (2002).
- 700 student teachers are introduced to AITC at various state universities each year.
- 388 teachers have enrolled in the developed Food, Land & People online course. Each teacher reaches 25-120 students with 15 hours of classroom instruction to meet course requirements (2002-2011).
- 62% of Utah schools have an AITC teacher contact (2011).
- More than 900 teachers requested materials from our Teacher Resource e-Store, grossing $35,000 in 2012.
- Traffic to the e-learning website has increased each year since it was launched in 1998.