RESEARCH FOCI FOR CAREER AND TECHNICAL EDUCATION:

FINDINGS FROM A NATIONAL DELPHI STUDY

A Record of Study

by

JEANEA MARIE LAMBETH

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

August 2008

Major Subject: Agricultural Education

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Approved by:

Co-Chairs of Committee,	Theresa Pesl Murphrey
	Matt Baker
Committee Members,	Glen Shinn
	David Doerfert
	Tim Murphy
	Patricia Lynch
Interim Head of Department,	David Reed

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ABSTRACT

Research Foci for Career and Technical Education:

Findings from a National Delphi Study. (August 2008)

Jeanea Marie Lambeth, B.S.; M.A., The University of Arizona

Co-Chairs of Advisory Committee: Dr. Theresa Pesl Murphrey
Dr. Matt Baker

Identifying a research agenda and critical research activities is crucial for continuous development of Career and Technical Education (CTE) programs that meet the needs of students, industry, and society. Previous studies have expressed a need for relevant and focused research for the CTE profession. The primary purpose of this study was to identify consensus among CTE experts using a Delphi technique regarding problems, objectives, and activities that serve as a research agenda for CTE.

The study panel was composed of experts from 25 states in the United States and represented 57 affiliations and organizations with direct ties to CTE. The Delphi process for this study was conducted in three rounds. Data were collected using the online survey collector, Survey Monkey™. The qualitative data were analyzed using the Affinity Diagram method of data analysis. At the conclusion of the data analysis from the Delphi rounds, the basic structure for the National CTE Research Agenda was developed. Rounds Four and Five served as validation rounds for the findings from the Delphi process. Data collection methods included online instruments using an internet-based survey tool. Data analysis revealed five research problem areas, 15 research objectives

and 53 research activities which were organized into the National CTE Research Agenda structure. Findings from this study also revealed a CTE Research Agenda Logic Model which illustrated a systematic form of the research structure developed from this study. The National CTE Research Agenda is further defined in a color model which included the five research problem areas and 15 CTE research objectives identified in this study. At the conclusion of the validation rounds, the National CTE Research Agenda Logic Model was developed and the National CTE Research Agenda structure was accepted by the expert panel with a 97% acceptance rate.

Based on the findings of this study, a sustained effort for research in CTE should be made by scholars in collaboration with national and international associations and organizations. The results of this study suggest a structure in which researchers should engage in focused and meaningful research in CTE. Future research is recommended to examine the issues identified by this expert panel.

DEDICATION

This Record of Study is dedicated to my dear husband Brad. Without his support, understanding, and love, I could not have even thought about beginning a doctoral program. My accomplishment is his success as well, it was truly a team effort. Brad kept things running at home while I was studying and writing. I can't imagine my life without him. I appreciate the sacrifices that he and our family have made over the past five years, and I hope that this final document will be a beginning of a new chapter in our lives.

Brent, Lauren, Julia, Clayton, Nicholas, Ashlee and Liam, thank you for your understanding and patience while I was studying and writing. You are a great bunch of kids! I love you all.

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CHAPTER I

INTRODUCTION

Research in any field tends to reflect the nature of what are perceived to be important issues facing that field (Pucel, 1995). Education and educational research is shaped by philosophy, psychology, and ever changing federal and state policies that have been hotly debated topics throughout the history of the United States. In fact, assertions were made by scholars from other disciplines that education was not a discipline in the first place (McCaslin & Parks, 2002).

The history of educational research has seen many methods employed in conducting research that is then disseminated to the profession and the federal government. In the 19th Century, the study of education "was mostly the province of amateurs and those without graduate training" (Reese, 1999, p. 3). However, the early part of the 20th Century (ca. 1890-1920), saw the emergence of the Progressive Era in the field of education that emphasized the power of science and laboratory methods and attempted to discover truth through objective systematic methods of inquiry best symbolized in the public schools by the survey method through the use of intelligence tests and achievement tests (Reese, 1999). Reese (1999) contended that "these first researchers examined the powerful influence that psychology rather than philosophy, history, or other disciplines had in shaping the dominant norms of educational research" (p.2).

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This record of study follows the style of the *Journal of Agricultural Education*.

Vocational education began as part of public schooling in the United States during the 19th Century. This addition to the secondary school curriculum helped to prepare young men and women for work roles that awaited them on farms, in factories, and in offices. McCaslin and Parks (2002) suggested that "the overall purpose of education is to prepare people to perpetuate and improve the society in which they live" (p. 71). Vocational education succeeded in that mission as long as there were enough jobs in the skill areas studied by the students (Castellano, Stringfield & Stone, 2003).

After the formation of the United States Office of Education in 1867, with the intent to collect information, there were several bulletins, articles, facts, and statistics on American schools published and disseminated (Reese, 1999). The idea that research in education would eventually have an impact on policy was inherent in the beginning. Douglas Scates (1939) stated "Research is larger than statistical work: it is something more than testing…it is a continuous fact-finding, exploring, investigating service applicable to all aspects of education – administration, business management, finance, schoolbuilding, transportation, curriculum, instruction, and psychological and sociological principles" (p. 590).

Historically, research in education was not considered scientific due to the fact that the context of studies cannot be replicated or generalized (Berlinger, 2002). Lagemann (2000) stated that inevitably, the science of education that emerged during the early decades of the Twentieth Century reflected the attitudes established in American society.

Even though this did not prevent psychologists from taking advantage of popular interest in education when doing so might advance their careers, skepticism about educational science, combined with an unwillingness to be too closely associated with teachers, did encourage an ambivalence that one could readily observe in the lives of two early giants, G. Stanley Hall and William James (p. 21).

The study of education and the education of teachers was changing as a result of the changing trends in American culture during the 1890's. Dewey's approach to education as "philosophical pragmatism, concern with interaction, reflection and experience, and interest in community and democracy," (Smith, 2001) was perceived to be failing and a new way of educating students based on Thorndike's approach of "education as the control of the human being through operant conditioning" (Franklin, 1975) was emerging.

What is best described as Thorndike's triumph and John Dewey's defeat was an important event in the early molding of educational scholarship. Limiting educational scholarship in ways that became more apparent over the years, Thorndike's triumph and Dewey's defeat were essential to the early educationists' quest to define a science that could help them rationalize the nation's public schools (Lagemann, 2000, p. 22). A brief history of CTE and school reform is found in Appendix A.

Currently, with the expectations for improvement in student achievement and teacher expertise required by the No Child Left Behind Act of 2001 (NCLB) and policy changes in the Carl D. Perkins Career and Technical Education Improvement Act of

2006 (Perkins IV) funding requirements, educational research and research in career and technical education are imperative for providing qualitative and empirical evidence that will support the mandate requirements and also provide results that can be disseminated.

According to Berlinger (2002), the problem with educational research is that broad theories and ecological generalizations often fail because of the large populations of students being studied and the power of the educational contexts which makes the implementation of scientific findings difficult. The embedded complex social network and human interactions are the reasons that qualitative inquiry has become so important in educational research (Berlinger, 2002).

Career and Technical Education (CTE), formerly known in the United States as Vocational Education, has evolved in role, function, and practice throughout American history. The need to revise or eliminate outdated curriculum and to develop new programs to meet the emerging work or family trends is a seemingly endless occurrence (Rojewski, 2002).

California Superintendant of Public Instruction Jack O'Connell stated that educational standards are based in research and provide a focus on content. "In 1991, the U.S. Secretary of Labor's report "Secretary's Commission on Achieving Necessary Skills" (SCANS) identified foundation knowledge, skills and abilities, and essential workplace competencies necessary to be competitive in our global, information-based economy" (California Department of Education, 2006, p. V).

The profession of CTE nationwide is unique to each state workforce and each set of curriculum standards developed by the respective state board of vocational education.

According to the Association for Career and Technical Education (ACTE) (n.d.), there are 11 national contextual divisions which are considered the CTE profession. The service areas that have been defined by the ACTE are:

1. Administration

2. Adult Workforce Development

3. Agricultural Education

4. Business Education

5. Engineering and Technology Education

6. Family and Consumer Sciences Education

7. Guidance and Career Development

8. Health Science Technology

9. Marketing Education

10. New and Related Services

11. Trade and Industrial Education.

Among CTE educators, agricultural educators have been more reluctant to adapt their programs to the industrial workplace (Rosenfeld, 1987). As a result, because agricultural education has remained attuned to a more entrepreneurial economy and basic education, vocational agriculture (now agricultural science and technology) may be the program best prepared to provide the technical skills, problem-solving skills, and leadership needed (Rosenfeld, 1987). A call for direction in research has come from agricultural education studies by Buriak and Shinn (1989), Silva-Guerrero and Sutphin (1990), and Radhakrishna and Xu (1997).

Matchett, Krueger, and Woods (2002) argued that few researchers explored the research topic areas previously defined by Buriak and Shinn (1993) including 1) faculty and staff development; 2) critical thinking and problem solving; 3) history, philosophy, futuring and policy; 4) needs of future workforce; and 5) teaching basic academic skills. The authors further suggested that future researchers conduct in-depth syntheses of research of the research problem areas and research activities suggested by Buriak and Shinn (1993) believing that such studies will identify the research objectives which have received very little or no research attention. "Once identified, those research objectives can and should be the focus for future research efforts and agendas" (Matchett, Krueger & Woods, 2002, p. 10). On the other hand, Kelsey (2002) argued that these categories were not ripe for analysis and thus deserved no further exploration. Furthermore, Kelsey (2002) suggested "further investigation should focus on the earnest needs of our stakeholders for new knowledge using a grounded theory approach" (¶ 3).

Pucel (1995) conducted two studies that examined trends in research regarding Trade and Industrial (T & I) education and practitioner attitudes regarding the vitality of T & I education. These studies revealed that research has not been focused on defining how T & I education should adjust to the changing needs of society and the resulting implications for changing curriculum and technology related to today's workforce needs. Pucel stated,

> I believe this represents a serious call to all people involved with T & I to begin
> to think about the need to revitalize the field and to make it more responsive to
> evolving societal needs if the field is to survive into the 21st century (p. 6).

Gemici and Rojewski (2007) in a recent study of the Association for Career and Technical Education Research (ACTER) challenge the fact the CTE scholars have not responded to the more constricting research standards outlined by the federal government.

> The recent emphasis on scientifically-based research (SBR) as the governments exclusive research paradigm has direct implications for career and technical education… Clearly the emphasis of most CTER research differs from SBR focus mandated for government-funded research…We found the overwhelming majority of published articles in our sample were either descriptive or qualitative in nature, whereas a mere four percent employed true or quasi-experimental designs (Gemici & Rojewski, 2007 p. 261).

"Our challenge is to develop research programs with high impact" (Williams, 1991, p. 12) that can define the standards needed to develop programs to train the future workforce. Williams (1991) concluded, "this will require teams of researchers pursuing relevant problems in a sustained manner that yields clear solutions and, when applied, provides vigor for the discipline…" (p. 12).

Statement of the Problem

Future CTE programs will emerge from today's research and development efforts. Identifying a research agenda and the important research activities to carry out this agenda is critical for the continuous development of CTE programs that meet the needs of students, industry, and society. A large share of the current research associated

within the 11 divisions in the Association for Career and Technical Education (ACTE) is limited to the field of study related to each service area.

Previous studies have expressed a need for relevant and focused research for the profession in individual service areas. The National Assessment of Career and Technical Education (NACTE) has proposed a research agenda based on the Congressional mandate in the Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV). The recommended studies by NACTE address more general questions about the evolution and effectiveness of career and technical education (CTE) (USDE, 2004).

The problem is that it is not known what these research foci should be, or if known, whether or not there is consensus within the profession. Obtaining such insight underlies the purpose of the research reported in this paper.

Purpose of the Study

A need for a relevant and forward research agenda exists for the field of Career and Technical Education (CTE). Based on this need, the primary purpose of this study was to identify and articulate a research agenda based upon a consensus among a panel of experts and to develop a logic model which represents the longitudinal relevance of the research objectives and research activities for CTE.

Research Objectives

The primary purpose of this study was to identify consensus among experts regarding objectives that serve as a research agenda for CTE. To accomplish the purpose

of this study, a representative panel of approximately 30 experts from the field of CTE was identified to re-examine and identify important research objectives. The research objectives were:

1. Using a Delphi Technique, identify a structure and important research problem areas, research objectives and research activities critical to CTE program development.

2. Synthesize an organizational structure and a logic model that will guide research inquiry of the CTE community.

Importance of the Study

Thousands of CTE students are enrolled in programs that provide skill training for the workplace according to the skill standards designed by state and national curriculum design committees. These committees depend upon the dissemination of research conducted in CTE and the CTE service areas to develop relevant research and rigorous curriculum standards for programs delivered in the United States. According to Louis and Jones (2001), "The quality and quantity of research in vocational education, as in other educational fields, has increased markedly and has had significant implications for practice" (p. 1).

There are over 15 million secondary and postsecondary career and technical education students in the United States (Association of Career and Technical Education, n.d., ¶ 6).

Across the country, career and technical education programs are offered in about 11,000 comprehensive high schools, several hundred career and technical high schools and about 1,400 area career tech centers, which serve students from several "sending" high schools. About 9,400 postsecondary institutions offer technical programs, including community colleges, technical institutes, skill centers and other public and private two- and four-year colleges (Association of Career and Technical Education, n.d., ¶ 7).

The information collected in this investigation from the experts in the CTE profession will assist decision makers to address better the most critical needs of the profession in guiding research to be considered and in designing program curriculum, teacher education, and professional development.

Definition of Terms

Career and Technical Education: Formerly known as Vocational Education, the term is generally used to describe vocational education in the United States. Career and Technical Education programs are dedicated to preparing younger generations to gain entry-level employment in a high skill, high wage job, to continue their education, and to manage the dual roles of family member and wage earner (Texas Education Agency, 2008).

Computer Conferencing: A way of linking people and organizations for many purposes using a computer hardware and software (Linstone & Turoff, 2002).

Delphi Panelist: An individual with more knowledge about the subject matter than most people, or who possess certain work experience (Murry & Hammons, 1995, p. 428).

Delphi Method: Technique based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback (Adler & Ziglio, 1996).

Logic Model: A narrative or graphic depiction of processes in real life that communicate the underlying assumptions upon which an activity is expected to lead to a specific result; a systems approach to communicate the path toward a desired result (McCawley, 2001).

Opinion: The opinions collected in this investigation refer to items, conditions, indicators, results, factors, concepts, and activities as perceived by the respondents.

Research Agenda: A structured framework by using motivational criteria which is driven by teaching, research, and service (Flesher, 1996).

Assumptions

For the purpose of this study, the assumption was made that the group of experts identified by the Association for Career and Technical Education Research Committee, the Association for Career and Technical Education Research Board of Directors (ACTER), and the researcher had come from diverse backgrounds, were knowledgeable of present issues and trends in CTE, and were able to anticipate core research needs.

Delimitations

This study was delimited to the following conditions:

1. The definition of "CTE Expert" as defined by the ACTE Research Committee Chairman, and committee members and validated by the ACTER President, was that the nominee was an expert in CTE educational issues and /or a member of a national or international professional organization with direct ties to CTE.

2. The data were gathered from October 3, 2007 to April 1, 2008.

3. The study was delimited further to the opinion of the experts from 25 states within the continental United States and the District of Columbia identified by the Association for Career and Technical Education (ACTE) Research Committee and the Association for Career and Technical Education Research (ACTER).

Limitations

Limitations associated with the method of data collection, online instruments, utilized in this investigation did exist and should be considered. Accuracy of the responses was subject to a) the willingness of the individual to participate in the study, b) the haste in completing the questionnaires, c) the willingness to divulge complete answers to the survey questions, and d) underestimating the demanding nature of the Delphi Method (Mattingly, n.d.). For this study, the exchange of ideas in a meeting was impractical due to the nationwide locations of the panel participants.

Further limitations were associated with the panel opinion of research activity immediacy priorities. The opinion of the expert panel for this investigation expressed a priority for conducting research in the short term (1-4 years) and the intermediate term (5-10 years).

Summary

The goal of this investigation was to create a public dialogue among recognized experts in the field and to seek consensus on important research problems. Findings aim to communicate a collaborative and complimentary research agenda and provide direction for an organizational structure for research in Career and Technical Education in the United States.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to provide an overview of relevant educational research, especially as it pertains to Career and Technical Education (CTE). While the focus of this study was the development of a research agenda and logic model, this review includes literature in the areas of: 1) The Search for Knowledge, 2) Theory Building, 3) Defining Research, 4) CTE Research Frameworks, 5) Development of the Research Agenda, 6) Conceptual Model of the Investigation, and 7) Rationale for the Delphi Method.

In order to understand the complexity of CTE, the study of the history and philosophy behind its development, and the current trends that have shaped educational reform movements are important for study. John Dewey, an American philosopher, believed in the development of vocational education as part of the academic curriculum through experiential learning. Dewey was a proponent of the social efficiency movement known as "social service or social reform" (Luetkemeyer, 1987). A brief history of Career and Technical Education and School Reform can be found in Appendix A.

The conceptual framework for this investigation has been developed from studies conducted by Buriak and Shinn (1989, 1991, 1993), Radhakrishna and Xu (1997), Silva-Guerrero and Sutphin (1990), Rojewski (2002), and the proposed research agenda from the National Assessment of Career and Technical Education, a unit of The United States Department of Education (USDE, 2007). While there is interest in specialty contexts in

CTE, there continues to be a need for a focused dialogue and collaboration among the professionals and researchers to develop relevant research that could eventually have an effect on future educational policy.

The Search for Knowledge

Human beings are naturally curious about the world. Over time, the ability to speak, and to form words and symbols was developed to communicate what they saw and believed about the world (Popkin & Stroll, 1993). These curiosities led to more questions and testing of processes and natural phenomena. Eventually, the reliance on personal experience or empirical evidence challenged the vested authorities and represented a significant step in the direction of scientific inquiry (Best & Kahn, 2003). These interpretations were unsystematic and limited by the lack of an objective method which leads to over generalization on the basis of incomplete evidence, or experiences, personal feelings or biases, and ignoring complex factors in both conclusions and observations (Best & Kahn, 2003). The search for knowledge and truth has been sought by humans from the beginning of time. The systematic method used to define and explain phenomena is called scientific; the result is knowledge.

Epistemology is the branch of philosophy that investigates the theory, nature, origins, value, and scope of knowledge. "Epistemology is about issues having to do with the creation and dissemination of knowledge in particular areas of inquiry" (Steup, 2005). Over the course of time, many philosophers have expressed opinions on the search for knowledge and truth. "According to pragmatic epistemology, knowledge

consists of models that attempt to represent the environment in such a way as to maximally simplify problem-solving….The model which is to be chosen depends on the problems that are to be solved" (Heylighen, 1993). Gall, Gall, and Borg (2003) contended that "behavioral researchers in education and psychology exemplify an approach to scientific inquiry that is grounded in positivist epistemology. They focus on the study of observable behavior as the basis for building scientific knowledge" (p. 15).

Theory Building

Kerlinger and Lee (2000) contended that "the basic aim of science is theory" (p.11). Glaser and Strauss (2006) proposed that "generating grounded theory is a way of arriving at theory suited to its supposed uses" (p. 3). Grounded theory can be presented as carefully coded propositions, or as an on-going theoretical discussion, using conceptual grouping developed from the data of social research (Glaser & Straus, 2006).

> A grounded theory can be used as a fuller test of a logico-deductive theory pertaining to the same area by comparison of both theories than an accurate description used to verify a few propositions would provide. Whether or not there is a previous speculative theory, discovery gives us a theory that "fits or works" in a substantive or formal area (though further testing, clarification, or reformulation is still necessary), since the theory has been derived from data, not deduced from logical assumptions (Glaser & Strauss, 2006, p. 29).

> Boyer (1990) suggested that "theory surely leads to practice. But practice also leads to theory. And teaching, at its best, shapes both research and practice" (p. 16).

Camp (2001) proposed, "one of the most perplexing problems [we] must continuously address is how to explain such esoteric concepts as the relationship between theory and research, theoretical frameworks, or as they are sometimes called conceptual frameworks" (¶ 2). The author further explained that the "conceptualization, conduct, and publication of research require a clear understanding of the notion of theoretical frameworks" (¶ 5). The author defined a theory as, "a set of interrelated constructs, definitions, and propositions that present a rational view of phenomena by explaining or predicting relationships among those elements" (¶ 18). Camp based his reasoning on Kerlinger's reductionist description and expanded parameters to permit for naturalistic inquiry.

> Substantive theoretical propositions based on appropriate discipline-based and research-based literature provide adequate theoretical frameworks for most research in career and technical education. Applied research based on theoretical assumptions falling well short of grand theory can have important implications for practice in our field and can be perfectly legitimate. Indeed, given the scientific immaturity of educational research in general and career and technical education in particular, substantive theory may well form the theoretical frameworks of much of our research for some time to come (Camp, 2001).

Camp (2001) claimed that merely citing theoretical frameworks was not the same as formulating a theoretical framework. He suggested that theoretical assumptions can be made at three levels: grand theory, middle-range theory, and substantive theory. An example of a grand theory would be behavioral science which leads directly to middle-

range theories; middle-range theory is proposed by other researchers based on prior investigation and based on a grand theory; and substantive theory is based on a clear description of one specific aspect which does not start with a single grand theory or a middle-range theory.

> We cannot afford to be seduced by the oversimplification that all research must derive directly from grand theory. Substantive theoretical propositions based on appropriate discipline-based and research-based literature provide adequate theoretical frameworks for most research in career and technical education (Camp, 2001, ¶48).

A German contemporary philosopher, Jurgen Habermas, is engaged in the critical study of the historical origins of knowledge in many disciplines. He contended that "…pure theory, uncontaminated by the practical interest of life, can be achieved…. The idea (or ideal) of a pure theory hides from itself its constitutive dependence upon a transcendental context, namely, that formed by a number of human interests" (Baltas, 1993, p. 521). Habermas (1987) argued that communicative action is "interaction between at least two individuals who can speak and act and who establish an interpersonal relation" (p. 124). Habermas was convinced that there is a universal center in language for change in social contexts.

Ary, Jacobs, and Razavieh (2002) described the construction of theory as an aspect of scientific approach. "The ultimate goal of science is theory formation" (p.12). Kerlinger and Lee (2000) defined a theory as "a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying

relations among variables, with the purpose of explaining and predicting the phenomena" (p. 11).

Carlile and Christensen (2004) proposed "a process of theory building that links questions about data, methods and theory" (p.1). The proposed model synthesized the work of other scholars who have studied how "communities of scholars build valid and reliable theory" (p. 1). The authors suggested that building theory takes place in two major stages – the descriptive stage and the normative stage. Within each of the stages, there are three steps that theory builders utilize: 1) Observation – researchers describe the phenomena they were observing, 2) Classification – defines the attributes of the phenomena, and 3) Defining Relationships – descriptive theory explores the correlations between the classifications or categories and the outcomes of the phenomena under study. Improvement in descriptive theory happens when the researcher's cycle from the top of the inductive pyramid moves back down to the deductive portion of the cycle; this is a form of testing the hypothesis that had been developed through inductive formulation. "It is only when an anomaly is identified – an outcome for which the theory can't account – that an opportunity to improve occurs" (p. 4). The authors suggested that anomalies have value in building theory because the discovery of an anomaly is the first step to improving the structure and foundations of the theory (Carlile & Christensen, 2004).

The transition from descriptive to normative theory is often accompanied by confusion and contradiction. This can be resolved if researchers are careful to detail empirical and ethnographic observations which move beyond the correlation opinions to

define what causes the outcome of interest. The three steps can be applied by researchers in the descriptive stage to test the causal opinion. "A theory completes the transition from descriptive to normative when it can give a manager unambiguous guidance about what actions will and will not lead to the desired result, given the circumstance in which she finds herself" (p. 6).

Defining Research

Defining research and educational research is controversial. Research is basically defined as the scientific search for knowledge and truth; educational research is perceived to be less than scientific in nature because it cannot place generalizations about the subject of a study in most cases.

Scientific research as defined by Kerlinger and Lee (2000) is "systematic, controlled, empirical, amoral, public and critical investigation of natural phenomena. It [research] is guided by theory and hypothesis about the presumed relations among such phenomena" (p. 14). The scientific approach discussed by the authors was based on Dewey's (1933/1991) paradigm of inquiry: Problem – Obstacle – Idea.

> The first and most important step is to get the idea out in the open, to express the problem in some reasonably manageable form. Rarely or never will the problem spring full-blown at this stage. The scientist must struggle with it, try it out, and live with it...The idea here is that the problem usually begins with vague and/or unscientific thoughts or unsystematic hunches. It then goes through a series of refinement steps (p. 15).

Ary, Jacobs, and Razavieh (2002) described scientific research as "the

application of the scientific approach to studying a problem. It is a way to acquire dependable and useful information. Its purpose is to discover answers to meaningful questions by applying scientific procedures" (p.16). These scholars go on to describe educational research as "the way in which people acquire dependable and useful information about the educative process" (p. 17).

The ultimate goal of educational research, as defined by Ary, Jacobs, and Razavieh (2002), "is to discover general principles or interpretations of behavior that people can use to explain, predict, and control events in educational situations…to formulate scientific theory" (p. 17). As a science, educational research uses investigative methods consistent with the basic procedures and operating conceptions of scientific inquiry by conducting different types of studies using a variety of methods to collect reliable information about educational issues (Ary, Jacobs, & Razavieh, 2002).

Gall, Gall, and Borg (2003) described educational research as developing new knowledge about learning, teaching, and educational administration that has value because it will eventually lead to the improvement of educational practice. These scholars describe four types of knowledge that research contributes to education: 1) description, 2) prediction, 3) improvement, and 4) explanation.

In descriptive research, the authors proposed that research studies involve description of natural or social phenomena through their form, structure, activity, change over time, and relationship to other phenomena which have led to many important scientific discoveries based on such descriptions. The descriptive function of research is

dependent on the instrumentation for measurement and observation, which has led to the increased knowledge base about what happens in schools.

Prediction is the ability to predict a phenomenon that will occur at a specified time from information available from the past. "Educational researchers have done many prediction studies to acquire knowledge about factors that predict students' success in school and in the world of work" (Gall, Gall, & Borg, 2003, p. 4). "Prediction research is needed in order to acquire more knowledge about how well the tests predict, whether they predict equally well for groups of students (i.e., minority students), and whether new instruments can improve the predictability of success in particular settings" (Gall, Gall, & Borg, 2003, p. 4).

Another type of research knowledge described by Gall, Gall, and Borg (2003) was based on the effectiveness of interventions (improvement). The authors suggest that many educational research studies are conducted "to identify interventions or factors that can be transformed into interventions for improving students' academic achievement" (p. 5). Research has shown that there have been many effective interventions for improving academic achievement; however, more research is needed to refine the interventions to make them more effective across different educational settings and for different types of students and to turn potential interventions into actual interventions (Gall, Gall, & Borg, 2003).

The final type of research knowledge described by Gall, Gall, & Borg (2003) is explanation. This type of knowledge is the most important in the long term, "if researchers are able to explain an educational phenomenon, it means that they can

describe it, can predict its consequences, and know how to intervene to change those consequences" (Gall, Gall, & Borg, 2003, p. 6). Ideally, researchers frame their explanations as theories about phenomena being investigated which are further explained through a system of constructs and laws which communicate how the constructs are related to each other. (Gall, Gall, & Borg, 2003).

Tuckman (1999) suggested that "research is a systematic attempt to provide answers to questions…to develop a model or theory that identifies all the relevant variables in a particular environment and hypothesizes about their relationships" (p. 4). Best and Kahn (2003) defined research as "the systematic and objective analysis and recording of controlled observations that may lead to the development of generalizations, principals, or theories, resulting in prediction and possibly ultimate control of events" (p. 23).

> Fundamental or basic research is the formal and systematic process of deductive-inductive analysis, leading to the development of theories. Applied research adapts the theories developed through fundamental research to the solution of problems. Action research, which may fail to attain the rigorous qualities of fundamental and applied research, attempts to apply the spirit of scientific method to the solution of problems in a particular setting, without any assumptions about the general application of findings beyond the situation studied (Best & Kahn, 2003, p. 23).

Fraenkel and Wallen (2006) stated that "the scientific method provides an important way to obtain accurate and reliable information" (p. 21). Lagemann (2000) contended that education research is an elusive science.

Ball and Forzani (2007) asked "what makes education research "educational?"" These authors describe a research perspective in education that deliberately presses into what they call "the instructional dynamic:"

> …it occurs in many settings and through a wide range of mechanisms, it is typically associated with schools, where it consists of interactions among teachers, students, and content, in the various environments of schools. Teachers interpret and represent subject matter to students, who interpret their teachers, the content and their classmates and then respond and act (p. 530).

Boyer (1990) contended that,

> American higher education is imaginative and creative enough to support and reward not only those scholars uniquely gifted in research but also those who excel in the integration and application of knowledge, as well as those especially adept in the scholarship of teaching (p. 27).

While Boyer contended that scholarship of teaching is a critical aspect of Higher Education, publication of research often takes precedence over teaching. Lagemann (2000) concluded that the reason for this is that there is not an established mechanism or research agenda established for educational research in general, nor are there the necessary infrastructures built to carry out those scholarly activities. This focus on research causes the individual researcher to be misguided in his or her research focus

and to fail to establish or follow any particular research agenda. In fact, Lagemann (2000) suggested that only a few areas such as health care and defense policy have developed the strict research agendas and systematically built the infrastructure to carry out those agendas. Education has not systematically developed partnerships with other disciplines to overcome the isolation of education research and to create networks to help keep researchers up to date in current trends and developments. If more teamwork between the faculties were to occur, it would allow educational scholars to become better acquainted with current developments, while also encouraging discipline-based scholars with interests in education to collaborate in the study of education (Lagemann, 2000). Boyer (1990) concluded that "we need scholars who not only skillfully explore the frontiers of knowledge, but also integrate ideas, connect thought to action, and inspire students" (p. 77).

Career and Technical Education Research Frameworks

Career and Technical Education provides a unique addition to a secondary or postsecondary academic institution. This distinctive function in education requires a different focus for research and scholarship because of the emphasis placed not only on the application of academic subjects, but also on the integration and training for the workplace.

Lewis (2001) in a joint effort of the National Dissemination Center for Career and Technical Education (NDCCTE) and the National Research Center for Career and Technical Education (NRCCTE) conducted a needs-sensing study in 2000. The study

group consisted of seven stakeholder groups from five regions in the 50 states. The study

was a needs analysis to identify most important needs facing the field of CTE. The

following list was developed by the participants from the needs-sensing analysis

conducted in 2000: 1) improve the image of CTE, 2) exemplary practices, 3)

partnerships with the community as a means of keeping programs rigorous and relevant,

4) teaching and learning, 5) clearinghouse for best CTE information that is easily

accessible, 6) recruitment, training and retention of instructors and CTE administrators,

7) professional development, 8) technology integration and professional development

and course delivery through distance education, 9) technical skill and academic skill

assessment, 10) implications of Workforce Investment Act of 1998, 11) technical skill

shortages and lack of basic skills, and 12) tribal/racial/ethnic constituent difficulties with

bureaucracy, language, and daily living. At the conclusion of this investigation, the

National Centers hoped that the needs-sensing results would be useful to the CTE field

and would help with decisions about the type of research, dissemination, and

professional development activities that should be conducted in the future.

In 2003, from a joint effort of the NDCCTE and NRCCTE, a follow-up needs-

sensing study was conducted by Pearson and Champlin (2003). This study explored the

themes from the previous studies and specifically directed the study toward "the

development of a research, dissemination, and professional development agenda for

Career and Technical Education" (p. iii). The participants' responses to the question:

"What are the major concerns related to research?" differed from the results of the Lewis

(2001) study. The concerns from the participants in this 2002 study included:

- The need for effective application of data, the desire to gain more information and knowledge from the field.

- Long-term research was needed to address questions about student achievement and articulation.

- Assessment of student achievement; Concern over the trend of "high stakes" testing, and how to better assess CTE student performance.

- More cohesive message about CTE and current research data and information that can be shared with parents, policymakers, counselors, and the media.

- Creating a better image of CTE.

- Professional support for conference attendance with possibilities for web-based professional development for participants with limited resources and time.

- Professional development in diverse populations including non-traditional students, special needs students, and populations with limited English proficiency.

The authors developed an agenda for research in CTE as a result of the needs-sensing investigation.

The National Assessment of Career and Technical Education (NACTE) has proposed a research agenda for career and technical education based on the Congressional mandate in the Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV) whose authorization extends until 2012. This proposed research

agenda builds upon work being conducted or sponsored by other divisions within the USDE and other federal agencies. Unfortunately, this research agenda is too broad for the current level of funding; however, it is hoped that the proposed research agenda will generate discussion about key priorities for NACTE, and about topics of lesser interest (USDE, 2004). According to Rojewski (2002),

few descriptive frameworks for CTE exist.…much if not all of the information needed to develop a coherent perspective of the field, both present and near future, is available through various sources such as legislation, descriptions of the work place and workforce, research, opinion and everyday practice (p. 7).

Rojewski (2002) suggested that a conceptual framework should be based on the existing literature, the current state of education reform, and projections of future direction for the economy, work-family-community demands, and career and technical education. Major components of CTE suggested by Rojewski (2002) are represented by five categories: curriculum, instruction and delivery options, student assessment, clientele, and program evaluation (accountability). The influence of internal and external forces on the field such as the new and emergent economy, educational reform initiatives, student learning, and the expectations of society for CTE are also included in the proposed model (Rojewski, 2002). The graphic illustration in Figure 2.1, as suggested by Rojewski (2002), is to serve as a starting point for discussion about the conceptual underpinnings of the CTE field.

The New
Economy

School
Reform

Student
Assessment

Curriculum

Student
Populations

Instruction &
Program Delivery
Options

Philosophy

Program Evaluation

Student Learning,
Motivation, and
Achievement

INFLUENCES

Public
Expectations
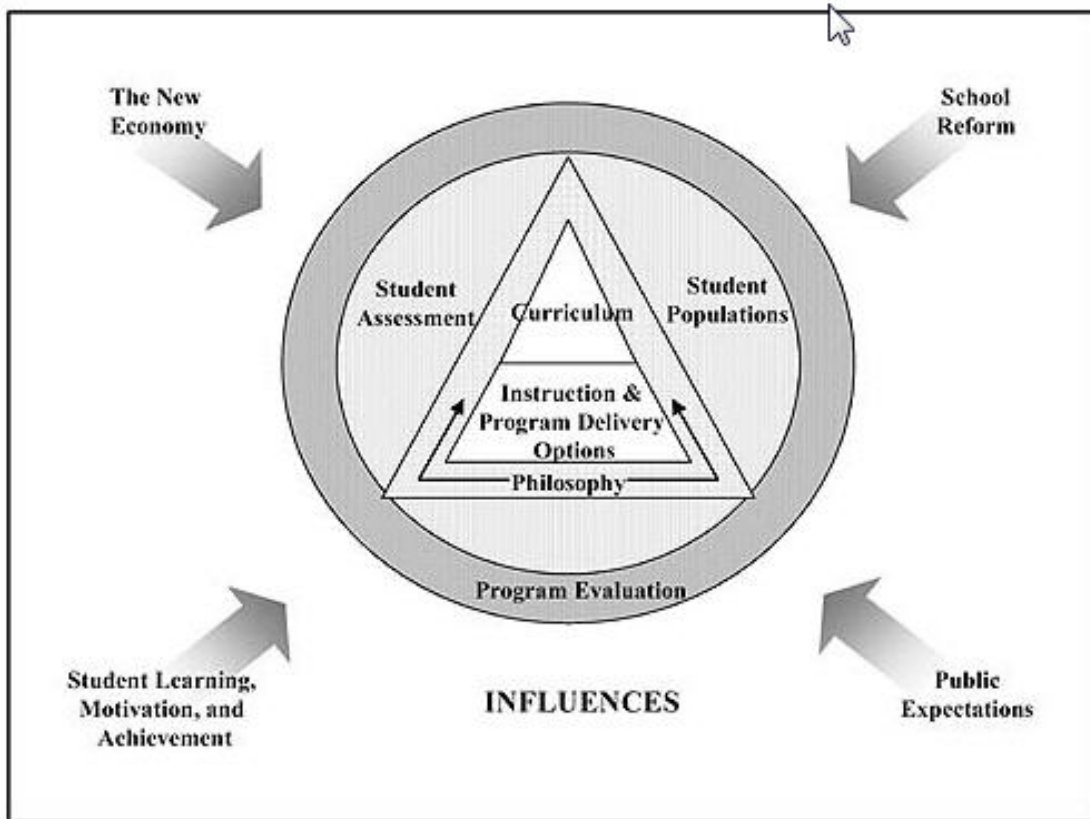
Figure 2.1. Conceptual Framework for Career and Technical Education (Rojewski, 2002). *Note:* From the "Preparing the Workforce of Tomorrow: A Conceptual Framework for Career and Technical Education" Rojewski, 2002 p. 18. Reprinted with permission.

Rojewski (2002) suggested that the following conceptual contexts represent the current state of CTE:

1) Curriculum – reflects the state of the field; what is considered important, what is being taught (content or conceptual structure), and how it is taught (process) (Lewis, 1999, Rojewski, 2002);

2) Instruction and Delivery Options – a number of contemporary teaching innovations have emerged or assumed a greater role in career and

technical education including tech prep, integrated curriculum, cognitive

– and work-based apprenticeship, career academies, school-based

enterprises and cooperative education.

3) Student Assessment – options for conducting authentic assessments

including portfolios, exhibitions, checklists, simulations, essays,

demonstrations or performances, interviews, oral presentations,

observations and self-assessment.

4) Clientele – the historic roots for vocational education were in providing

job-specific training to working class (noncollege-bound) youth; work

skills required in the 21st Century include higher-order thinking skills

(reasoning, decision-making, problem-solving), flexibility, interpersonal

skills, and technological literacy.

5) Program Evaluation – must include performance indicators that examine

legislative mandates and underlying philosophy, as well as specific

outcomes, practices, and inputs (p.18-25).

Rojewski (2002) proposed that changes in the workplace, legislation, and school

reform initiatives provide the ideal platform to consider moving career and technical

education to a common core called 'workforce education.' Most career and technical

teacher educators acknowledge the need to revisit the basic assumptions, conceptual

framework, and syllabi of existing pre-service programs (Rojewski, 2002).

Indeed, the entire profession must be willing and able to engage in ongoing

examination of issues that contribute to a dynamic and relevant conceptual

framework, e.g., philosophy, workplace demands, and skill requirements. The field's best thinking must be integrated into teacher preparation programs and, subsequently, into secondary and postsecondary classrooms comprised of a diverse clientele within the context of an increasingly sophisticated work place characterized by a global economy where success is directly tied to work force readiness, the rapidly changing nature of jobs and required work skills, and increasing role of technology in the performance of work tasks (Lewis, 1977 as cited in Rojewski, 2002).

Development of the Research Agenda

Three studies from the Agricultural Education context were conducted by Buriak and Shinn (1989, 1991, 1993), Radhakrishna and Xu (1997), and Silva-Guerrero and Sutphin (1990). In those works, research in agricultural education was described as soft, lacking in rigor, without focus, and of limited scholarship and/or importance; it was considered by some to be inferior to research conducted in other disciplines (Dyer, Whittler & Washburn, 2001). Many of these weaknesses stem from a lack of research focus (Williams, 1991).

Buriak and Shinn (1989, 1991) used a Delphi approach in two studies in which the panelists responded to different investigation procedures. Figure 2.2 depicts a graphic description of the Buriak and Shinn (1991) model, Research Structure for Agricultural Education. These two authors recommended that a strategic plan be

developed to ensure that "our research is guided, thoughtful and important" (Buriak &

Shinn, 1993, p. 31).

Buriak and Shinn (1991) asked, "Do we identify, prioritize and research

important problems and issues that are a part of a collective and systematic effort?"

Figure 2.2. Research Structure for Agricultural Education (Buriak & Shinn, 1993).
Note: From "Structuring Research for Agricultural Education: A National Delphi
Involving Internal Experts" Buriak & Shinn, p. 35. Reprinted with permission.

Radhakrishna and Xu (1997) suggested that the research agenda should emphasize three important aspects: 1) focus more on issues critical to the profession; 2) identify a collaborative approach to research, and 3) conduct periodic reviews of our premier journals and proceedings. Further, these researchers recommended that future research should examine how the subject matter would fit into the Buriak and Shinn (1993) research structure.

Silva-Guerrero and Sutphin (1990) stated that "researching to research" is a line of inquiry to focus the profession on salient problems that are significant to the future. An alternative approach such as the Delphi technique may be used to "wipe the slate clean" and to stimulate creative thought and discussion within the profession (Silva-Guerrero and Sutphin, 1990). Miller (2006) quoting from Johnson (1986) suggested, "…Educators must think beyond discipline-specific research, and relate to subject matter research or problem solving research" (p. 106). Further, current faculty and administrators should broaden their perspectives of research paradigms by participating in training programs to enhance their world view and to increase their appreciation for the contributions that imperative and critical science can make (Miller, 2006).

Dyer, Wittler, and Washburn (2001) conducted a study that examined the degree to which agricultural education research has adhered to a structured approach based on the conceptual frameworks developed by Buriak and Shinn (1989, 1993), Radhakrishna and Xu (1997), Silva-Guerrero and Sutphin (1990), and Warmbrod (1986) over a 10-year period. The researchers evaluated all research articles published in the *Journal of Agricultural Education* from 1990 to 1999. Findings revealed that the majority of the

research conducted in agricultural education over the decade of the 90s had been quantitative, applied, and survey research (Dyer et al., 2001). In addition, Dyer et al. (2001) found that the research authors cited a limited number of references in establishing conceptual and theoretical frameworks and often failed to relate their findings back to those frameworks, resulting in the recommendation that agricultural education researchers work more rigorously to develop clear and appropriate conceptual and theoretical frameworks.

Gemici and Rojewski (2007) cited several scholars who stated concerns inherent in the federal government's approach toward education research. These scholars were concerned with the government's move toward

> … confusing scientific methods with the process of science, the adoption of an evidence-based social engineering approach to educational program effectiveness, the disregard for the complexity of the issues concerning the scientific method and research quality, and the utter rejection of postmodern theories (Gemini & Rojewski, 2007 p. 261).

Reese (1999) implied that "professors of education commonly hear that the relationship between education-related research and changing and improving school practice is ambiguous, difficult to pinpoint, perhaps nonexistent" (p. 1). These implications require attention if future research is to be funded through the Federal system.

Gemici and Rojewski (2007) reported that "a principal driver for the federal position is based on a perceived need to answer questions related to student achievement

and program improvement in order to raise efficacy of current and future interventions"
(p. 262).

Since the inception of public career and technical education in the early 1900's,
economic developments have had a major influence on the content and direction of
curricula at secondary and postsecondary levels (Rojewski, 2002). Generally,
researchers and policy groups have concluded that long-term, sustaining, substantive
changes will occur in public education only if implemented at the grassroots level – in
local communities and schools and by classroom teachers (Lynch, 1996). A focused
research agenda could provide the platform that local school administration and CTE
teachers need to develop well-balanced and productive CTE programs. Lakes and Burns
(2001) stated that most policy makers believe skill training is heightened and that student
achievement soars when the vocational curriculum is thoroughly integrated into an
academic course of study.

The theory base, knowledge, understandings, and skills needed to teach for and
about the workplace and workforce have yet to be codified into a professional
knowledge base for prospective and practicing vocational education teachers (Lynch,
1996).

> McCaslin and Parks (2002) suggested that
> career and technical teacher education faculty should conduct research on topics
> such as career and technical education supply and demand of teachers, the
> amount and kind of academic and technical skills that career and technical
> education students need, the degree to which teachers prepared by different

means (e.g., baccalaureate, post-baccalaureate, and alternative certification) contribute to students' achievement of academic and technical skills, the effectiveness of teacher education programs delivered through distance education, and factors contributing to recruiting teachers from diverse populations (p. 100).

"The landscape of education has changed dramatically over the past few years. Our constituencies are calling for more and more accountability and when they are not satisfied; they enact legislation that includes new mandates with little or no new funding" (Jackman, 2006, p. 75). Jackman (2006) contended that in all the discussions about education, one voice that was lacking was that of career and technical educators and researchers. "We have always focused on the improvement of student learning and documenting that improvement. However, we did that as part of our academic disciplines, not as career and technical teachers and researchers" (p.76).

The accountability movement described by Jackman (2006) suggested that education needed "fixing." When the profession was asked to provide evidence or the data for educational studies, the researchers offered anecdotal evidence. These issues led to the charge of researchers to provide research based on evidence to support their points of view. However, the definitions of research have changed from being heavily slanted toward quantitative research to including qualitative and mixed method research.

"Practitioners, researchers, and others often ask for examples of high quality career and technical education programs that can be emulated at other locations or studied to determine what make them successful" (McCaslin & Parks, 2002, p. 86).

Castellano, Stringfield, and Stone (2003) contended that "CTE reform efforts are seriously under-researched. School and district personnel are forced to make major programmatic decisions in the absence of replicating studies or, often, any process or outcome studies to inform their thinking" (p. 231). The authors also suggested that "it is ironic that, at the very time that national policy is calling for a more integrated and outward-looking version of CTE, there have been few scholarly attempts to build bridges from CTE to research on academic components of U.S. schooling" (p. 232).

Conceptual Model of the Investigation

The foundation of this investigation was formed around the research problem areas defined by Buriak and Shinn (1989, 1993) from two national Delphi studies using external decision-makers and internal decision-makers. These two studies recommended that a strategic plan be developed to ensure that "our research is guided, thoughtful and important" (Buriak & Shinn, 1993, p. 31). The conceptual model in Figure 2.3 depicts the flow of the investigation followed throughout the study.

This investigation was focused on finding the critical research topics for the future of CTE. Based on the collection of these topics and the input for future study from a panel of experts, this study can also be called a study in theory building. "Theories knit together the results of observations, enabling scientists to make general opinions about variables and the relationships among variables. Theories range from a few simple generalizations to complex formulations of laws" (Ary, Jacobs & Razavieh, 2002).
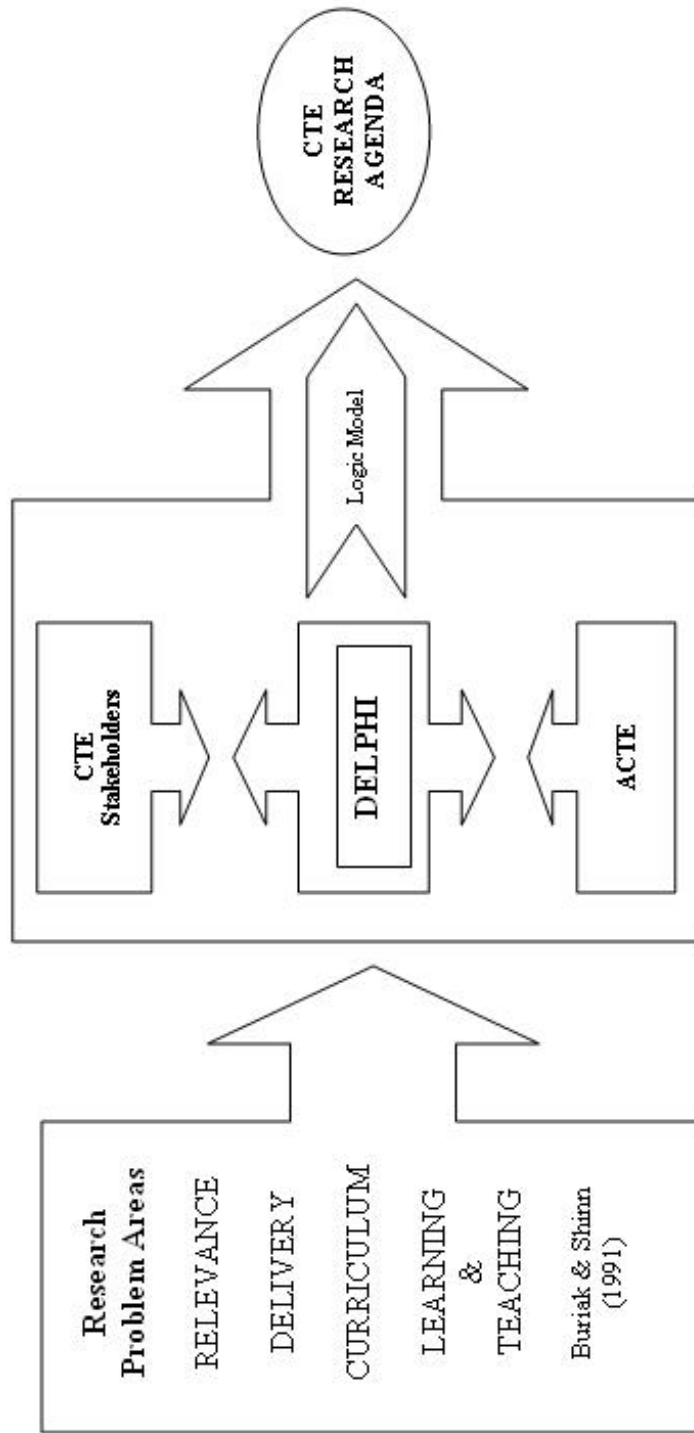
Figure 3. 2007-2008 Conceptual Model for the Career and Technical Education Delphi Study.

Rationale for the Delphi Method

The Delphi is an expert panel study developed by Norman Dalkey and Olaf Helmer of the RAND Corporation. This method is a research strategy that was used by the RAND Corporation in the 1950's primarily for forecasting, for policy investigations and for goal-setting (Uslack, 1983). Helmer and Dalkey first used the Delphi method in 1953 to solicit the opinions of seven atomic warfare experts in order to address a specific military problem (Helmer, 1983). Helmer (1983) emphasized that the Delphi technique was designed to allow a group of individuals to deal with complex problems with a minimum of interference from the kind of psychological distractions that often affect open-forum discussions among panels of experts, and to achieve as close a consensus as possible compatible with individual divergences from the central tendency of the panel's opinions (p. 134). Dalkey (1969) suggested that the Delphi procedure is "a rapid and relatively efficient way to "cream the tops of the heads" of a group of knowledgeable people" (p. 16).

The Delphi technique is a method of eliciting expert opinion and refining group opinions in a systematic manner (Buriak & Shinn, 1989; Martin & Frick, 1998). The Delphi method was chosen for this study because its method of inquiry was unique and better suited to securing collaborative systematic participation from experts in the field of career and technical education. The Delphi method also was selected because it allowed participants to participate equally in the structured group process, it guaranteed anonymity to the participants of the study, and allowed participation of experts across a wide geographic area. The Delphi method can provide important insight into a particular

problem, is suited to online communication, and it can be highly motivating (Pill, 1971, p. 57).

This approach attempted to solve several problems often associated with committee activities such as the undue influence of powerful personalities, the individuals desire to conform to a majority opinion, and the difficulty of relinquishing support for an opinion once it is voiced publicly (Martin & Frick, 1998). This method can produce a reliable consensus among an expert group by a series of questionnaires combined with controlled opinion feedback (Dalkey & Helmer, 1963).

The Delphi method was particularly useful to the current study because of the geographical locations, and the varied professional expertise of the panel members. The members of the panel for this study were comprised of industry representatives, international vocational education representatives, researchers, policy makers, classroom teachers, school administrators, professional association representatives, career and technical education student organizations (CTSO) executive directors, and alumni of CTE programs. Weaver (1971) affirmed the primary justification for the use of the Delphi in investigations as follows: "it prevents professional status and high positions from forcing judgments in certain directions as frequently occur when panels of experts meet" (p. 267). Murry and Hammons (1995) pointed out that "using Delphi enables a researcher to gain the added reliability of group decisions while avoiding typical problems encountered in face-to-face meetings, such as the bandwagon effect and deference to authority" (p. 433). Linstone and Turoff (2002) described the Delphi technique "as a method for structuring a group communication process, so that the

process is effective` in allowing a group of individuals, as a whole, to deal with complex

problems" (p. 3).

CTE professionals have few opportunities to interact with one another outside of

their service area interests and professional responsibilities. The CTE profession spans a

breadth of interest areas and specialized skills. Researchers who wish to survey this

diverse population can find it difficult to reach populations outside of their service area

because of lack of network contacts and/or meeting opportunities. The use of

computerized data collection in a Delphi allowed the panelists to continue their

participation in the investigation when face-to-face meetings would be jeopardized by

attrition because of on-going professional responsibilities. "Computer conferencing

promises more effective use of energy and resources for many group tasks, especially

those previously assumed to require that participants be in each other's presence at the

same time (and therefore with a need to travel to the same location)" (Linstone & Turoff,

2002, p. 490).

Linstone and Turoff (2002) suggested that computerized conferencing offers a

number of advantages compared to face-to-face meetings, telephone or video

conferencing, or letters when any of the following circumstances occurs:

1. The group is geographically dispersed.

2. Insufficient travel opportunity is available.

3. The individuals are busy and frequent meetings are difficult.

4. A written record is desirable.

5. Topics are complex and require reflection and contemplation from the panelists.

6. A large group is involved (15-50).

7. Disagreement exists which requires anonymity to promote the discussion…or to exchange ideas (p. 4).

Pill (1971) stated that the Delphi exercise "can be a highly motivating environment to respondents" (p. 58), and Presser and Blair (1994) found that using expert panels were the most productive and reliable method, and less expensive to use than other survey methods.

Linstone and Turoff (2002) professed that the "Delphi is particularly well suited when the problem does not lend itself to precise analytical techniques, but can benefit from subjective judgments on a collective basis. It is also useful when the heterogeneity of the participants must be preserved to assure validity of the results, such as avoiding domination by strength of personality" (p. 4).

In a review of literature, Murry and Hammons (1995) found that "a Delphi is a reliable qualitative research method with potential for use in problem solving, decision making, and group consensus reaching in a wide variety of areas" (p. 425). This makes the Delphi method beneficial when the researcher is attempting to establish preliminary information. Dalkey (1969) suggested:

A Delphi exercise, properly managed, can be a highly motivating environment for respondents. The feedback, if the group of experts involved is mutually self-respecting, can be novel and interesting to all. The use of systematic procedures

lends an air of objectivity to the outcomes that may or may not be spurious, but

which is at least reassuring. And finally, anonymity and group response allow a

sharing of responsibility that is refreshing and that releases from the respondents

inhibitions (p. 17).

Pill (1971) suggested that "Delphi could be used in almost any situation requiring

quantification or ordering of subjective variables" (p. 60). Buriak and Shinn (1989)

concluded that "Delphi provides a window into the prospective of decision-makers who

can impact research…these decision-makers can identify primary missions and research

initiatives, as well as obstacles which impede the conduct of research…" (p. 22).

Summary

The literature review began with a brief look at the historical perspective of

career and technical education. The two most important influences that have shaped

vocational education are federal legislation and philosophy. In order to understand the

intricate details that had an impact on of the formation of CTE, a study of the main

advocates, Charles Prosser and John Dewey are important.

The search for knowledge and truth are defined as a branch of philosophy named,

Epistemology. Research is defined as the search for knowledge and truth. The systematic

method used to define and explain phenomena is called scientific; the result is

knowledge. Kerlinger and Lee (2000) stated that "the basic aim of science is theory" (p.

11).

Theory is developed through science. Glaser and Strauss (2006) proposed that "generating grounded theory is a way of arriving at theory suited to its supposed uses" (p. 3). Theory was described by Camp (2002) as "a set of interrelated constructs, definitions, and propositions that present a rational view of phenomena by explaining or predicting relationships among those elements" (¶ 18). Carlile and Christensen (2004) proposed that "a process of theory building that links questions about data, methods, and theory" (p. 1) is developed through a proposed model synthesizing the descriptive stage and the normative stage.

Defining research and educational research is controversial. Ary, Jacobs, and Razavieh (2002) stated that the ultimate goal of educational research "is to discover general practices or interpretations of behavior that people can use to explain, predict, and control events in educational situations…to formulate scientific theory" (p. 17). Educational research was described by Gall, Gall and Borg (2003) as developing new knowledge about learning, teaching, and educational administration that has value because it will eventually lead to the improvement of educational practice. Tuckman (1999) suggested that "research is a systematic attempt to provide answers to questions…to develop a model or theory that identifies all the relevant variables in a particular environment and hypothesizes about their relationships" (p. 4).

CTE research is defined as complex and uses the same scientific methods as other scientific disciplines to make discoveries, to make predictions and to answer questions that could eventually lead to theory development.

CTE provides a unique addition to a secondary or postsecondary academic institution requiring a diverse focus for research and scholarship. The National Dissemination Center and the National Research Center for Career and Technical Education conducted needs-sensing investigations to identify the major needs facing CTE. Needs were identified by the study groups for implications for future research, dissemination and professional development and for the development of an agenda for research in career and technical education. The National Assessment of Career and Technical Education proposed a research agenda based on the federal mandates from the Carl D. Perkins IV Legislation. Rojewski (2002) suggested a CTE conceptual framework for conducting CTE research with a focus and structure. Studies by Buriak and Shinn (1989, 1993), Radhakrishna and Xu (1997), and Silva-Guerrero and Sutphin (1990), suggested that research should be focused, thoughtful and important.

A conceptual model was used to guide the investigation based on the studies of Buriak and Shinn (1993). The method chosen for the investigation was the Delphi technique. This methodology attempts to produce a consistent consensus among a group of experts through the use of multiple iterations and controlled opinion feedback (Dalkey & Helmer, 1963).

CHAPTER III

METHODS

The primary purpose of this study was to identify consensus among experts regarding objectives that serve as a research agenda and as a logic model for career and technical education (CTE). The aim of this study was to provide a structured research agenda and a logic model as an information base that can be utilized by researchers as well as practitioners.

The Delphi Process

The Delphi process described by Murry and Hammons (1995) is characterized by three important features that distinguish it from other group interaction techniques. These features include:

1. Anonymous group interaction and responses.

2. Multiple iterations or rounds of questionnaires or other means of data collection with researcher-controlled statistical group responses and feedback.

3. Presentation of statistical group responses (p. 424).

The Delphi begins with an open-ended inquiry that is given to a panel of selected experts to solicit specific information about a subject or content area, using a divergent process. In subsequent convergent rounds of the procedure, participants rate the importance of individual items while also making changes or additions to the substance

of the items on the questionnaire. "Through a series of rounds the process is designed to

yield consensus" (Custer, Scarella & Stewart, 1999, ¶ 5).

The Development of the Delphi Panel

Recruitment of the panel of experts is crucial to the success of the Delphi. Buriak

and Shinn (1989) suggested that panel experts be identified from current and appropriate

frames (p. 15). Murry and Hammons (1995) suggested that the chief criterion for

selection of the panel "is their expertise on the issues under study" (p. 428). Expertise as

defined by Murry and Hammons (1995) is the implication that individual panelists "have

more knowledge about the subject matter than most people, or that they posses certain

work experience, or are members in a relevant professional association" (p. 428). Delp,

Thesen, Motiwalla, and Seshadri (1977) suggested that respondents chosen to be part of

the Delphi should be persons who have special experience or knowledge to share, who

represent a cross-section of opinions, and who can be motivated to participate (p. 169).

Pill (1971) explained that "in fact, 'expert' should be defined as anyone with relevant

input" (p. 60). Erlandson, Harris, Skipper, and Allen (1993) suggested that "the

researcher must select the sources that will most help to answer the basic research

questions and fit the basic purpose of the study" (p. 83).

Adler and Ziglio (1996) stated that personal preference must not be the criteria

for selection of the expert panel. These authors suggested that explicit criteria be used in

identifying the expert panel:

… 'Expertise' is usually the key requirement in selecting members for a Delphi

panel. The first component of expertise is, of course, knowledge and practical

engagement with the issues under investigation. Another criterion is the capacity

and willingness of selected experts to contribute to the exploration of a particular

problem. Other criteria for selection include assurance from experts that

sufficient time will be dedicated to the Delphi exercise. Skill with written

communication and in expressing priorities through voting procedures can also

represent criteria for selection (p.14).

The Delphi method is an exercise in group communication among a panel of

geographically dispersed experts (Adler & Ziglio, 1996). This enabled the Association

for Career and Technical Education (ACTE) research committee and the Association for

Career and Technical Education Research (ACTER) officers to identify a list of potential

experts from national and international organizations who were involved in CTE to be

nominated for the Delphi study regardless of geographic location. Solicitation of

nominations of well-known and respected individuals from members within the target

groups of experts was recommended by Linstone and Turoff (2002). The initial list

consisting of 41 potential experts and organizations was given to the researcher on

August 25, 2007. A research design team of two data analysis experts and one

researcher/decision-maker were assembled according to the Delp et al. (1977)

recommendations:

The design team will have a significant amount of time designing questionnaires.

Integration between the decision-maker and the Delphi design team is necessary

to ensure that the goals or requirements of the decision-maker are understood by the design team (p. 169).

An additional 34 potential experts were added to the list of nominees, and electronic mail (e-mail) was sent to each candidate (Appendix B) on October 3, 2007, explaining the purpose of the study and the methodology of the investigation. Each candidate and organization was asked to be part of the study by self-nomination or nomination of other potential experts. The principal nomination criteria used for the nomination process was that the nominee was an expert in CTE educational issues and/or a member of a national or international professional organization with direct ties to CTE.

The size of the respondent group for a Delphi has been debated in the literature. Parentè and Anderson-Parentè (1987) suggested that at a minimum, the number of the final panel should be 10 carefully selected panelists. Delbecq, Van de Ven, and Gustafson (1975) "found that in their experience thirty well-chosen respondents were sufficient" (p. 169). Murry and Hammons (1995) suggested "few new ideas are generated within a homogeneous group once the size exceeds thirty well-chosen participants" (p. 428). Brooks (1979) agrees that "little improvement in results is achieved with groups of more than twenty-five" (p. 377). The RAND Corporation, in extensive studies of the Delphi method, found that when the number of participants per advisory group was greater than 13, process reliability was a function of group size (Buriak & Shinn, 1989). A total of 32 experts agreed to participate in the first round of the study, and an e-mail confirming their participation (Appendix C) was sent on October 15, 2007. During Round One, several individuals who had not previously

responded to the initial letter inviting them to participate in the study responded to the

researcher and asked to be included in the study process. The Data Analysis Team

decided to allow the additional experts to join the study during Round Two, increasing

the size of the panel. There were also requests to participate in the investigation from

potential panelists in subsequent rounds. It was believed by the Data Analysis Team that

the addition of panel members brought new expertise to the investigation, thereby

validating the reliability of the panel responses to the questionnaires.

Panel Profile

The Nomination Process

Recruitment of the expert panel for this investigation began on August 25, 2007.

An initial list of potential panelists from national and international organizations was

assembled by the Association for Career and Technical Education (ACTE) research

committee and the Association for Career and Technical Education Research (ACTER)

board of officers. Seventy-five electronic mail (e-mail) messages were sent to

individuals and organizations explaining the purpose and the methodology of the

investigation (Appendix B). Experienced leaders and educators from various areas in

CTE across the United States served as participants on the expert panel for this

investigation. The panel included educators, executive directors of professional

associations, career and technical education student organizations, representatives from

state departments of education, university professors, business and industry partners,

advisory committee members and educational policy makers. A total of 32 participants

agreed to participate in the first round of the study. Confirmation letters (Appendix C) were sent to each person nominated to confirm their participation in the investigation on October 15, 2007.

Individual Characteristics

This investigation was conducted through the use of computerized conferencing which included email and online instruments. This panel of experts was comfortable and familiar with using electronic communications and computer hardware.

The expert panel consisted of women and men from 25 states and the District of Columbia in the continental United States. The number of men and women participating in each round is depicted in Table 3.1. The representation of approximately one-third females in this investigation is a fair number in consideration of the domination of male representation in CTE throughout the history of the profession.

Table 3.1

Gender of CTE Expert Panel from 25 States and the District of Columbia for Each Round of the National CTE Research Agenda Investigation, 2007-2008

Round	Women	Men	Total [a]
One	11	21	32
Two	11	32	43
Three	12	32	44
Four	13	32	45
Five	13	32	45

a. *Additional panelists were admitted after the conclusion of Delphi Rounds Two and Three.*

State of Residence

The state of residence for each participant was asked as part of the demographic information collected from the panelists participating in the study. One panelist represented an international organization; however, the panelist resided in the United States. Table 3.2 depicts the geographic distribution of the panelists for each round in the investigation.

Table 3.2

*Geographic Distribution of CTE Expert Panel by State for Each of the National CTE
Research Agenda Investigation Rounds, 2007-2008*

Delphi Round One $n= 32$	Delphi Round Two $n= 43$	Delphi Round Three $n= 44$	Model Validation Round Four $n= 45$	Model Validation Round Five $n= 45$
AZ (5)	AZ (5)	AZ (6)	AZ(6)	AZ (6)
AR (1)	AR(1)	AR(1)	AR (1)	AR(1)
CA (1)	CA (1)	CA (1)	CA (1)	CA (1)
GA (2)	GA(4)	GA(4)	GA (4)	GA (4)
IL (1)	ID(1)	ID (1)	ID (1)	ID (1)
KS (1)	IN (1)	IN (1)	IN (1)	IN (1)
KY (1)	IL(1)	IL (1)	IL(1)	IL (1)
LA (1)	KS (1)	KS (1)	KS (1)	KS (1)
MA (1)	KY (1)	KY (1)	KY(1)	KY (1)
MI (2)	LA (1)	LA(1)	LA (1)	LA (1)
MO (1)	MA (1)	MA (1)	MA (1)	MA (1)
MN (1)	MI (2)	MI (2)	MI (2)	MI (2)
MT(1)	MO (1)	MO (1)	MO (1)	MO (1)
NE (1)	MN (2)	MN (2)	MN (2)	MN (2)
NY (1)	MT (1)	MT (1)	MT (1)	MT (1)
NC (1)	NE (1)	NE (1)	NE (1)	NE (1)
OH (1)	NH (1)	NH (1)	NH (1)	NH (1)
PA (1)	NM (1)	NM (1)	NM (1)	NM (1)
VA (6)	NY (1)	NY (1)	NY (1)	NY (1)
DC (1)	NC (1)	NC (1)	NC(1)	NC(1)
WV (1)	OH (2)	OH (2)	OK (1)	OK (1)
	PA (1)	PA (1)	OH (2)	OH (2)
	VA (8)	VA (8)	PA (1)	PA (1)
	DC (2)	DC (2)	VA (8)	VA (8)
	WV (1)	WV (1)	DC (2)	DC (2)
			WV (1)	WV (1)

Professional Affiliations

The panelists reported 57 professional organizations, affiliations, institutions, and businesses with direct ties to CTE. The reported associations, affiliations, businesses, and institutions were:

- American Association of Agricultural Education (AAAE)

- American Society for Training and Development (ASTD)

- American Society of Association Executives & The Center for Association Leadership

- Appalachian State University

- Arizona Business Education Association (ABEA)

- Arizona Department of Education

- Association for Career and Technical Education (ACTE)

- Association for Career and Technical Education – Arizona (ACTE-AZ)

- Association for Career and Technical Education Research (ACTER)

- Association for International Agricultural and Extension Education (AIAEE)

- Association for Skilled and Technical Sciences (ASTS)

- Concord University

- Cornell University

- CTE Local Directors

- Delta Pi Epsilon (Graduate Honorary Society for Business Research)

- Distributive Education Clubs of America (DECA)

- Future Business Leaders of America (FBLA) Phi Beta Lambda (PBL)

- Intelitek Corporation

- International Technology Association (ITEA)

- International Vocational Education and Training Association (IVETA)

- Louisiana State University

- Massasoit Community College

- Mesa Public Schools

- Megatech Corporation

- Minnesota State Colleges and Universities System

- Missouri Department of Elementary and Secondary Education

- Montana State University – Great Falls College of Technology

- National Association for Career and Technical Education Information (NACTEI)

- National Association of Industrial Technical Teacher Educators (NAITTE)

- National Association of State Directors of CTE Consortium (NASDCTEc)

- National Association of Supervisors of Agricultural Education (NASAE)

- National Business Education Association (NBEA)

- National Council of Workforce Education (NCWE)

- National Occupational Competency Testing Institute (NOCTI)

- National Research Center for CTE

- Nebraska Department of Education

- Old Dominion University

- Ohio Department of Education

- Oklahoma State University

- Omicron Tau Theta (OTT)

- Peoria Unified School District

- Pittsburg State University

- SkillsUSA

- Southern Business Education Association (SBEA)

- Technology Education

- Technology Student Organization (TSA)

- The Academy

- The National FFA Organization

- The University of Arizona

- University of Arkansas

- University Council for Workforce and Human Resources Education

- University of Georgia

- University of Illinois at Urbana-Champaign

- University of Louisville

- Valdosta State University

- Virginia Tech

- Western Michigan University

Instrumentation

In order to facilitate the computerized process necessary for the implementation of this computer-based Delphi study, a web-based survey software subscription (Survey Monkey™) was purchased by the ACTER for the researcher to use as the tool for web-based delivery of data-gathering instruments and electronic mail invitations. The instruments for this investigation were developed as digital instruments and a link to each instrument was delivered using confidential electronic mail. The internet and web-based applications were used to disseminate, display, and collect data and to transfer to a secure server database. This study employed e-mail to communicate with respondents, a secure server through which information was sent and received, and a database to capture, codify, and calculate results to be used in subsequent iterations and in drawing conclusions for dissemination.

The Delphi Rounds

After receiving the Institutional Review Board (IRB) approval on September 26, 2007, the expert panel was empanelled, and the researcher proceeded with Round One. A participant contact protocol was established that allowed for seven days of engagement and a minimum of three days for preparation of a new instrument for the next round.

Non-response is a serious matter in a Delphi study due to the relatively small number of subjects, and the multiple iterations required in the Delphi format. On the fifth day, contact was made by individual e-mail to those participants who had not responded to the instrument. Dillman (2007) recommended that one week is an appropriate interval of time to set a deadline in a mailed survey technique, and suggested that three days after the given deadline between iterations, the investigator calls or e-mails the non-respondents asking them to return their instruments. The use of email or telephone contacts in combination with a short time interval between iteration deadlines enables the researcher to communicate directly with the non-respondents for the purpose of collecting data, expediting the Delphi process and eventually maintaining a high response rate (Hsu & Sandford, 2007a). Delp et al. (1977) explained that "if sufficient questionnaires are not returned by the specified date, dunning, or carefully composed reminders, should be directed to the Delphi Group…. A response rate of 85% is usually considered acceptable" for a Delphi process (p. 171). The average response rate for the three Delphi rounds and two validation rounds in this investigation was 87%. (Table 3.3).

Table 3.3

CTE Expert Panel from 25 States and the District of Columbia Response Rate, Response
Percentages, and Timeline for the Development of a National CTE
Research Agenda, 2007-2008

	Panel Size [a]	Panel Response	Percent Response [b]	Round Began	Round Concluded
Delphi Round One	32	31	97%	Oct 18, 2007	Oct 25, 2007
Delphi Round Two	43	35	81%	Oct 31, 2007	Nov 7, 2007
Delphi Round Three	44	40	91%	Nov 13, 2007	Nov 21, 2007
Model Validation Round Four	45	39	87%	Feb 7, 2008	Feb 15, 2008
Model Validation Round Five	45	35	78%	Mar 24, 2008	Apr 1, 2008

a. *Additional panelists were admitted after the conclusion of Delphi Rounds Two and Three.*
b. *Average response rate = 87%*

Delphi Round One

Round One consisted of an open-ended question. Murry and Hammons (1995) described "the typical first round questionnaire uses an open-ended format to elicit individual judgments or opinions from each member of the panel about the particular issue or problem under study" (p. 424). Basically, the first round is an anonymous brainstorming session.

Delp et al. (1977) explained that when designing the first questionnaire, "the initial task of the respondents is generally to generate a list of items. Examples of such items would be barriers to delivery of services, perceived problems, or potential developments" (p. 171).

The Round One instrument asked the panelists to reflect on their familiarity with career and technical education and then to list the Research Problem Areas (RPAs) they believed were critical for future research in the field of career and technical education. Round One was delivered by e-mail to a 32-member expert panel on October 18, 2007 (Appendix D). The first Round focused on developing a list of RPAs identified by the individual experts. The instrument also included a text box for additional comments from the respondents. The division of the opinions collected from the expert panel followed the research structure RPAs developed by Buriak and Shinn (1991). The Round One instrument is provided in Appendix E. Demographic information identifying each respondent was also collected on the Round One instrument. Round One ended on October 25, 2007, with 31experts responding.

The responses to the open-ended opinions were analyzed using a four-step

process. The four steps included:

> Step 1: All responses to Round One were copied to Postit™ notes and a
>
> complete list of all responses was generated and saved to a
>
> separate computer file.
>
> Step 2: Responses were sorted according to the RPA's developed by
>
> Buriak and Shinn (1991).
>
> Step 3: Through group discussion, the Data Analysis Team agreed upon
>
> the categorization of the responses. All of the additional
>
> comments were analyzed for data that could be included in the
>
> RPAs.
>
> Step 4: The data in the final summary were examined to remove
>
> duplicate responses.

Based on the recommendations of Delp et.al, a Data Analysis Team was

organized for the purpose of analyzing the data collected from the iterations in the study,

composed of two experts in the CTE field who were not participants in the study and the

researcher who served as the decision maker. For this investigation, the Data Analysis

Team was comprised of the researcher, and two professors from Land Grant Universities

in two different states which have CTE Teacher Education programs.

During the analysis process from Round One, the Data Analysis Team decided

that an additional RPA should be included in the Round Two questionnaire. The RPA

sections from the Buriak and Shinn (1989) model presented in Round Two were: 1)

Knowledge Base for Teaching and Learning, 2) Curricula and Program Planning, 3)

Delivery Methodologies, 4) Program Relevance and Effectiveness. The new RPA

section developed from this study and presented with the Buriak and Shinn (1989) RPAs

was called: 5) Accountability.

Delphi Round Two

Round Two began the convergent evaluation phase. According to Murry and

Hammons (1995), the second round questionnaire requests the expert panel to "consider,

to rank, and/or rate, to edit, and to comment upon the responses developed during Round

One. Typically, the ranking and/or rating are done on a Likert-type Scale" (p. 424).

Delp et al. (1977) suggested that the second questionnaire "should help

respondents understand, clarify, criticize, and support items identified in questionnaire

one" (p. 172).

> Several things may be asked of the respondent. He may be asked to forecast
>
> when a development may take place or if the items identify potential future
>
> developments. He may be asked to identify what impacts such a development
>
> might have, or he may be asked to vote on the items. The respondent is
>
> encouraged to provide comments, e.g., he (sic) may state why he thinks a
>
> problem is important. If the respondent is to vote on the items, the rank-order
>
> procedure may be used (p. 171).

The Round Two instrument consisted of a list of responses to the open-ended

opinion which had been divided into the RPA's developed by Buriak and Shinn (1991),

and the additional RPA from the data analysis team (Appendix F). The panel was asked

to describe their strength of agreement to keep a opinion or to remove a opinion using a five-point summated rating scale. The scale included the choices: "Very Important," "Important," "Of Moderate Importance," "Of Little Importance," and "Unimportant." A text box for additional opinions, edits, or comments was included at the end of each RPA section. Round Two began on October 31, 2007 and ended on November 7, 2007.

During Round One, several individuals who had not previously responded to the initial letter inviting them to participate in the study responded to the researcher and asked to be included in the study process. The Data Analysis Team decided to allow the additional experts to join the study during Round Two, increasing the size of the panel to 43. The addition of panel members brought new expertise to the investigation, thereby validating the reliability of the panel responses to the questionnaires.

Data analysis methods in previous Delphi investigations employed several methods. Helmer (1983) describes the use of the Interquartile range to reach consensus on responses submitted by respondents. Responses from the Round Two instrument in this investigation were analyzed using the two-thirds decision rule protocol established at the beginning of the study based on the methods used in studies conducted by Shinn and Smith (1999), Boyd (2003), Boyd (2004), and Baker, Shinn and Briers (2007). Because the goal of the study was to identify a structure for a CTE Research Agenda, only those items that two-thirds of the active panel rated as "Very Important" and "Important" were kept for inclusion in the Round Three instrument. All additional opinions, comments, or edits were analyzed to see where they would fit for inclusion into the Round Three instrument.

Delphi Round Three

The purpose of Round Three was to seek consensus for the structure of the Research Agenda and the RPA's rated by the expert panel and to give feedback about the previous round. Murry and Hammons (1995) explained that:

During Round Three and any future questionnaire rounds, the panel is given feedback about the previous round. This information includes panel comments and composite and individual rankings and/or ratings for each questionnaire item. Panel members are asked to rank and/or rate, edit, and comment upon each item (p. 424).

Delp et al. (1977) stated that the third questionnaire "aims to explore disagreements identified in the second questionnaire. The cover letter informs the respondents that they should react to any questions and criticisms and should lobby for or against items they feel strongly about" (p. 172). This procedure of requerying, tabulating, and reporting back to the panelists continues in subsequent rounds until convergence or stability of panel members' responses is achieved (Sackman, 1975).

The purpose of Round Three was to seek consensus on the opinions to be included into the structure of the CTE Research Agenda and the RPA's developed by the expert panel. A dichotomous scale was used on the Round Three instrument asking the experts to rank whether they "Agreed" or "Disagreed" to keeping an opinion as part of the research agenda. Text boxes were included at the end of each RPA section for additional comments or edits regarding the current round (Appendix G).

The responses from Round Three were analyzed using the established protocol for determining opinions that were included in the draft structure for the CTE Research Agenda. Round Three began on November 13, 2007 and ended on November 21, 2007.

The Validation Rounds

The Delphi process for the consensus of research problem areas opinions was concluded following the completion of Delphi Round Three. The decision was made by the researcher and the Data Analysis Team to use two rounds as validation rounds for the findings from the Delphi process. Model Validation Round Four introduced the CTE Research Logic Model and focused on determining the panelists' opinions of when they believed research activities should be conducted. Model Validation Round Five focused on the acceptance of the proposed National CTE Research Agenda structure and model depiction, and to determine the panelist's final opinions on the "Short Term," "Intermediate Term," and "Long Term" Outcomes/Impacts for the CTE Research Logic Model. The same expert panel that participated in the Delphi rounds was used as panelists for Model Validation Round Four and Two. The validation rounds allowed the researcher to validate findings and develop a Logic Model from the Delphi study results. In so far as can be determined, this was the first time that the Delphi process was used to develop a Logic Model for CTE.

Model Validation Round Four

Round Four was the first of the Model Validation Rounds of the Delphi findings for this investigation. The instrument consisted of the first graphic form of the CTE

Research Logic Model (Appendix H). This iteration asked the participants to rank the research agenda opinions in order of the time frame for research activities using the descriptors "Short Term," "Intermediate Term," and "Long Term." The participants were provided a definition of each descriptor. A textbox was included for edits, or additional comments regarding the logic model structure and the contents of the Logic Model sections. The responses for Model Validation Round Four were analyzed using the protocol established previously for determining the final iteration of Model Validation Round Five of the National CTE Research Agenda Logic Model. Model Validation Round Four began on February 7, 2008 and ended on February 15, 2008.

At the conclusion of Model Validation Round Four, the researcher and the Data Analysis Team developed the proposed National CTE Research Agenda structure and graphic model, and also included the "Short Term", "Intermediate Term" and "Long Term" Outputs/Impacts feedback from Model Validation Round Four in the CTE Research Logic Model for presentation to the panelists in Model Validation Round Five.

Model Validation Round Five

Model Validation Round Five served as the final validation round of the proposed National CTE Research Agenda. This validation process instrument consisted of three parts. The first part of the instrument served the purpose of determining agreement to the proposed National CTE Research Agenda structure and model. The second part of the instrument was designed to obtain the final opinion regarding immediacy priorities for CTE research. The third part of the instrument was included to collect demographic information about the panelists. The Model Validation Round Five

instrument presented the panelists with the proposed National CTE Research Agenda structure, the first graphic depiction of the research agenda structure, and the final graphic depiction of the CTE Research Logic Model (Appendix I). Participants were asked to review the three sections of the Model Validation Round Five instrument, and to provide a response to questions using multiple rating scales. A text box was used after each question for the panelists to contribute edits or additional comments.

Part one of the Model Validation Round Five instrument was divided into six questions. The first five questions asked the panelists to indicate final acceptance/non-acceptance of the proposed research agenda structure using a dichotomous rating scale of "agree" or "disagree." The instrument proposed a National CTE Research Agenda structure which was divided by the five RPAs defined in Round Two or Three. Question six in section one of the Model Validation Round Five instrument asked panelists to review the model depiction of the proposed National CTE Research Agenda and to "agree" or "disagree" to accept the model.

Part two of the Model Validation Round Five instrument depicted the CTE Research Logic Model which included the research activities that make up the structure of the proposed National CTE Research Agenda. The instrument presented the research activities that were divided by RPA and asked panelists to rank the RPAs as to whether they were "Short Term," "Intermediate Term," or "Long Term" using a three-point scale to determine the immediacy priority for the study depicted by the Logic Model using the descriptors "Short Term," "Intermediate Term," and "Long Term."

Part three of the Model Validation Round Five instrument asked the panelists to provide their name, occupations and memberships in professional organizations, affiliations, and businesses or institutions that had direct ties to CTE. Model Validation Round Five began on March 24, 2008 and ended on April 1, 2008.

Summary

The Delphi process is an interactive means of collecting information from a panel of experts in a specific field of study. This method of inquiry is especially useful when meeting face-to-face is prohibited because of panelist location. The Delphi process is helpful in reaching consensus on issues, or generating ideas for future discussion. This approach also attempts to solve the problem of committee activities related to undue influence of powerful personalities, and an individual desire to conform to a majority opinion by using a confidential instrument.

This investigation was composed of two complex parts. The first part of this study began with three rounds of the Delphi process. Round One asked the panelists to identify the critical research problems in CTE using an open-ended questionnaire that was delivered by e-mail. Feedback from the first round was analyzed and divided into five Research Problem Areas. Round Two utilized an instrument using a five-point summated rating scale created by the researcher using the feedback from the first Delphi Round. The Round Three instrument was created from the feedback of the previous iterations using a dichotomous rating scale asking the panelists to retain or delete opinions that were to be included as part of the proposed National CTE Research

Agenda. Each of the instruments presented during the Rounds included textboxes for panelists to propose edits or additional opinions or comments.

The second part of the investigation involved the use of validation rounds and began with Model Validation Round Four. The instrument presented in the first validation round was designed to introduce a CTE Research Logic Model. The panelists were asked to define the opinions retained from the Delphi as short term, intermediate term, or long term research priorities that would be part of the Outcomes/Impacts of the CTE Research Logic Model.

The validation rounds concluded with the Model Validation Round Five instrument. This round introduced the proposed National CTE Research Agenda structure and model in part one of the instrument asking panelists for acceptance/non-acceptance of the research agenda structure and model. Part two of the Model Validation Round Five instrument presented a final iteration of the CTE Research Logic Model asking participants to verify the priority of the short term, intermediate term, and long term research activities. The third part of the Model Validation Round Five instrument asked panelists to provide their name, occupation, and professional organization affiliations related to CTE.

This investigation began October 18, 2007 and officially ended on April 1, 2008. Findings from the Delphi process and the validation rounds are shared in Chapter IV.

CHAPTER IV

DATA PRESENTATION AND ANALYSIS

Introduction

The primary purpose of this study was to identify and articulate agreement among experts in career and technical education (CTE) about critical research topics that will help in the development of a National Career and Technical Education Research Agenda. Identifying these research topics will help clarify and broaden the CTE research literature and allow researchers to focus on strengthening and developing the research knowledge base. Stakeholders involved in CTE research will be better prepared to meet the workforce needs by sponsoring and focusing research on relevant topics.

The findings from this investigation are the result of a complex methodology based on the Delphi process. The first section of this chapter presents the findings from Delphi Rounds One, Two and Three. The final section of this chapter presents the findings from Model Validation Rounds Four and Five. It is important to note that identifiers were not provided in the narrative relative to respondent quotes in order to preserve the confidentiality of responses.

The Delphi Panel

The success of a Delphi process depends upon the careful selection of the expert panel members (Buriak & Shinn, 1989, Murray & Hammons, 1995). The panel for this study included educators, executive directors of professional associations, career and technical education student organizations, representatives from state departments of

education, university professors, business and industry partners, advisory committee

members, and educational policy makers. The individuals consisted of women and men

from 25 states and the District of Columbia in the continental United States.

Participation size by round included: Round One – 32 participants; Round Two – 43

participants; Round Three – 44 participants; Rounds Four and Five – 45 participants.

Further details regarding panel members can be found in Chapter III.

The Delphi Rounds

The Delphi process was conducted in three rounds through the use of instruments

delivered via electronic mail. Questions were presented to the expert panel and feedback

provided during the iteration was analyzed by the Data Analysis Team following an

established protocol. Data were collected and analyzed to determine consensus, or lack

of consensus for each individual item submitted by expert panel members. Round One

produced 235 opinions from question one and 12 opinions from question two (Table

4.1). The opinions collected in this investigation refer to items, conditions, indicators,

results, factors, concepts, and activities as perceived by the respondents. After the

opinions were divided into Research Problem Areas (RPAs) and similar opinions were

combined, a total of 134 opinions were presented to the panel during Round Two. The

expert panel yielded a consensus on 87 of the 134 opinions presented in Round Two

(Table 4.1). Round Three yielded consensus on 73 of the 87 opinions presented in

Round Two (Table 4.1). Opinions not retained in each of the Delphi rounds were

removed through condensing, combining, and rewording in order to prevent redundancy.

Table 4.1

CTE Delphi Expert Panel from 25 States and the District of Columbia Response Rate and Research Activity Opinions Retained in each Delphi Round, 2007-2008

Delphi Round	Panel Size [a]	Panel Response	Opinions Presented at Beginning of Round [b]	Opinions Not Retained [c]	Opinions Retained
One	32	31			235
Two [d]	43	35	134	47	87
Three [d]	44	40	87	14	73

> a. *Actual individuals contacted for participation in the investigation.*
> b. *Total number of opinions collected from Round One was 235.*
> c. *The removal of opinions was not only through consensus, but was also through condensing, combining, and rewording to prevent redundancy.*
> d. *Additional panelists were admitted after the conclusion of Delphi Rounds Two and Three.*

Delphi Round One

The expert panel responded to an open-ended question which stated, "Reflecting on your familiarity with Career and Technical Education, please list, starting with the most important, up to ten major research problem areas that should be investigated by researchers." Question two stated, "Please add any additional comments you may have regarding Career and Technical Education research."

The panel responded with 235 original opinions resulting from question one and twelve opinions resulting from question two. These opinions were examined by the

researcher and the Data Analysis Team using a four-step process. The four steps included:

Step 1: All responses to Round One were copied to Postit™ notes and a complete list of all responses was generated and saved to a separate computer file.

Step 2: Responses were sorted according to the RPAs developed by Buriak and Shinn (1991).

Step 3: Through group discussion, the Data Analysis Team agreed upon the categorization of the responses into the Buriak and Shinn (1993) RPA's. Additional comments from panelists in each round were analyzed for comments or opinions that could be included in subsequent instruments.

Step 4: The data in the final summary were examined to remove duplicate responses.

After the opinions were sorted into RPAs and common opinions combined, there were 134 opinions that were used in the Round Two instrument. Table 4.2 illustrates the number of opinions assigned to each RPA as defined by Buriak and Shinn (1993). The RPAs defined by the expert panel from the 1993 Buriak and Shinn study were: (a) knowledge Base for Teaching and Learning, (b) Curricula and Program Planning, (c) Delivery Methodologies, and (d) Program Relevance and Effectiveness. During data analysis of the Delphi Round One opinions from this investigation, one additional RPA was defined by the researcher and the Data Analysis Team: (e) Accountability. The instrument for Round One can be found in Appendix E.

Table 4.2

CTE Research Agenda Investigation Total Number of Opinions of Experts from 25 States and the District of Columbia by Research Problem Area Presented in Round Two, 2007-2008 (n = 134)

Research Problem Area	Number of Opinions Presented In Round Two [c]
Knowledge Base for Teaching And Learning [a]	n= 23
Curricula and Program Planning [a]	n= 21
Delivery Methodologies [a]	n= 17
Program Relevance and Effectiveness [a]	n= 52
Accountability [b]	n = 21

a. *RPA defined by Buriak and Shinn (1993).*
b. *RPA defined by this investigation.*
c. *Total number of panelists contacted was 43.*

Delphi Round One Panelist Comments

Panelists expressed their opinions related to research and other topics in CTE by submitting comments in the textbox provided in question two. Several panelists suggested that: "As a profession we need to 'prove' to society that CTE works to overcome the extreme bias for four year degrees," and that it is important to "pursue a national debate concerning the increasing secondary student dropout rate, the economic implications of school leavers, the format of secondary education, and the purposes of education." One panelist suggested that "we need to predict what employers will need a

year or two years down the road so that participants have marketable skills upon completion of their programs." Another panelist added:

> CTE and its CTSO's need to do whatever they (sic) can to conduct research that will document to the general public the value of its programs. We are in an age of accountability based on standards and academic education. We need to provide documentation that we develop the problem solvers, inventors and innovators for tomorrow. We also need to show that we train our students to be leaders and adaptable to the changes of tomorrow's workplace.

Further, a panelist asks, "why do we still have the stigma of old vocational education students as dummies?" In relation to the topic of teachers and teaching, a panelist commented that:

> A growing concern is finding qualified teachers and affording to keep them. Many are lost because schools cannot pay them what they can get in industry. How are these new teachers being recruited? Are salary levels sufficient to keep them? What difficulties do they find in getting certified to teach?

"Finding support for research will be difficult in light of school pressures for testing" was a concern for one panelist. Another panelist commented that "it appears to me that research is limited and only a few individuals are conducting the research…we need to engage others in the research." Another panelist suggested that "all investigative efforts should include both quantitative and qualitative research designs to produce the most reliable data." Finally, one panelist suggested that "CTE research needs to be in lay

person terms so that the general populace can understand the extreme importance of CTE in our personal survival, our homeland security and our nation as a whole."

Round One provided the panelists an outlet for offering their opinions about critical research topics in CTE by asking the experts to prioritize their opinions and to add any additional comments that would be pertinent to the study. The panel was engaged, highly motivated, and passionate about CTE as reflected by the response rate of 97% (31 of 32 panelists responded).

Delphi Round Two

The Round Two instrument included 134 opinions and was divided into the five RPAs: (a) Knowledge Base for Teaching and Learning, (b) Curricula and Program Planning, (c) Delivery Methodologies, (d) Program Relevance and Effectiveness, and (d) Accountability. This was the first round of consensus building in the Delphi process. The panel was asked to rate the opinions presented using the descriptors: "Unimportant" (1), "Of Little Importance" (2), "Of Moderate Importance" (3), "Important" (4), and "Very Important" (5). A text box was included after each section to provide the panelists with an opportunity to add their edits, additions, or comments to the opinions in the Round. The panelists were also asked to confirm their email address and their state of residence. The instrument for Round Two can be found in Appendix F.

Based on studies by Shinn and Smith (1999), Boyd (2003), Boyd (2004), and Baker, Shinn and Briers (2007). The data were analyzed using the two-thirds decision rule established by the researcher and the Data Analysis Team. Consensus for this Round was defined when two-thirds of the active panel members rated an opinion

"Important" (4) or "Very Important" (5). For Round Two, consensus was reached when

23 of the 34 panelists (66.7%) rated an opinion "Important" or "Very Important." Each

RPA section is depicted by a table showing the RPA and the mean, standard deviation,

response count and rating percent for individual opinions (Tables 4.3 - 4.7).

Three opinions in the Program Relevance and Effectiveness RPA reached 100%

agreement from thirty-four panelists:

- Impact of CTE courses on student achievement ($M = 4.62$, $SD = .49$)

- Impact of CTE courses on graduation rates ($M = 4.58$, $SD = .50$)

- CTE impact on dropout prevention ($M = 4.50$, $SD = .51$)

This was the only Round in the Delphi process that had 100% agreement on any of the

opinions presented during the iteration (Table 4.6)

Table 4.3

Opinions Reaching Consensus in Round Two for the Research Problem Area: Knowledge Base for Teaching and Learning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 14)

Knowledge Base for Teaching and Learning	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Critical Thinking and Problem Solving	4.56	.56	32	96.9%
Quality of Instruction	4.56	.75	34	91.1%
Professional Preparation and Competence	4.55	.56	31	96.8%
Teaching Strategies	4.38	.79	32	87.5%
CTE Teacher Education	4.30	.80	33	84.9%
Teacher-Learner Interaction	4.18	.88	33	75.8%
Value and Importance of Work-based Learning	4.15	.86	34	76.5%
Higher Order Thinking	4.09	.75	34	82.3%
Motivation, Self Concept and Individual Difference	4.09	.84	33	75.8%
Leadership and Organizational Development	4.03	.80	34	82.4%
Impact of CTE Student Organizations	4.00	.95	34	73.5%
Curricula Structure	3.97	.88	33	72.7%
Experience	3.91	.83	34	73.5%
Climate of the Classroom	3.85	.89	34	70.6%

a. *A total of 43 panelists were contacted. A total of 35 panelists participated.*
b. *Rating Scale: 1 = Unimportant, 2 = Of Little Importance, 3 = Of Moderate Importance, 4 = Important, 5 = Very Important*

Table 4.4

Opinions Reaching Consensus in Round Two For the Research Problem Area: Curricula and Program Planning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 14)

Curricula and Program Planning	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Needs of Future Workforce	4.48	.62	31	93.5%
Integration of Basic Academic Skills	4.44	.70	34	88.3%
Effect of CTE on Student Preparation for Workforce	4.41	.70	34	88.2%
Infusion of Science and Mathematics	4.35	.73	34	85.3%
Teaching Basic and Academic Skills	4.31	.78	32	81.3%
Infusion of Communications and Language	4.30	.73	33	81.8%
Employment, Supply-Demand and Nature of Workforce	4.09	.57	34	88.2%
Literacy	4.06	.92	34	73.5%
Infusion of Social Values	4.00	.92	34	76.5%
Student Preparation for Entrepreneurship and Economic Globalization	3.97	.71	34	79.4%
Economics, Entrepreneurship and Free Enterprise	3.91	.86	34	76.4%
Impact of CTE on Career Satisfaction	3.88	.94	34	73.6%
Global Market Demands	3.88	.77	34	76.4%
Success Rate of CTE Entrepreneurs	3.68	.84	34	67.7%

a. *A total of 43 panelists were contacted. A total of 35 panelists participated.*
b. *Rating Scale: 1 = Unimportant, 2 = Of Little Importance, 3 = Of Moderate Importance, 4 = Important, 5 = Very Important*

Table 4.5

Opinions Reaching Consensus in Round Two for the Research Problem Area: Delivery Methods by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 7)

Delivery Method	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Articulation of Programs Between Secondary and Higher Education	4.15	.78	34	82.4%
Educational Methodologies for Learning and Teaching	4.13	.80	31	74.2%
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	4.09	.84	33	75.8%
Integration of Technology into CTE Classrooms and Laboratories	4.03	.87	34	76.5%
Innovative Instructional Technologies	3.97	.75	34	83.4%
Development of Programs of Study	3.88	.89	33	72.7%
ESL/ELL Learners in CTE	3.85	.89	34	73.5%

a. *A total of 43 panelists were contacted. A total of 35 panelists participated.*
b. *Rating Scale: 1 = Unimportant, 2 = Of Little Importance, 3 = Of Moderate Importance, 4 = Important, 5 = Very Important*

Table 4.6

Opinions Reaching Consensus in Round Two for the Research Problem Area: Program Relevance and Effectiveness by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 35)

Program Relevance and Effectiveness	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Impact of CTE Courses on Student Achievement	4.62	.49	34	100%
Impact of CTE Courses on Graduation Rates	4.58	.50	34	100%
CTE Impact on Dropout Prevention	4.50	.51	34	100%
Program Impacts	4.38	.60	34	94.1%
Proficiency of CTE Students on Standardized Tests	4.35	.64	34	91.2%
Faculty and Staff Development	4.33	.71	30	86.7%
Professional Development of CTE Teachers	4.32	.73	34	85.3%
Alignment of Secondary and Postsecondary Standards	4.26	.75	34	88.3%
CTE Alignment with Economic Development Plans	4.26	.79	34	79.5%
Impact of No Child Left Behind on CTE	4.26	.75	34	88.3%
Relevance of CTE in Workforce Investment	4.26	.71	34	85.3%
Evaluation of Teaching/Programs	4.23	.73	30	83.3%
Future of CTE Program Content	4.21	.77	34	85.3%

Table 4.6 (continued).

Program Relevance and Effectiveness	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Recruitment of CTE Teachers	4.21	.84	34	79.4%
Retention of CTE Teachers	4.18	.67	34	85.3%
Marketing of CTE for Rigor and Relevance	4.15	.74	34	79.4%
Student/Parent Perceptions of CTE	4.12	.91	34	76.5%
End of Program Assessment	4.12	.81	34	79.4%
Program Evaluation and Accreditation	4.12	.77	34	76.5%
Efficacy of Career Pathways as a Model	4.09	.83	34	76.5%
Follow-up Program Completers	4.09	.86	34	79.4%
Transition to Postsecondary	4.06	.81	34	82.3%
CTE Alignment with Economic Development Plans	4.06	.79	34	79.5%
Technical Skill Assessment	4.06	.78	34	79.4%
Integrating Workforce Standards	4.03	.85	33	78.8%
Recruitment of Alternatively Certified Teachers	3.97	.1.09	34	67.7%
Retention of Alternatively Certified CTE Teachers	3.97	.85	33	78.7%
Values and Ethics	3.88	1.07	34	70.6%
Policy Development	3.88	.81	34	67.6%
Qualitative Results and Impact	3.88	.73	34	73.5%
Perceptions, Satisfaction and Retention	3.88	.73	34	73.5%

Table 4.6 (continued).

Program Relevance and Effectiveness	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Recruitment of CTE Students	3.88	.78	33	69.7%
Curricula Designs	3.88	.86	33	75.7%
Best Practices for Implementing Perkins IV	3.85	.92	34	70.6%
Value of Middle School/Junior High Programs	3.74	.96	34	67.7%

a. *A total of 43 panelists were contacted. A total of 35 panelists participated.*
b. *Rating Scale: 1 = Unimportant, 2 = Of Little Importance, 3 = Of Moderate Importance, 4 = Important, 5 = Very Important*

Table 4.7

Opinions Reaching Consensus in Round Two for the Research Problem Area: Accountability by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 17)

Accountability	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
High Quality of CTE Teachers	4.42	.75	33	90.9%
CTE Teacher Preparation	4.36	.74	33	84.8%
CTE Graduation Rate	4.33	.59	33	93.9%
Return on Investment by State for CTE	4.30	.77	33	81.8%
Economic Impact of CTE in Community Development	4.30	.77	33	81.8%
CTE Teacher Professional Development	4.27	.76	33	81.9%
Effectiveness of Teacher Preparation Programs	4.21	.74	33	81.8%
Industry Credentials for CTE Program Completers	4.15	.62	33	87.9%
Postsecondary CTE Program Graduates	4.15	.83	33	87.9%
Programs of Study	4.03	.85	33	72.7%
High Skill, High Wage, or High Demand Occupations	3.97	.81	33	72.8%
Minority, Non-Traditional and Diverse Student CTE Populations entering High Tech Fields compared to Non-CTE Students	3.94	.75	33	75.7%

Table 4.7 (continued).

Accountability	Mean	SD	Response Count [a]	Percent Rating 4 or 5 [b]
Jobs that Require Associate Degree or Technical Degree compared to Bachelor Degree	3.94	.80	32	71.9%
Funding	3.91	.84	33	72.7%
Levels of Performance	3.91	.76	33	72.7%
Number of CTE Students Enrolled Nationwide	3.91	.84	33	72.7%
Student Enrollment	3.76	.87	33	72.8%

a. *A total of 43 panelists were contacted. A total of 35 panelists participated.*
b. *Rating Scale: 1 = Unimportant, 2 = Of Little Importance, 3 = Of Moderate Importance, 4 = Important, 5 = Very Important*

An important part of the Delphi process is the condensing and elimination of opinions. Opinions ranking below 66.7% for each RPA (n = 35) were dropped from consideration by the expert panel for Round Two. Those opinions listed by RPA are:

- Knowledge Base for Teaching and Learning

    o Administration and organizational development

    o Career development theory

    o Ethics and values

    o Individual achievement

    o Metacognition

    o Sources of Information

- o Value and Importance of Technical Competitions

- o Preparation of future researchers and professors

- o Prerequisite experience and qualifications

- Curricula and Program Planning

  - o Demographic analysis

  - o Development of programs of study

  - o Gender, race and delivery

  - o Demographic analysis

  - o Job satisfaction

  - o Non-traditional students in CTE

  - o Specific training needs

  - o Guidance and counseling

- Delivery Method

  - o Learning style-teaching style interaction

  - o Cooperative learning and peer teaching

  - o Experiential methods including youth groups

  - o Methods for special populations

  - o Best practices for special populations

  - o Innovative, adoption and diffusion of technology

  - o Development of online instruction

  - o Expert systems and knowledge representation

  - o Learner-Client technology preference

- o Articulation strategies

- Program Relevance and Effectiveness

  - o History, philosophy, futuring and policy

  - o Historic perspectives and social change

  - o Philosophical bases of vocational education/career and technical education

  - o Future roles

  - o Viability of CTE introductory programs in Elementary schools

  - o Alternate teacher certification

  - o Needs assessment

  - o Structures and organizations

  - o Undergraduate and graduate curricula

  - o Effective methods of disseminating research

  - o Importance of CTE in homeland security

  - o Charter schools and CTE

  - o National CTE standardization

  - o Program change

  - o Communications methods

  - o Recruitment of CTE administrators

  - o Effective use of occupational advisory committees

- Accountability

  - o Tech Prep

- o No child left behind requirements

- o Teacher certification

- o Standard rubrics and performance measurement

Each section in the Round Two Instrument contained a textbox for edits, additions or comments. The additional comments submitted by panelists were read and classified by topic to be included in subsequent Rounds. There were nine comments submitted in Round Two. The Round Two instrument was the first feedback provided to the panelists. Round One opinions were analyzed through combining and categorizing into the five RPA's: knowledge base for teaching and learning, curricula and program planning, delivery methods, program relevance and effectiveness and accountability. These categories provided a structure for the panelists in future iterations.

Prior to the beginning of Round Two, new panelists, who had been previously identified as CTE experts were included as participants in Round Two. The Data Analysis Team decided to allow the eleven additional experts to join the study, therefore increasing the panel size for Round Two to 43. Thus, the responses for Round Two and subsequent rounds included responses from two groups of experts. The first group was identified as the CTE Delphi Main Group (n = 34), the second group was identified as the Association for Career and Technical Education Research (ACTER) Group (n = 9). Three nominees were included in the CTE Main Delphi Group, to be included in the subsequent Rounds. The second group was included after Round One. The new individuals' inclusion into expert panels was based on the fact that the persons were nominated as experts in CTE, and responded late to the confirmation letter indicating a

desire to participate. The Data Analysis Team believed that inclusion of these individuals would have a positive effect on the study. The response rate total for both groups was 81% (n = 43). However, the response total for the CTE Delphi Main Group was 97% (33 of 34 panelists responded), and the response rate for the ACTER Group was 22% (two of nine panelists responded).

Delphi Round Two Panelist Comments

Each RPA section included a textbox for edits, additions or comments. In the Knowledge Base for Teaching and Learning Section, one panelist commented

It has been discovered that 'teaching' and 'learning' may, in fact, be two different attributes. There are some great teachers out there, but are their students learning? Given the fact that students are changing (attitudes, perceptions, problems, needs, etc.); teachers also need to change in order to keep up with various methodology. However, some aspects of teaching will always remain constant, such as structure, organization, ethics and values. CTSO's are without a doubt, one of the most important components to include in any CTE program. Just ask what employers want…and the experiences discovered in belonging to an active CTSO provide the results! In order to discover what works, just look at what has been effective for a long time. Case in point, SkillsUSA started out as the Vocational Industrial Clubs of America (VICA) in 1965! FFA (Future Farmers of America) even longer than that.

Another panelist pointed out that, "The importance of being able to teach in an inter-disciplinary environment and assess student learning outcomes through such a process"

could be another possible research topic for consideration. An additional panelist responded, "Regardless of the technology present or absent in a class, the success of the student is still largely related to the abilities of the person delivering the lesson. Mentoring and Role Modeling are key competencies for successful CTE Teachers."

"Curricula and Program Planning should be viewed as a continuum of service provision as students touch and retouch, integrate and re-integrate, assimilate and re-assimilate into the education and employment transition pipeline" is suggested by one panelist. Another panelist criticized,

> Read, write, communicate and 'figure it out' is what business wants. CTE has always been successful because we can easily infuse applied academics into the curricula without the students' specific knowledge of how we are doing it. Unfortunately, this fact was also hidden to our administrators and now we are forced to expose the content, there by potentially 'turning off' certain students. A real dilemma.

An additional comment from a panelist in relation to the importance of all the research topics in Curricula and Program Planning suggested that, "All of these are not important per se, but in collaboration to understand how to increase market share of students in CTE, these are extremely important."

Comments related to Delivery Methods indicated that, "We should not use technology just for the purpose of using technology. We should use technology that works! Some programs may be difficult (peer teaching, cooperative education) but we should use the programs that have proven to work."

The Program Relevance and Effectiveness Section of the instrument drew an interesting list of comments from one panelist in reference to many of the opinions listed as topics for future research. This panelist was passionate about their belief of relevance in CTE,

ACTE blew it. Early history identifies Vocational Education. Somewhere along the road, we decided that had to mean Vocational/Technical Education. Then came Career and Technical Education, instead of just Career Education that would encompass all education leading to a career-that is academic, social, technical, world economy, and so forth. Are Career Pathways new? I don't think so. Are Career Pathways a good thing? Only if we really get serious about the concept. That means Career Awareness at an early level, Career Exploration shortly afterwards, Career Development including direct articulation with postsecondary education. Along those lines of thought…if we are really supporting Career Pathways then why do we continue to offer elective programs? Attitudes and perceptions must change. Regarding Needs Assessment – we usually require a needs assessment (possibly for funding) whenever a new program is initiated. Why don't we require another needs assessment whenever we decide to discontinue a particular program of study? Few things in my mind are more important than national program certification. This endeavor combines (or should) all of the components for quality education. One only has to research the design of the Automotive Youth Education Systems (AYES) to understand what can work in CTE.

Comments from the Accountability Section discussed federal policies and curriculum movements related to CTE. The panelist asked: "What ever happened to Tech Prep? Doesn't that mean technical preparation, including integration of all applied academics and postsecondary articulation? Isn't that what all of CTE should be, and not just an add-on in Carl Perkins?" This panelist commented that this type of instrument is difficult to address in such a short time and suggested that, "this study could include a sit down session of participants in order to discuss a lot of these in complete detail".

Delphi Round Three

The Round Three Instrument included 87 opinions that were divided into the five RPA's defined in Round Two. The panel was asked to rate the opinions using a dichotomous scale of "Agree" (1) or "Disagree" (2). A text box was included for edits, additions or comments from the expert panel regarding the Round. The instrument for Round Three can be found in Appendix G.

The data were analyzed by the researcher by using the two-thirds rule established by the researcher and the Data Analysis Team. Consensus for this Round was defined when two-thirds of the active panel members rated an opinion "Agree" (1). For Round Three, consensus was reached when twenty-seven of the forty panelists (66.7%) rated an opinion "Agree." Each RPA section is depicted by a table showing RPA, response count and percentage of agreement for individual opinions from Round Three. (Table 4.8 - 4.12). For this iteration, the highest percentage of agreement was 97.5% on two opinions:

- Needs of future workforce (RPA = Curriculum and Program Planning),

- Impact of CTE courses on student achievement (RPA = Program Relevance and Effectiveness).

Table 4.8

Opinions Reaching Consensus in Round Three for the Research Problem Area: Knowledge Base for Teaching and Learning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n =10)

Knowledge Base for Teaching and Learning	Response Count [a]	Number in Agreement	Percent Agreement [b]
Teaching Strategies	40	38	95.0%
CTE Teacher Education	37	35	94.6%
Critical Thinking & Problem Solving	40	36	90.0%
Professional Preparation and Competence	40	36	90.0%
Value and Importance of Work-Based Learning	40	35	87.5%
Quality of Instruction	40	34	85.0%
Impact of CTE Student Organizations	40	34	85.0%
Higher Order Thinking	39	31	79.5%
Leadership and Organizational Development	40	30	76.9%
Curricula Structure	39	29	74.4%

a. *A total of 44 panelists were contacted.*
b. *Rating Scale: 1 = Agree, 2 = Disagree*

Table 4.9

*Opinions Reaching Consensus in Round Three for the Research Problem Area:
Curricula and Program Planning by the CTE Expert Panel from 25 States and the
District of Columbia (n = 12)*

Curricula and Program Planning	Response Count [a]	Number in Agreement	Percent Agreement [b]
Needs of Future Workforce	40	39	97.5%
Infusion of Science and Mathematics	39	36	92.3%
Effect of CTE on Student Preparation for Workforce	39	36	92.3%
Infusion of Communications and Language	39	35	89.7%
Employment, Supply-Demand and Nature of Workforce	40	35	87.5%
Student Preparation for Entrepreneurship and Economic Globalization	40	34	85.0%
Integration of Basic Academic Skills	40	33	82.5%
Economics, Entrepreneurship and Free Enterprise	40	30	75.0%
Teaching Basic Academic Skills	40	29	72.5%
Impact of CTE on Career Satisfaction	40	28	70.0%
Global Market Demands	39	27	69.2%
Literacy	40	27	67.5%

a. *A total of 44 panelists were contacted.*
b. *Rating Scale: 1 = Agree, 2 = Disagree*

Table 4.10

Opinions Reaching Consensus in Round Three for the Research Problem Area: Delivery Method by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n =7)

Delivery Method	Response Count [a]	Number in Agreement	Percent Agreement [b]
Educational Methodologies for Learning and Teaching	39	35	89.7%
Articulation of Programs Between Secondary and Higher Education	39	35	89.7%
Innovative Instructional Technologies	39	34	87.2%
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	39	34	87.2%
Integration of Technology into Classrooms and Laboratories	39	33	84.6%
ESL/ELL Learners in CTE	39	29	74.4%
Development of Programs of Study	39	28	71.8%

a. *A total of 44 panelists were contacted.*
b. *Rating Scale: 1 = Agree, 2 = Disagree*

Table 4.11

Opinions Reaching Consensus in Round Three for the Research Problem Area: Program Relevance and Effectiveness by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 32)

Program Relevance and Effectiveness	Response Count [a]	Number in Agreement	Percent Agreement [b]
Impact of CTE Courses on Student Achievement	40	36	97.5%
Professional Development of CTE Teachers	40	38	95.0%
Follow-up Program Completers	40	38	95.0%
Student/Parent Perceptions of CTE	40	37	92.5%
Program Evaluation and Accreditation	40	37	92.5%
Future of CTE Program Content	40	36	90.0%
Program Impacts	40	36	90.0%
CTE Impact on Dropout Prevention	40	36	90.0%
Impact of CTE Courses on Graduation Rates	40	36	90.0%
Transition to Postsecondary Education	40	33	86.8%
Alignment of Secondary and Postsecondary Standards	40	34	87.2%
Perceptions, Satisfaction and Retention	40	34	87.2%
Relevance of CTE in Workforce Investment	40	34	87.2%
End of Program Assessment	40	34	87.2%

Table 4.11 (continued).

Program Relevance and Effectiveness	Response Count [a]	Number in Agreement	Percent Agreement [b]
Proficiency of CTE Students on Standardized Tests	40	34	85.0%
Best Practices for Implementing Perkins IV	40	33	82.5%
Integrating Workforce Standards	40	33	82.5%
Technical Skill Assessment	40	33	82.5%
Retention of CTE Teachers	40	33	82.5%
Qualitative Results and Impact	40	31	81.6%
Evaluation of Teaching/Programs	40	32	80.0%
Recruitment of CTE Teachers	40	32	80.0%
Efficacy of Career Pathways as a Model	40	31	79.5%
Faculty and Staff Development	40	31	77.5%
Marketing of CTE for Rigor and Relevance	40	31	77.5%
Impact of No Child Left Behind on CTE	40	29	72.5%
Recruitment of CTE Students	40	29	72.5%
CTE Alignment with Economic Development Plans	40	37	70.0%
Recruitment of Alternatively Certified Teachers	40	28	70.0%

Table 4.11 (continued).

Program Relevance and Effectiveness	Response Count [a]	Number in Agreement	Percent Agreement [b]
Retention of Alternatively Certified CTE Teachers	40	33	70.0%
Policy Development	39	27	69.2%
Curricula Designs	40	27	67.5%

a. *A total of 44 panelists were contacted.*
b. *Rating Scale: 1 = Agree, 2 = Disagree*

Table 4.12

Opinions Reaching Consensus in Round Three for the Research Problem Area: Accountability by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 12)

Accountability	Response Count [a]	Number in Agreement	Percent Agreement [b]
CTE Graduation Rate	40	37	92.5%
High Quality of CTE Teachers	40	35	87.5%
Industry Credentials for CTE Program Completers	40	35	87.5%
Return on Investment by State for CTE	40	35	87.5%
Economic Impact of CTE in Community Development	40	35	87.5%
Postsecondary CTE Program Graduates	40	35	87.5%
Effectiveness of Teacher Preparation Programs	40	34	83.0%
High Skill, High Wage, or High Demand Occupations	40	31	81.65
Minority, Non-Traditional and Diverse Student CTE Populations entering High Tech Fields compared to Non-CTE Students	40	32	80.0%
Levels of Performance	40	31	77.5%
Programs of Study	40	29	70.0%

Table 4.12 (continued).

Accountability	Response Count [a]	Number in Agreement	Percent Agreement [b]
Jobs that Require Associate Degree or Technical Degree Compared to Bachelor Degree	40	28	70.0%

a. A total of 44 panelists were contacted.
b. Rating Scale: 1 = Agree, 2 = Disagree

Several opinions ranked lower than 66.7% agreement and were thus dropped from consideration for Round Three. These opinions came from four of the five RPA sections. Opinions removed included:

- Knowledge Base for Teaching and Learning

    o Experience

    o Motivation, self-concept, and individual difference

    o Climate of the classroom

    o Teacher-learner interaction

- Curricula and Program Planning

    o Infusion of social values

    o Success rate of CTE entrepreneurs

    o Sustainability of natural resources

- Program Relevance and Effectiveness

    o Values and ethics

- o   Value of middle school/Junior high programs

- Accountability

  - o   CTE Teacher Preparation

  - o   CTE Teacher Professional Development

  - o   Effectiveness of Teacher Preparation Programs

  - o   Funding

  - o   Student enrollment

In an effort to consolidate responses further, the opinions "CTE Teacher Preparation," "CTE Teacher Professional Development," and "Effectiveness of Teacher Preparation Programs" were removed and restated as "Professional Preparation."

Panelists submitted a total of thirty-two edits, additions, and comments in the textboxes provided in each RPA section of the Round Three instrument. Nine comments were related to the instrument, and general comments not related to the investigation, therefore those comments were not considered for inclusion into the instrument for the subsequent round. Twenty-one comments related to edits for the RPA sections which were considered during data analysis and development of the National CTE Research Logic Model.

Round Three Panelist Comments

Regarding the Curricula and Program Planning Section, one panelist argued, "the assumption of these selected indicators is that CTE should continue to be a separate program of curriculum and study instead of integrated into the curriculum and education of all 7-12 students. Are the right questions being asked?" Another panelist insisted that

"we need to prove to administrators and our colleagues in the academic areas that CTE curricula are integrated and effective for helping students prepare for the workplace and higher education." An additional panelist pointed out that "although some of the topics are worthy of research, these seem redundant to research being carried on in other fields as well, and some not directly related to what we do in the CTE classroom."

From the Delivery Methodologies section, one panelist stated that "CTE programs already have technology and innovative methods. CTE needs to concentrate more on its contribution to the larger educational system such as articulation with postsecondary." An added comment from a different panelist insisted that:

> While it is important to infuse Technology in the classroom, it is imperative for us to note that technology does not improve the presenter. That's not what it is for. It is a visual medium to enhance student retention of material. Somewhere we need to help teachers stay focused on improving their ability to get the message across, not just using technology for technology's sake.

> In the RPA Accountability section one panelist asked,

> Where is the calculation of economic and financial rate of return, and the evaluation of the impact of CTE on improving social equity and lowering poverty rates? The entire effectiveness and evaluation section continues to focus on a lot of looking at inputs (teachers) and outputs (number of people graduating), versus outcomes (did the graduates get jobs in the area trained, etc.) and impact (did CTE graduates get jobs faster than non-CTE graduates, have less

poverty, and did CTE show improvement in social equity and poverty rates over non-CTE participants).

Another panelist argued that "there are but two important CTE issues: 1) Individual program certification/accreditation/licensure/recognition by industry, and 2) Career and Technical Student Organizations (CTSO). Just about every other issue/concern can be addressed within those two components." Additionally, one panelist argued that;

> We don't have good stats for the CTE programs broken down into the different CTE fields: e.g. business, marketing, trades, etc. CTE is such a broad umbrella and most people just think of the trades as the CTE program. How can we change perceptions and have people understand that business, marketing, technology education is also part of the CTE program but quite different. I would love to see some statistics broken down program by program regarding academics compared to CTE students, advancement to higher education, standardized test scores, etc. Also I would like to see if the CTSO's make a difference in the programs' improving academic credentials of the students.

Panelists' comments in the Program Relevance and Effectiveness section reflected a sense of ownership in CTE.

> I sure hope that we never get into testing for the sake of testing. I would rather put efforts into making good programs, other than the excessive reporting and attempts to make every CTE student conform and pass the same requirements as their collegiate counterparts – thereby possibly causing programs to close down.

In other (plain and simple) words, if a kid doesn't understand Math…Please

don't just give him/her more math! Find a better way.

Another panelist was concerned that a topic was missing in the structure, "Professional

development of CTE teachers is mentioned. Yet, throughout this survey there is little or

no mention of preparation for CTE leaders." A different panelist was concerned that the

"impact of different teacher licensing programs on student achievement" was also

missing in the research structure.

The total response rate for Round Three was 91% (n = 44). The response total for

the CTE Main Delphi Group was 94% (n = 33), and the response rate for the ACTER

Group was 78% (n = 7).

The Validation Rounds

The Delphi process concluded with Round Three. The validation rounds began

with Model Validation Round Four. The researcher and the Data analysis Team analyzed

the results of the Delphi rounds and determined that there was stability in the consensus

of the opinions remaining at the conclusion of Round Three. Prior to start of Model

Validation Round Four, it was determined by the researcher and the Data Analysis Team

that 11 opinions were to be combined with other opinions, removed, or reworded for

presentation in Model Validation Round Four. There were 63 opinions that were retained

for presentation in Model Validation Round Four. The data collected from Model

Validation Round Four consisted of immediacy rankings of opinion priorities for the

research activity opinions. At the conclusion of the first validation round, the data along

with edits and comments from panelists were analyzed by the researcher and the Data

Analysis Team. It was determined that 18 opinions should be removed or reprioritized

for presentation in Model Validation Round Five (Table 4.13). The final number of

opinions retained for presentation in Model Validation Round Five was 45 of the

original 63 opinions presented in Model Validation Round Four (Table 4.13). At the

conclusion of this investigation, 45 opinions were retained from Model Validation

Round Five and 8 opinions were added back as research activities presented in the

proposed National CTE Research Agenda structure. The Delphi process allows for

panelist feedback to be presented in later rounds if deemed appropriate for inclusion.

The opinions in the structure were divided into five Research Problem Areas (RPA).

Model Validation Round Four

Model Validation Round Four introduced a Logic Model to the panelists. The

Logic Model was described as a "narrative or graphical depiction of processes…that

illustrate a sequence…a systems approach to communicate the path toward a desired

result" (McCawley, 2001, ¶ 2). The Logic Model presented to the panel is depicted in

Figure 4.1. This validation round was designed to collect the panelists' opinions

regarding the time frame for each opinion collected from the previous rounds of the

Delphi process.

Table 4.13

2007-2008 CTE Delphi Expert Panel from 25 States and the District of Columbia
Response Rate and Research Activity Opinions Retained in Each Model Validation
Round.

Validation Round	Panel Size [a]	Panel Response	Opinions Presented at Beginning of Round [b]	Opinions Not Retained [c]	Opinions Retained
Four	45	39	63	18	45
Five	45	35	45	0	53[d]

a. *Actual individuals contacted for participation in the investigation.*
b. *Total number of opinions collected from Round One was 235.*
c. *The removal of opinions was not only through consensus, but was also removed*
   through condensing, combining, and rewording to prevent redundancy.
d. *Eight opinions were added after the conclusion and analysis of Model Validation*
   Round Five.
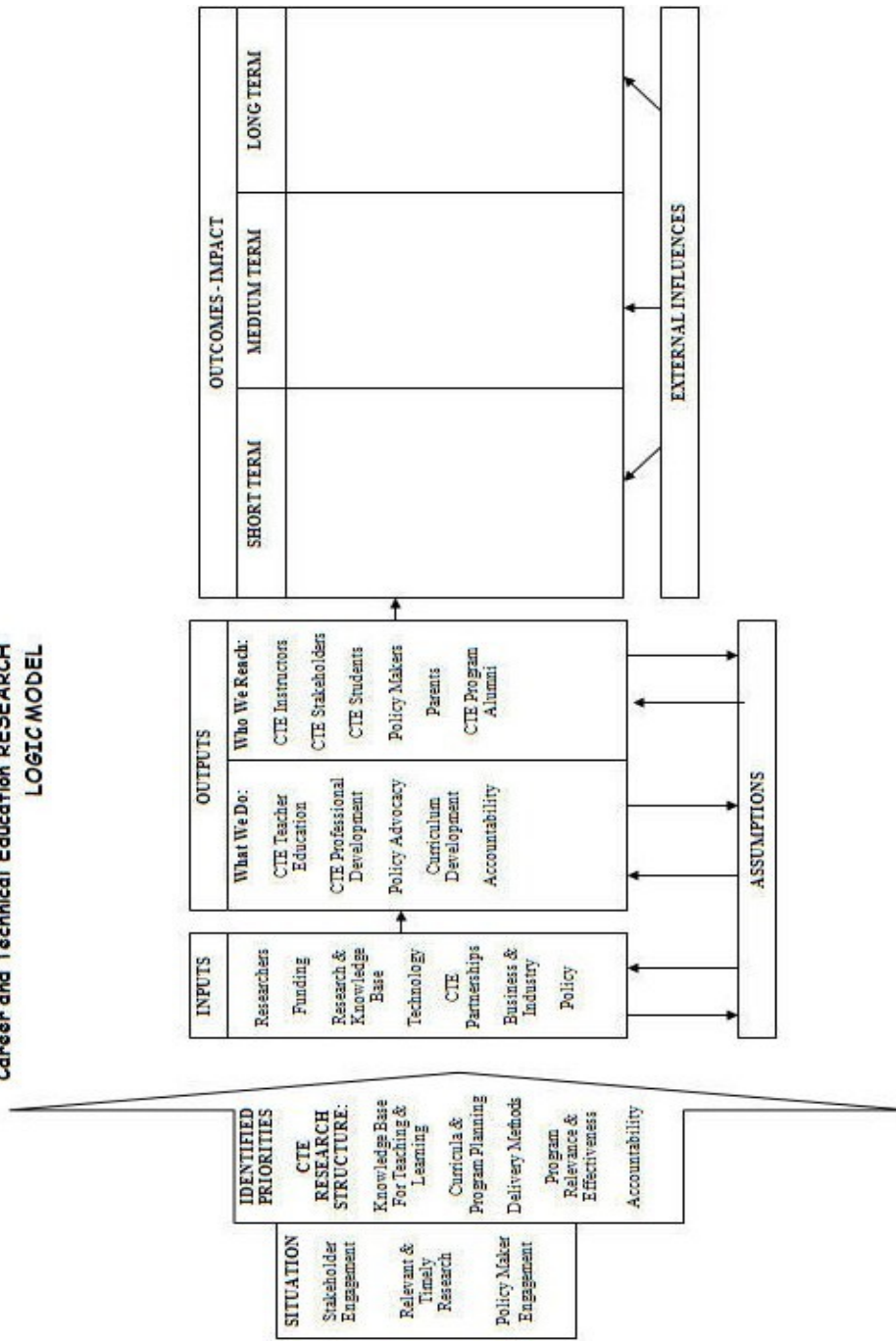
Figure 4.1. Proposed Career and Technical Education Research Logic Model Presented to the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia During Model Validation Rounds Four and Five.

Model Validation Round Four included 63 opinions and was divided into five RPA sections. The panel was asked to rate the opinions in the timeframe they believed the activities should be addressed using the descriptors "Short Term," "Intermediate Term," and "Long Term." Each time frame on the instrument was defined as:

- Short Term: Should be addressed immediately 1 - 4 years.

- Intermediate Term: Should be addressed in the next 5 - 10 years.

- Long Term: Should be addressed after about 11 – 20 years.

The instrument for Model Validation Round Four can be found in Appendix H.

Model Validation Round Four instrument responses designating the "Short Term," "Intermediate Term," and "Long Term" priorities for each RPAs are presented in Tables 4.14 through Table 4.18.

Table 4.14

Model Validation Round Four Summary Table of Research Immediacy Opinions for the RPA Knowledge Base for Teaching and Learning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 9)

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
CTE Teacher Education	31	83.8%	6	16.2%	0	0
Quality of Instruction	28	71.8%	9	23.1%	2	5.1%
Professional Preparation and Competence	23	61.5%	14	35.9%	1	2.6%
Teaching Strategies	22	57.9%	12	31.6%	4	10.5%
Value and Importance of Work-based Learning	22	56.7%	12	30.8%	5	12.8%
Critical Thinking and Problem solving	18	48.6%	17	45.9%	2	5.4%
Teacher-Learner Interaction	18	47.4%	13	34.2%	7	18.4%
Leadership and Organizational Development	17	45.9%	13	35.2%	7	18.9%
Higher Order Thinking	15	41.7%	15	41.7%	6	16.7%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.15

*Model Validation Round Four Summary Table of Research Immediacy Opinions for the
RPA Curricula and Program Planning by the 2007-2008 CTE Expert Panel from 25
States and the District of Columbia (n = 11)*

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
Effect of CTE on Student Preparation for Workforce	34	89.5%	3	7.9%	1	2.6%
Teaching and Integration of Basic Academic Skills	34	87.2%	4	10.3%	1	2.6%
Infusion of Science and Mathematics	29	74.4%	9	23.1%	1	2.6%
Employment, Supply-Demand and Nature of Workforce	28	73.7%	9	23.7%	1	2.6%
Needs of Future Workforce	27	71.1%	10	26.3%	1	2.6%
Literacy	21	53.8%	12	30.8%	6	15.4%
Future CTE Program Content	19	48.7%	20	51.3%	0	0
Global Market Demands	18	47.4%	16	42.1%	4	10.5%
Infusion of Communications and Language	18	46.2%	16	41%	5	12.8%
Curricula Designs	14	37.8%	17	45.9%	6	16.2%

Table 4.15 (continued).

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
Student Preparation for Entrepreneurship and Free Enterprise	14	35.9%	20	51.3%	5	12.8%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.16

Model Validation Round Four Summary Table of Research Immediacy Opinions for the RPA Delivery Methods by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n =13)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
Articulation of Programs of Between Secondary Education and Higher Education	31	79.5%	8	20.5%	0	0
Alignment of Secondary and Postsecondary Education Standards	31	79.5%	8	20.5%	0	0
CTE Teacher Preparation	27	71.7%	10	26.3%	1	2.6%
Best Practices for Implementing Perkins IV	27	71.1%	8	21.1%	3	7.9%
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	27	69.2%	12	30.8%	0	0
Innovative Instructional Technologies	23	62.2%	11	29.7%	3	8.1%
Marketing of CTE for Rigor and Relevance	23	60.5%	14	36.8%	1	2.6%
Transition to Postsecondary Education	22	59.5%	15	40.5%	0	0
Efficacy of Career Pathways as a Model	21	55.3%	17	44.7%	0	0

Table 4.16 (continued).

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
Integration of Technology into Classrooms and Laboratories	20	52.6%	15	39.5%	3	7.9%
ESL/ELL Learners in CTE	19	50%	16	42.1%	3	7.9%
Development of Programs of Study	17	44.7%	13	34.2%	8	21.1%
Educational Methodologies for Teaching and Learning	14	35.9%	20	51.3%	5	12.8%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.17

Model Validation Round Four Summary Table of Research Immediacy Opinions for the RPA Program Relevance and Effectiveness by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n =19)

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
Impact of CTE Courses on Student Achievement	32	88.9%	3	8.3%	1	2.8%
Relevance of CTE in Workforce Investment	30	83.3%	6	16.7%	0	0
Recruitment of CTE Teachers	30	81.1%	7	18.9%	0	0
Retention of CTE Teachers	26	70.3%	10	27%	1	2.7%
Recruitment of Alternatively Certified CTE Teachers	24	64.9%	10	27%	3	8.1%
Professional Development of CTE Teachers	21	58.3%	15	41.7%	0	0
Follow-up of Program Completers	21	56.8%	14	37.8%	2	5.4%
Retention of Alternatively Certified Teachers	21	56.8%	13	35.1%	3	8.1%
CTE Alignment with Economic Development Plans	20	54.1%	12	32.4%	5	13.5%
Impact of Student Organization	20	54.1%	8	21.6%	9	24.3%

Table 4.17 (continued).

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
Industry Credentials for CTE Program Completers	20	54.1%	15	40.5%	2	5.4%
Integrating Workforce Standards	20	52.6%	17	44.7%	1	2.6%
Jobs that require Associate Degree or Technical Degree Compared to Bachelor Degree	17	45.9%	15	40.5%	5	13.5%
Recruitment of CTE Students	17	45.9%	15	40.5%	5	13.5%
CTE Alignment with Economic Development Plans	17	45.9%	15	40.5%	0	0
Faculty and Staff Development	16	43.2%	19	51.4%	2	5.4%
Impact of No Child Left Behind Act on CTE	15	39.5%	11	28.9%	12	31.6%
Student-Parent Perceptions, Satisfaction and Retention in CTE	14	37.8%	19	51.4%	4	10.8%
Policy Development	12	33.3%	19	52.8%	5	13.9%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.18

Model Validation Round Four Summary Table of Research Immediacy Opinions for the RPA Accountability by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 11)

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
High Skill, High Wage or High Demand Occupations	25	67.6%	11	29.7%	1	2.7%
Minority, Non-Traditional and Diverse Student CTE Populations Entering High Tech Fields Compared to Non-CTE Students	25	67.6%	11	29.7%	1	2.7%
Technical Skill Assessment	25	67.6%	11	29.7%	1	2.7%
High Quality of CTE Teachers	25	65.8%	13	34.2%	0	0
CTE Graduation Rate	25	65.8%	11	28.9%	2	5.3%
Proficiency of CTE Students on Standardized Tests	25	65.8%	12	31.6%	1	2.6%
Return on Investment by State for CTE	23	60.5%	12	31.6%	3	7.9%
Economic Impact of CTE in Community Development	22	59.5%	11	29.7%	4	10.8%

Table 4.18 (continued).

Opinion	Short Term Votes[a]	%	Intermediate Term Votes[b]	%	Long Term Votes[c]	%
End of Program Assessment	21	55.3%	13	34.2%	4	10.5%
Postsecondary CTE Program Graduates	17	45.9%	17	45.9%	3	8.1%
Levels of Performance	11	30.6%	19	52.8%	6	16.7%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

The highest priority found from Model Validation Round Four overall for the "Short Term" priorities was "Effect of CTE on Student Preparation for Workforce" (89.5%) from the Curricula and Program Planning RPA and the lowest priority overall for the "Short Term" was "Levels of Performance" (30.6%) from the Accountability RPA.

Model Validation Round Four Panelist Comments

Panelists also submitted 30 edits and comments in Model Validation Round Four. Panelists suggested five edits to the wording of opinions, nine comments related to the instrument, and 17 general comments related to the RPA section and the opinions listed for ranking. One panelist suggested that,

All of these issues are important and have been for a very long time in CTE. However, the issues most looming on the horizon are the fact that the baby

boomers will soon retire and all that educational leadership that we have will

soon disappear. In order to continue to progress as a profession, how will we

replace those leaders and excellent teachers with years of experience?

Another panelist commented that "follow-up and program completers have always been

a problem. There needs to be a more defined definition of a program completer. It

depends on the state definition." Another panelist remarked,

We went from the 'Auto Mechanic' to the 'Automotive Technician' over the

span of almost 100 years. We now need to get these programs thinking about

alternative energy and the nest stage of the service and repair industry that will

involve 'Automotive Engineers.' This concept does not work without good,

quality articulation!

Other panelists suggested that when the new president takes office, that the

educational policies will change again. "In education it seems every thirty years things

recycle with different names and tweaks." One panelist contended that "Preparation of

CTE Teacher education is becoming increasingly difficult with No Child Left Behind

requirements and how CTE teachers are licensed or credentialed, will have an impact on

[how] programs of study are developed." Another panelist added that "my concern is

when we say CTE, many of the questions seemed biased and geared toward more of the

trades' fields versus the business/marketing fields when students continue higher

education." A panelist suggested, "Sometimes we put too much stock on assessment. It

needs to be the 'right' type of assessment, geared toward business and industry or a

career pathway."

One panelist suggested that the global economy was the most important topic for research. The panelist also suggested that, "we must continue to monitor and seek out how to better infuse the basic skills in our classrooms and partner with academics, now and long term." One panelist stated "short term = 1-4 years? We need all this NOW!" Another panelist concluded "one to four years may not seem like a long time to 'educators,' but it sure is to business and industry!" Another panelist suggested, "Frankly, I think all the topics listed in all five areas are critical and need to be addressed in the next one to four years!"

At the conclusion of Model Validation Round Four, the researcher and the Data Analysis Team analyzed the responses, combined similar opinions, and defined opinions into Research Objectives and Research Activities for each RPA to be presented in Model Validation Round Five. As a result of this analysis, opinions were removed, reworded, or combined with other opinions to prevent redundancy. The total response rate for Model Validation Round Four was 87% (n = 39). The response rate for the CTE Delphi Main Group was 89% (n = 32), and the ACTER Group response rate was 78 % (n = 7).

Model Validation Round Five - Part One

Model Validation Round Five consisted of the second validation round and included three parts: Part One – The CTE Research Agenda Structure; Part Two – The National CTE Research Logic Model; and Part Three – Panelist Demographic Information.

Part one included 45 opinions defined by the researcher and the Data Analysis Team as Research Activities. The instrument was divided by the five RPAs which

included further divisions by Research Objectives and Research Activities. The

instrument also included another iteration of the Logic Model. The instrument for Model

Validation Round Five can be found in Appendix I. Table 4.19 depicts the ratings of the

expert panel regarding acceptance of the proposed research agenda structure using the

descriptors "Agree" or "Disagree." Each section of the proposed research agenda

contained a textbox for edits, additions or comments from the panelists.

Table 4.19

*Model Validation Round Five Summary Table of Percent Agreement of the Proposed
National CTE Research Agenda Structure by the Delphi Panel from 25 states and the
District of Columbia in 2007-2008 [a]*

RPA	Number in Agreement [b]	Percent Agreement	Number in Disagreement [b]	Percent Disagreement
Knowledge Base for Teaching and Learning	33	97.1%	1	2.9%
Curricula and Program Planning	31	91.2%	3	8.8%
Delivery Methods	31	91.2%	3	8.8%
Program Relevance and Effectiveness	31	96.9%	1	3.1%
Accountability	29	87.9%	4	12.1%

a. *Total number of panelists contacted was 45. Total number of panelists that
participated in this question was 34.*
b. *Rating Scale: 1 = Agree, 2 = Disagree*

Panelists submitted 49 edits, additions, and comments for section one in Model

Validation Round Five. 14 of the comments were related to the panelist's agreement

with the proposed CTE Research Model (Figure 4.2). There were 18 general comments

about the instrument and the investigation that were not related to the research agenda

and therefore not considered with the feedback from the round. One panelist argued that,

"we continue to leave out leadership development for persons leading CTE programs in

local communities across the country. I see much about CTE teacher preparation, but I

do not see much about professional learning for our local CTE leaders." On the same

topic, another panelist suggested "there appears to be a growing and rising concern about

the impact of the inability to bring current CTE professionals into the administrative and

policy ranks."

Panelists made suggestions for research activities to be included into the

proposed model:

- "Integration of the CTSO's into the CTE Classroom"

- "Are CTSO's embedded within the classroom or are they extra-curricular

  activities that happen outside the classroom? Which of these versions has

  had the greatest impact on student achievement and success?"

- "Is Curricula Design really just about the needs of the future workforce?"

- "In Future content is the issue of diversity addressed?"

- "I suggest another Research Objective: Teacher Pedagogy and CTE

  Licensing requirements. A Research Activity would include the impact of

flexible CTE licensing requirements on curricular design and teacher-
learner interaction."

- "Addressing the achievement gap among CTE students just as it is
  addressed for the general population of students"

- Add return on Investment for localities, since many states have a tax
  structure where education is primarily funded or supplemented through
  local property taxes."

- "Change Accountability RPA to 'Program Outcomes.' "

- "I would like to use the words student engagement next to student
  achievement; another way to examine learning."

- "Under Assessment activities: Placement of students into jobs"

- "Does CTE affect where students are placed?"

- "Under quality of Teachers; include teacher sources, where are the next
  generations of teachers coming from? What are their backgrounds? What
  experiences do they have?"

- "Under Faculty and Staff Development, I would include an objective on
  recruiting and retaining CTE teacher educators for universities to sustain
  the profession."

The proposed National CTE Research Agenda was depicted by a model shown in
Figure 4.2. The model was designed to reflect that CTE Philosophy and Mission is the
core of study in CTE. The inner ring depicts the Research Problem Areas with a
spectrum of color symbolizing the uniqueness of each RPA, but also that each RPA is

connected and interchangeable. This model does not provide prioritization by numbering

of the RPA's listed but a logical order for reference. The outer ring depicted the

Research Objectives in shades of grey. This coloration defined the Research Objectives

as fluid objects in the model. These Objectives could be placed under any of the

Problem Areas and still maintain their importance for study (see Figure 4.2).
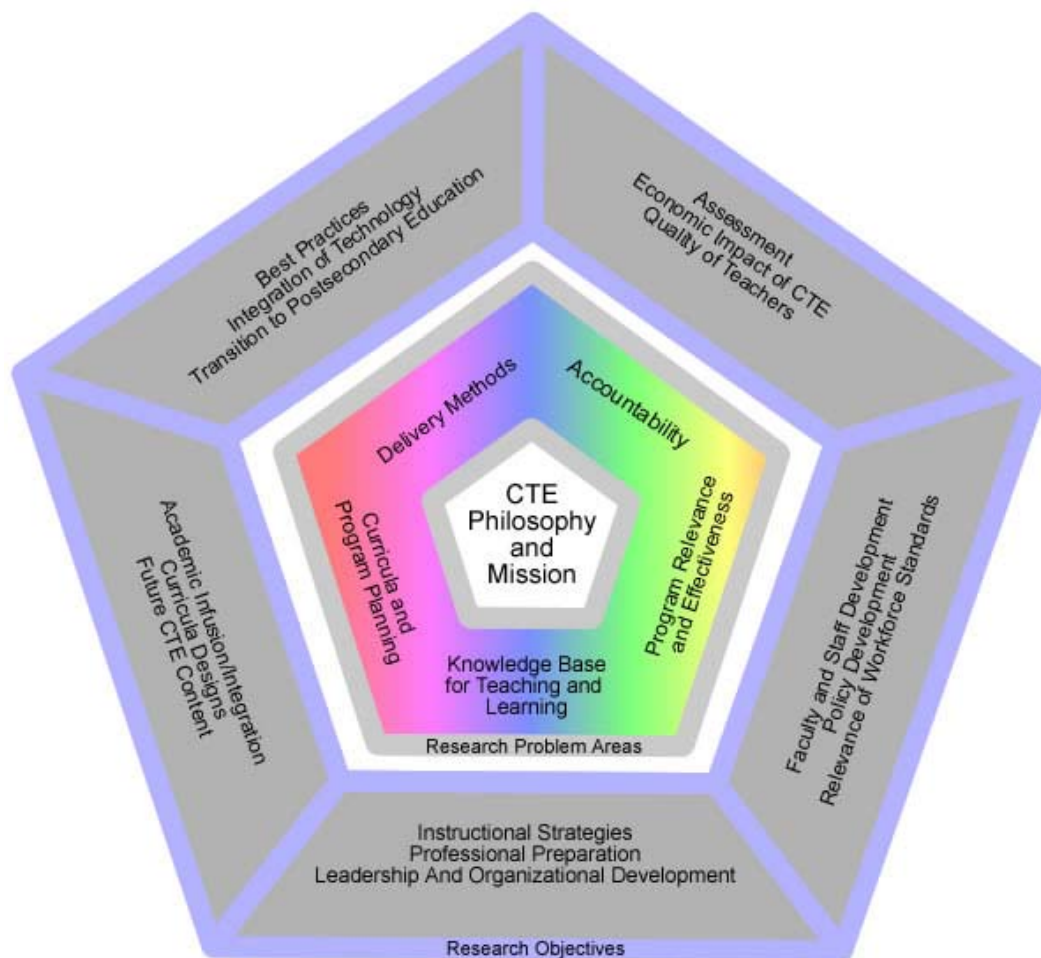
Figure 4.2. Proposed National Career and Technical Education Research Agenda Model
Presented to the 2007-2008 CTE Expert Panel During Model Validation Round Five.

The proposed National CTE Research Agenda met with 96.9% agreement with one panel member disagreeing with the proposed model (n = 35). Each RPA was divided into Research Objectives (RO). Research Activities (RA) were not visible in this static model. The list of RAs was included in the findings section of Chapter IV. In reference to the Proposed Model, one panelist suggested

Let's be sure to explore the 'core' of the model…what ought to be CTE's philosophy? Based on what set of values? From our core philosophy should flow a set of principles that should then guide policies and practice as informed by research in the five general areas as identified in the model. The research should not drive the policies and practice…the research should inform us of the current state of affairs which provides the context for us to then apply our core principles and values that drive why and how CTE is implemented in our educational institutions and in the private sector.

Another panelist stated:

Perhaps we should include a circle around the outside of the model, which includes things like: workforce trends, educational trends, economic trends. The reason for this is that the model is great in giving us a focus, but it must always be looked at as it relates to these different issues. We can't funnel our research and ignore what's going on in the world around us…As CTE professionals; everything we teach has to have practicality in the world we live in. We are the ones that make science theories make sense and practicality; we are the ones that

demonstrate when students will use these ideas in the real world. So must our

research always show how our approaches will work in the real world?

Another panelist suggested that,

I like the concept, but I believe that the components and objectives are not really

tied as closely as the model implies. The geometry implies that each component

in the outer ring is tied to only the middle ring item on the same face. While that

is literally true, I believe that the model will be more powerful if you unlink the

objectives from their respective components. The reader could conclude for

instance that Faculty and Staff Development links only to Program Relevance

and Effectiveness. I would contend that Faculty and Staff Development also

impacts accountability, delivery methods, and the other components. It is

attractive and intuitively clean, except for that.

Model Validation Round Five - Part Two

The second part of the Model Validation Round Five Instrument included the

presentation of the Logic Model. The 45 research activity opinions contained in this part

of the instrument were submitted to the panelists in the same format as the proposed

National CTE Research Agenda presented previously in Part One of the instrument.

Summary tables depicting the Model Validation Round Five instrument responses

designating the "Short Term," "Intermediate Term," and "Long Term" research

priorities for the RPAs are presented in Tables 4.20 - Table 4.24.

The highest priority found from the Model Validation Round Five Part Two

instrument for overall "Short Term" priorities was "Quality of Instruction" (93.8%) and

the lowest priority overall for the "Short Term" was "Teacher Professional

Organizations" (21.9%) of which were both found in the RPA Knowledge Base for

Teaching and Learning.

Table 4.20

Model Validation Round Five Summary Table of Research Immediacy Opinions for the RPA Knowledge Base for Teaching and Learning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 9)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
Quality of Instruction	30	93.8%	2	6.3%	0	0
CTE Teacher Education	28	87.5%	4	12.5%	0	0
Teacher Competence	21	65.6%	10	31.3%	1	3.1%
Critical Thinking and Problem Solving	20	62.5%	10	31.3%	2	6.3%
Work-based Learning	18	56.3%	13	40.6%	1	3.1%
Teacher-Learner Interaction	17	53.1%	13	40.6%	2	6.3%
CTE Student Organizations	14	43.8%	16	50.0%	2	6.3%
Higher Order Thinking	11	35.5%	17	54.8%	3	9.7%
Teacher Professional Organizations	7	21.9%	22	68.8%	3	9.4%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.21

Model Validation Round Five Summary Table of Research Immediacy Opinions for the RPA Curricula and Program Planning by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 8)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
Infusion of Math and Science	28	87.5%	4	12.5%	0	0
Integration of Basic Skills	24	77.4%	7	22.6%	0	0
Infusion of Communications and Language	23	71.9%	8	25.0%	1	3.1%
Literacy	21	67.7%	8	25.8%	2	6.5%
Needs of Future Workforce	21	65.6%	10	31.1%	1	3.1%
Global Market Demands	20	64.5%	9	29.0%	2	6.5%
Employment, Supply-Demand and Nature of Workforce	17	53.1%	12	37.5%	3	9.4%
Entrepreneurship and Free Enterprise	8	25.0%	16	50.0%	8	25.0%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.22

Model Validation Round Five Summary Table of Research Immediacy Opinions for the RPA Delivery Methods by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n= 9)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
CTE Teacher Preparation	29	90.6%	3	9.4%	0	0
Alignment of Secondary and Postsecondary Education	24	72.7%	9	27.3%	0	0
Articulation of Programs Between Secondary, Postsecondary and Higher Education	24	72.7%	9	27.3%	0	0
Programs of Study	20	62.5%	10	31.3%	2	6.1%
Dual Enrollment	19	57.6%	13	39.4%	1	3.1%
Innovative Instructional Technologies	18	56.3%	14	43.5%	0	0
Marketing for Rigor and Relevance	18	54.5%	12	36.4%	3	9.1%
Educational Methodologies for Teaching and Learning	17	51.5%	15	45.5%	1	3.1%
ESL/ELL Learners in CTE	12	36.4%	19	57.6%	2	6.1%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.23

Model Validation Round Five Summary Table of Research Immediacy Opinions for the RPA Program Relevance and Effectiveness by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 9)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
Recruitment and Retention of Teachers	27	81.8%	6	18.2%	0	0
Professional Development of Teachers	26	78.8%	7	21.1%	0	0
Industry Credentials for Program Completers	21	63.6%	10	30.3%	2	6.1%
Recruitment and Retention of Alternatively Certified Teachers	20	60.6%	11	33.3%	2	6.1%
Follow-up Program Completers	19	57.6%	18	39.4%	1	3.1%
Parent and Student Perceptions, Satisfaction and Retention	14	42.4%	15	54.5%	1	3.1%
Impacts of External Program Standards and Accreditation	13	41.9%	17	48.4%	3	9.7%
Workforce Investment	13	39.4%	18	51.5%	3	9.1%
Alignment with Economic Development	12	37.5%	13	56.3%	2	6.3%

a. *Short Term – RPA should be addressed immediately, within 1-4 years.*
b. *Intermediate Term – RPA should be addressed within the next 5-10 years.*
c. *Long Term – RPA should be addressed after about 11-20 years.*

Table 4.24

Model Validation Round Five Summary Table of Research Immediacy Opinions for the RPA Accountability by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 10)

Opinion	Short Term Votes [a]	%	Intermediate Term Votes [b]	%	Long Term Votes [c]	%
CTE Graduation Rate	27	81.8%	6	18.2%	0	0
Technical Skill Assessment	27	81.8%	4	15.2%	1	3.1%
End of Program Assessment	23	69.7%	10	30.3%	0	0
Teacher Education	21	65.6%	11	34.4%	0	0
Levels of Performance	20	60.6%	13	39.4%	0	0
Proficiency of CTE Students on Standardized Tests	20	60.6%	12	36.4%	1	3.1%
Return on Investment by State for CTE	20	60.6%	10	30.3%	3	9.1%
High Skill, High Wage or High Demand	17	51.5%	12	36.4%	4	12.1%
Teacher Standards	13	39.4%	20	60.6%	0	0
Impact of CTE in Community Development	12	36.4%	16	48.5%	5	15.2%

a. Short Term – RPA should be addressed immediately, within 1-4 years.
b. Intermediate Term – RPA should be addressed within the next 5-10 years.
c. Long Term – RPA should be addressed after about 11-20 years.

Model Validation Round Five Panelist Comments

Panelists submitted 10 edits, and comments related to part two of the Model Validation Round Five instrument. One panelist stated, "We have been talking about a seamless flow in the educational system, womb-tomb, for nearly 20 years, yet there are many snags still in the system. We must work quickly to end the tragedy of non-transferable coursework." Another panelist contended, "Immediately facing us is the issue of vast teacher shortages. We must deal with where will teachers come from, their level of competence, their preparation to enter the classroom." Additionally, "The baby boom bust by 2017 is going to have a huge impact immediately. We cannot afford to wait and react." Another panelist argued, "The greatest thing facing us is the glut of professionals preparing to retire in the next ten years." One panelist suggested, "All of these research activities would be salient in the short term, intermediate term, as well as long term." "Everything is important especially since you are defining intermediate 5-10 years into the future. By then there will be a whole new set of concerns."

Another panelist stated, "I firmly believe immediate priorities should be centered on CTE Student Organizations and individual national industry program certification/accreditation/licensure/recognition." Another panelist submitted, "Again, all issues are important. But as the workforce changes, so does industry needs and we have to keep on top of that."

After analysis of part two of the instrument for of Model Validation Round Five, The findings indicate that the panelists believed that 14 of the research activities were critical in the short term and intermediate term

The Model Validation Round Five Logic Model iteration resulted in 13 short term Outcomes/Impacts to be included in the CTE Logic Model (Table 4.25).

The Model Validation Round Five Logic Model iterations resulted in one intermediate term Outcomes/Impacts to be included in the CTE Logic Model, namely in the RPA: Knowledge Base for Teaching and Learning, the Research Activity: Teacher Professional Organizations.

Model Validation Round Five - Part Three

Part three of Model Validation Round Five requested the panelists to share all affiliations or organizations that they represented for the current study. The 35 panelists who responded to this question reported 57 professional organizations, affiliations, institutions, and businesses. These affiliations are reported in Chapter III as part of the panel profile.

Table 4.25

Short Term Research Activities Defined by the 2007-2008 CTE Expert Panel from 25 States and the District of Columbia (n = 13)[a]

1. **Knowledge Base for Teaching And Learning**

   Quality of Instruction

   CTE Teacher Education

2. **Curricula and Program Planning**

   Infusion of Science and Mathematics

   Integration of Basic Skills

   Infusion of Communications and Language

3. **Delivery Methods**

   CTE Teacher Preparation

   Alignment of Secondary and Postsecondary Education

   Articulation of Programs between Secondary, Postsecondary and Higher Education

4. **Accountability**

   CTE Graduation Rate

   Technical Skill Assessment

   End of Program Assessment

5. **Program Relevance and Effectiveness**

   Recruitment and Retention of Teachers

   Professional Development of Teachers

a. *Total number of panelists contacted was 43. A total of 35 panelists responded.*

Model Validation Round Five Closing Stages

At the conclusion of Model Validation Round Five, comments submitted by the panelists were analyzed. It was determined that seven opinions should be returned to the proposed National CTE Research structure. These seven opinions were added to the final presentation of the National CTE Research Agenda and can be found in Appendix J. The Logic Model resulting from this study was intended as a starting point for discussion and further investigation.

One panelist opted out of Model Validation Round Five, and four panelists contacted the researcher and reported that they could not participate during the allotted time of the final iteration due to overseas travel and internet connection issues abroad. Extended time was offered to these panelists, but none responded. The total response rate for Model Validation Round Five was 78% (n = 35). The response rate for the CTE Delphi Main Group was 83% (n = 30), and the response rate for the ACTER Group was 56% (n = 5).

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter includes an overview of the investigation including the summary, conclusions, implications and recommendations. The conclusions and implications are based on the data collected. The recommendations are based upon the conclusions and implications reached in the investigation.

Summary

The focus of this study was to gather opinions of nationally dispersed experts and identify consensus on opinions to serve as a national research agenda for Career and Technical Education (CTE). Identifying a research agenda and important research activities is critical for continuous development of CTE programs that meet the needs of students, business, industry, and society.

Previous studies have expressed a need for relevant and focused research for the CTE profession. Research frameworks for CTE were developed from several studies. The conceptual framework for this study was based on studies conducted by Buriak and Shinn (1989, 1991, 1993), Radhakrishna and Xu (1997), Silva-Guerrero and Sutphin (1990), and Rojewski (2002). The findings from these studies suggested that there was a need for focused, relevant, and rigorous research in CTE. Rojewski (2002) suggested a CTE research framework for conducting research with a focus and structure. Buriak and Shinn (1993) recommended that "our research [be] guided, thoughtful and important"

(p.31). A conceptual model was developed and used to guide the investigation. This study was guided by two research objectives:

1. Using a Delphi Technique, identify a structure and important research problem areas, research objectives, and research activities critical to CTE program development.

2. Synthesize an organizational structure and a logic model that will guide research inquiry of the CTE community.

The Delphi technique utilizes a process of iterations of instruments conducted with a panel of identified experts with knowledge and understanding of the issue or issues being studied. The identification and selection of the panelists is critical to the success of the Delphi process, and must be executed carefully. Institutional Review Board (IRB) approval was secured prior to conducting the study. IRB approval number 2007-0575 was granted for the study on September 26, 2007 (Appendix K).

The panel selected for the study was composed of experts from 25 states and the District of Columbia, and represented 57 affiliations, institutions, businesses, and organizations with direct ties to CTE. One panelist represented an international organization, but resided in the United States.

Data were collected using the online data collector Survey Monkey™. The method used to determine the data to be retained in each round was set *a priori* by the Data Analysis Team. The Data analysis Team for this investigation was comprised of the researcher and two Professors who are experts in CTE, and who were affiliated with

CTE teacher education programs within a department from Land Grant Universities in two different states.

The analysis method for the investigation was the two-thirds decision rule, meaning that an opinion was retained for presentation in the next round when two-thirds of the active panel rated an item as "Important," or "Very Important" in Delphi Round Two or "Agree" in Delphi Round Three. The two-thirds decision rule was also used to determine opinion retention in Model Validation Round Four and Five. The data collected from the instruments were also analyzed using the analysis tools from within Survey Monkey™, which presented the data using ordinal data, means, and percentages. Descriptive statistics and percentages were also used to analyze and calculate the data collected from the study using the Statistical Package for Social Sciences (SPSS, Inc. version 15.0).

The qualitative data were analyzed using the Affinity Diagram method of data analysis. This method provides a way to organize opinions into coherent pattern, groups, or themes using predetermined categories. This method is also known as the constant comparative method of content analysis. The researcher used Postit™ notes as the means for organizing the opinions on a large chalkboard.

The Delphi process for this study was conducted in three rounds. At the conclusion of the data analysis from the Delphi rounds, the basic structure for the National CTE Research Agenda was developed. Rounds Four and Five served as validation rounds for the findings from the Delphi process. At the conclusion of the validation rounds, the National CTE Research Agenda Logic Model was developed and

the National CTE Research Agenda structure was accepted by the expert panel with a 97% acceptance rate. The structure was depicted using a linear structure depicting the RPAs with their Research Objectives (RO) and Research Activities (RA) in a numerical format for presentation. The proposed National CTE Research Agenda structure developed from this study can be found in Appendix J.

Findings from the three Delphi rounds and the two validation rounds revealed five Research Problem Areas (RPA), 15 Research Objectives (RO) and Research Activities (RA) as indicated in Tables 4.1 and 4.13.

Based on the findings from this study, two models were developed to depict the proposed National CTE Research Agenda. The first model developed was the CTE Research Logic Model. A Logic Model is defined as process tool that is used to describe logical sequences or processes (McCawley, 2001). The Logic Model presented in Model Validation Round Four, the first of the validation rounds, in which the panel was asked to rank the "Short Term," "Intermediate Term," and "Long Term" priorities, resulted in the findings for the Outcomes/Impacts for the CTE Research Logic Model as indicated in Tables 4.14 - 4.18. In Model Validation Round Five, the second validation round, asked the panelists to finalize their priority rating of the "Short Term," "Intermediate Term," and "Long Term" Research Activities. This resulted in 13 opinions to be included as Outcomes/Impacts in the "Short Term" section of the CTE Research Logic Model (Table 4.25) and one opinion to be included as Outcomes/Impacts for the "Intermediate Term," namely, Teacher Professional Organizations, to be included into the CTE Research Logic Model.

"Long Term" priorities were not identified in this investigation. Although the primary purpose of this investigation was to identify and to articulate a research agenda based upon the a consensus of a panel of experts, and to develop a logic model which represents the longitudinal relevance of the research objectives and research activities in CTE, the findings from this investigation suggest that the research opinions expressed by the panel, are critical and need immediate study.

For the reason that the panel recognized the research needs as immediate priorities, and not long term, the longitudinal study topics or opinions intended to emerge from this investigation were not clearly identified by this panel. The panel in this investigation had the task of developing a research agenda for CTE in which this task entailed examining and re-examining the immediacy of the research activity opinions that the panel developed through consensus. Because the participants in the study submitted opinions regarding critical research topics, their interpretation of the time frames in which to complete this research revealed the need for immediate action rather than waiting to actually conduct the research. Participants did not address the need for long-term or longitudinal studies. Therefore, further investigation is required to address this area.

The second model that was developed depicted the National CTE Research Agenda as a five-sided color figure (See Figure 4.2). This depiction was intended to allow the observer to see the big picture of the proposed National CTE Research Logic Model. It was designed to reflect the CTE Philosophy and Mission as the core of study in CTE. The inner ring depicted the RPAs with a spectrum of color symbolizing the

uniqueness of each RPA, while also indicating that each RPA is connected and interchangeable. This model does not provide the prioritization of the RPAs by number as provided in the research agenda structure (Appendix J), but instead presents a logical order for reference. The outer ring depicted in shades of gray represented the ROs. This coloration illustrates the ROs as fluid objects in the model. These objectives could be placed under any of the problem areas and still maintain their importance for study.

Conclusions

The following conclusions presented are based upon the data obtained during the investigation.

Objective 1

Using a Delphi Technique, identify a structure and important research problem areas, research objectives and research activities critical to CTE program development.

Conclusions Related to Objective 1

Several conclusions were justified upon the analysis of the data obtained during the three Delphi rounds and the two validation rounds. Based on the findings, it was concluded that the Research Problem Areas: Knowledge Base for Teaching and Learning, Curricula and Program Planning, Delivery Methods, and Program Relevance and Effectiveness, were congruent with those recommended by Buriak and Shinn (1989) with one additional Research Problem Area: Accountability, identified through this investigation. The proposed research agenda structure developed based on the findings

from this study supports the conclusion that CTE research needs to have rigor and focus. These conclusions are based on the findings from studies conducted by Buriak and Shinn (1998, 1991, 1993), Rojewski (2002), Dyer, Whittler and Washburn (2001), and Williams (1991, 1997). The findings also support this conclusion through opinions by panelists regarding the need to have a clearly defined and focused research agenda for CTE to conduct research and disseminate important findings.

Based upon the unanimous agreement of the importance of studying the "Impact of CTE courses on student achievement," "Impact of CTE courses on graduation rates," and "CTE impact on dropout prevention" during Delphi Round Two, it is concluded that these opinions are imperative for study. Support for this conclusion is based on the fact that the concept of studying the impacts of CTE on student achievement and graduation rates reached 97% consensus for inclusion into the proposed National CTE Research Agenda Structure.

Rigorous research designs and data analysis strategies are imperative to the future of CTE research. Rigorous qualitative and quantitative approaches need to be employed to provide the most reliable data. Support for this conclusion was obtained by consensus of opinions regarding research objectives and research activities submitted by the CTE expert panel from this investigation. The conclusions are further supported by comments submitted by panelists regarding research rigor in CTE. This conclusion supports studies conducted by Rojewski (2002) and Gemici and Rojewski (2007).

Based on comments submitted by panelists from Delphi Round Three, it was concluded that there is a perception that CTE research is being accomplished on a small

scale, and that it is separate from the academic curriculum, thus making some CTE research redundant. Lagemann (2000) indicated that to overcome the isolation of educational research, networks and collaboration between and among faculties from different disciplines should be created. These networks can be found in the professional disciplines through organizations that meet individual researcher needs and interests.

The 53 Research Activities on which the expert panel reached consensus provides clear direction for CTE research. The expert panel submitted 134 unique Research Activities during the Delphi process. It was concluded that the 61 Research Activities that failed to reach consensus may reveal 'niche' Research Activities that warrant further investigation.

Objective 2

Synthesize an organizational structure and a logic model that will guide research inquiry of the CTE community.

Conclusions Related to Objective 2

Based on the findings of this investigation, the expert panel reached consensus on a broad logic model. The expert panel perceived a sense of immediacy in addressing most Research Activities (RA). This conclusion is supported by the findings from Model Validation Rounds Four and Five, which resulted in identifying 13 short terms and one intermediate term Outcomes/Impacts depicted in Tables 4.25. As a result of this study

the investigation attempted to establish the Outcomes/Impacts for the CTE Research

Logic Model illustrated in Figure 4.1.

Long term priorities were not identified in this study, because opinions that

reached consensus by the panel were considered an immediate priority for the short term

(Table 4.25) and the intermediate term. It was concluded that the panelists identified

their own research topics through the Delphi process and thus, placed an immediate

priority on these topics. However, this does not mean that long term research should not

be considered for CTE. As future studies address these opinions identified as CTE

research agenda activities, progress can be made in regard to both longitudinal and long

term research based on the identified opinions from this investigation. It was concluded

that continued study should take place in regard to longitudinal and long term research

using the research objectives and research activities identified by the CTE expert panel.

A second figure that was developed based upon the findings from this study was

the National CTE Research Agenda model; it was a visual representation that gives the

reader a quick look at the big picture of CTE. The graphic depiction found in Figure 4.2

was developed as a result of the findings from this study to serve as a starting point for

future discussion in CTE research. It was concluded that the CTE research model can

serve as a conceptual guide for conducting research. Support for this conclusion is

supported by the findings from Model Validation Rounds One and Two.

The researcher concluded that the core of CTE research is based on the mission

and philosophy of CTE. The basis for this conclusion comes from opinions collected

from panelists who participated in Model Validation Round Five. The philosophy and

mission for CTE has not been clearly defined in recent years as evidenced by the lack of literature regarding a current CTE philosophy and unified CTE mission.

Implications

Based on the findings of this study and the attendant conclusions, the following implications for action and consideration exist.

The results for this investigation provide clear focus for state and national CTE leaders and researchers as they chart the course for the future direction of CTE programs, research, and professional development. An attempt must be made to ensure that CTE, as a unified body, is positioned to address the nation's educational trends and issues. The five critical Research Problem Areas proposed by CTE experts were: Knowledge Base for Teaching and Learning, Curricula and Program Planning, Delivery Methods, Program Relevance and Effectiveness, and Accountability. Within those five problem areas, 15 Research Objectives and 53 Research Activities were identified by the CTE experts.

Opinions submitted by panelists through the Delphi process and then removed by consensus by the CTE panel of experts could reveal a 'niche' in CTE research. Although these particular opinions were not included in the final research agenda, it is important to reconsider these opinions based on the fact that they were opinions from an expert panel and worthy of study.

Based upon the data obtained in this study, the effectiveness of the CTE programs should be measured with more than anecdotal evidence. CTE programs should

be assessed for effectiveness using qualitative and well as quantitative methods. Clear and concise empirical evidence based on approved research methods will provide a solid foundation for decision making.

Rigorous research designs and data analysis strategies are imperative to the future of CTE. Rigorous qualitative approaches need to be employed to begin to understand the depth of the issues that face CTE. However, closer attention needs to be paid to new modeling approaches and mixed methods approach for research such as Q-Sort, and how scholars can make sense of multiple types of data (i.e., anecdotal, qualitative, quantitative, spatial, economic). Gemici and Rojewski (2007) suggest that CTE scholars have responded to the more astringent research standards of scientifically based research employed by the United States Department of Education (USDE). However, a recent study found that a tremendous majority of published research in CTE was either descriptive or qualitative in nature, and less than four percent of the researchers employed true or quasi-experimental designs. This discrepancy does not indicate lack of quality in CTE research, only a lack of USDE mandated scientifically-based research (Gemici & Rojewski, 2007).

The development of educational policy is tied directly to the perceived needs of the public. CTE professionals should be involved when educational policy is constructed to insure that policy makers address the current educational issues and workforce trends based on research. Understanding the critical issues and the current workforce trends facing CTE is important to the success of the future CTE programs.

CTE should position itself in a proactive position to be organized to meet the challenges for the generations ahead.

Based on the CTE expert panel opinion of immediacy for the study of the research activities developed from this investigation, long term research activities did not surface. An implication that emerges is that the research objectives and research activities that came forward from this investigation were immediate needs identified by the panel. This does not dismiss long term or longitudinal research from this study, it simply places the priority for investigation based on the opinion of this panel, as an immediate need. The need for long term and longitudinal research is necessary in CTE; however the time and financial resources necessary to conduct such studies may prove to be barriers to this type of research.

A sustained effort for research in CTE should be made by scholars in collaboration with national and international associations and organizations. The Research Activities identified by the CTE experts in this study provide a predetermined focus for students looking for topics to study in CTE. In the United States, the National Center for Career and Technical Education Research (NCCTER) and the ACTER could be the clearinghouses for dissemination of this CTE research.

Recommendations

Based on the results of this study, the following recommendations are presented:

1. The proposed model should be viewed by stakeholders as a descriptive model and not a prescriptive model.

2. The researcher recommends that the CTE Research Committee use the model in developing a more detailed national research agenda for CTE.

3. This proposed National CTE Research Agenda should be disseminated on a national and state level to provide a unified research focus based on the priorities identified by this study.

4. The results of the Logic Model iterations reflected immediate needs. Based on the results of this study, long term research objectives and research activities were not identified for placement into the logic model. It is recommended that future studies be conducted in order to identify critical longitudinal studies that should be conducted both in the short-term and long-term.

5. It is recommended that a series of Delphi rounds be conducted with the same expert panel from this study to identify the long term or longitudinal research priorities for CTE.

6. A global network for CTE should be developed to encourage the collaboration of research and professional development of CTE issues on a global scale.

7. CTE at the state and national levels should develop a unified system for influencing public policy in education and CTE based on research. These systems should collaborate and operate cooperatively, forming partnerships, networks, and alliances with other noteworthy organizations, faculties, and research institutes. This should be an immediate action rather that a long-range goal.

8. One or more national organizations in CTE should create an educational process for monitoring and keeping state and national leaders updated on emerging CTE research. Organizations that might consider this may include the Association for Career and Technical Education research committee and Association for Career and Technical Education Research.

9. The researcher recommends that a study be completed to compare the results of this study with the needs analysis studies conducted jointly by the National Dissemination Center for Career and Technical Education (NDCCTE) and the National Center for Research in Career and Technical Education (NCRCTE) (referred to as The National Centers). Although the intention to develop a national research agenda was similar, the processes employed and the panels of experts used in the three different studies yielded different results. Further study of these investigations could yield interesting and important results.

10. The use of a Delphi Technique proved to be a useful tool in collecting information from a diverse panel of individuals located in 25 states and the District of Columbia across the United States. This technique could be used as a versatile method in gathering qualitative and statistical data necessary for supporting the important empirical evidence from research conducted in CTE and currently required by the government.

11. The researcher recommends that discussion be encouraged to begin to define or redefine the philosophy of CTE. A unified philosophy will provide a foundation from which to build both collaboration and research focus.

12. It is further recommended that additional studies be conducted to determine if the late-to-respond panelists and non-responders had an effect on each round.

13. Focus group studies should be conducted to develop fully the findings from this study. The results of a focus group could reveal more depth and understanding of the CTE research needs.

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APPENDIX A

BRIEF HISTORICAL PERSPECTIVE OF CAREER AND

TECHNICAL EDUCATION

Career and technical education has a long history, since the Land Ordinance of 1785, Northwest Ordinance of 1787, Hatch Act of 1887, the 1910 Davis and 1910 Dolliver-Davis Bills, and the 1911 Page Bill, considered the most significant of the pre-1917 laws, the federal government has demonstrated continued interest in the education of its citizenry (Gordon, 2008). The Smith Hughes Act of 1917:

> Is especially designed to prepare workers for the common occupations in which a great mass of our people find useful employment…to give training of a secondary grade to persons more than 14 years of age for…employment in the trades and industries, in agriculture, in commerce and commercial pursuits, and in callings based upon… home economics (Plawin, 1992, p.31 as cited in Gordon, 2008, p. 87).

Education from the founding of the United States through the late 1800's had been focused on preparing students for higher education, despite the fact that few attend colleges and universities. However, the needs of the nation changed with the onset of the industrial revolution in the early Nineteenth century. The nation needed a large number of workers, which had a direct effect on schools, with the emphasis changing from theoretical learning to more practical. Almost overnight, the nation needed a large number of workers prepared for trade and manufacturing positions. New processes of

technology and corporate, bureaucratic organizational forms were changing the world of work and the life style of Americans (Wirth, n.d.).

American philosophers and educational leaders played a large part in the development of the educational system as we know it. Through the many issues and trends, a few of these persons stand as solid pioneers in American education. The most influential leaders in vocational education are David Snedden, Charles Prosser and John Dewey.

Snedden was a powerful advocate of the social efficiency doctrine (Gordon, 2008). Drost (1977) defined social efficiency in education as "the direct teaching of knowledge, attitudes, and skills, intended to shape the individual to pre-determined social characteristics. It presumes to improve society by making its members more vocationally useful and socially responsible" (p. 3). Prosser's view was that vocational education, practice and theory must go hand in hand: the more intimately they are related to each other, the more the school will contribute to the learner's immediate success in their chosen pursuits (Gordon, 2008).

Charles Prosser wrote the Smith-Hughes Act while in the process brought together a coalition of groups with compatible political, economic, and educational philosophies (Kincheloe, 1999). Prosser was the only professional educator among the principal players in the development of the Act, and was a prominent educational leader. Prosser was hired in 1912 as the first Executive Secretary of the National Society for the Promotion of Industrial Education (NSPIE) (Camp, 1987). Concessions were made by Prosser to the agricultural and industrial alliance which transformed the definition of

vocational education to a narrow vision that clearly separated vocational and academic education creating a dual system. The separation was solidified with the creation of a separate Board for Vocational Education, designed to advise local communities and states, administer money for vocational education, and publish research on the field (Kincheloe, 1999).

John Dewey a pragmatist was a solid and vocal advocate for vocational education. He was critical of the existing traditional liberal education of the day and felt that it did not provide the skills and attitudes that individuals needed to live in an age of science (Gordon, 2008). The type of vocational education that Dewey promoted was dedicated to the reform of the industrial system in the form of schooling that would attempt to develop the types of skills and intelligence that would help workers to control their own work lives (Kincheloe, 1999). He favored a holistic approach to education within his Democracy and Education philosophy (Martin, 2006). Dewey advocated for integrated vocational and academic education that would eventually lead to the development of a renewed understanding of the dignity of work for America's youth. Dewey refused to see vocational education outside of its social, political, and economic context (Sherman, 1974). Dewey believed that issues such as duplication of buildings, administration and equipment because of the dual tracking system would separate the children of the social elite from those who work in manual and commercial jobs. "All that such tracking [of students] would accomplish, Dewey argued, would be to produce a corps of industrial workers that employers would find easy to exploit" (Kincheloe, 1999, p. 121).

Toward the latter part of the Nineteenth Century, private trade schools and private business schools provided the vocational training needed for the workforce. A second major development in CTE prior to the beginning of the Twentieth Century occurred through the establishment of programs in the public schools known as manual training, commercial training, domestic science and agriculture (Gordon, 2008). As a result of those developments, CTE as we know it today, originated in the early part of the Twentieth Century. Several benefits were expected as vocational education became a part of the system of public education (Miller, 1985).

> Not only would schools be meaningful for more students, but education for employment would help extend the years of education, thus increasing the level of citizenship of those persons. Vocational education would also make for greater efficiency in production and increase the wage-earning ability of youth – both boys and girls – by helping them move from noneducative occupations as unskilled laborers to positions as skilled workers sought after by industry (Miller, 1985, p. 14).

Lynch (2000b) describes the earliest vocational education programs as grounded primarily in the need to prepare more blue-collar type students with practical skills for the nation's farms, factories and homes (p. 9).

The 1960's began the movement for change in the way vocational education was operating. President John F. Kennedy appointed a committee composed of people from education, labor, industry, agriculture, the departments of agriculture and labor as well as the lay public to look at vocational education. The report "Education for a changing

World of Work" was published in 1962 (North Carolina State University, n.d.) The committee criticized vocational education's narrowness, its limited economic benefits, and its failure to take into account labor market conditions (Kincheloe, 1999). The panel recommended that vocational offerings be expanded, updated and made available to all people. The Vocational Education Act of 1963 introduced a much broader definition of vocational education into public schooling and provided federal financial support to a greater number of training programs (Tanner & Tanner, 1980, Hyslop-Margison, 2001). This legislation stipulated that funds be used for persons who have academic, socioeconomic, or other handicaps that prevent them from succeeding in a regular vocational education program (Gordon, 2008).

In 1983, the government report, A Nation at Risk, began the call for educational reform through higher academic standards, and was followed by efforts to bring business concepts such as Total Quality Management into schools (Daggett, 2002).

> The same forces were at work in the report that followed A Nation at Risk – the report of the Task Force on Education for Economic Growth, Action for Excellence proclaimed: our national defense, our social stability, our national prosperity, and our future success as a nation depend on the success of business-directed reforms (Tozer, Violas & Senese, 1993 as cited in Kincheloe, 1999).

The call for accountability through state testing, the standards movement, and the Adequate Yearly Progress (AYP) mandates in the legislation have led to the age of school reform in the 1980's (Daggett, 2002). There was also a movement called *A Nation Prepared*, by Boyer that calls for the nations corporations to "heal themselves"

through restructuring to meet the realities of the changing global economy, rather than to force the nation's schools to reform to the corporate demand (Kincheloe, 1999). Boyer believed that such a restructuring would involve the creation of a high-skill, high-wage workforce (Kincheloe, 1999).

The Carl D. Perkins Vocational Education Act of 1984 amended the Vocational Education Act of 1963. This legislation consisted of two major goals; The economic goal of the act was to improve the skills of the labor force and prepare adults for job opportunities; the social goal was to provide equal opportunities for adults in vocational education (Gordon, 2008). Also in 1984, the William T. Grant Foundation released its report, *The Forgotten Half*. This report alerted educators to the notion that vocational education should be reconceptualized and reformed (Kincheloe, 1999).

The evidence indicates that, with few exceptions, vocational education does not prepare young people adequately for *specific* jobs. But its hands-on methodology can offer students a valuable and effective way to acquire the basic skills and general abilities they will need to be successful in a wide range of endeavors (W.T. Grant Foundation, 1988 p. 4).

In the late 1980's and early 1990's vocational education experienced unprecedented enrollment percentage increases from special populations as an increasing number of general education student groups opted out of vocational education to take more academic courses (Lynch, 2000a). Carl Perkins Vocational and Applied Technology Education Act of 1990 (Perkins II) and Carl D. Perkins Vocational – Technical Education Act of 1998 (Perkins III) were basically grounded in school reform

and the mandate to use federal funds to improve student performance and achievement (Lynch, 2000b).

The federal focus continues to be on developing the academic, vocational, and technical skills of students through high standards and linking secondary and postsecondary programs. Each state will be required to provide data on four core indicators of performance: 1) attainment of academic and vocational/technical proficiencies; 2) attainment of a secondary degree or General Education Development certificate, proficiency credential in conjunction with a secondary diploma, and a postsecondary degree or credential; 3) placement in, retention in, and completion of postsecondary education or advanced training, placement in military service, or placement or retention in employment; and 4) participation in and completion of programs that lead to nontraditional training and employment (Lynch, 2000b, p. 10).

The Age of School Reform

Two of the most important influences that have shaped vocational education, both at its inception and now, are federal legislation and philosophies about the nature of vocational education (Rojewski, 2002).

In March of 1994, the Goals 2000: Educate America Act was signed. Catalyzed by reports such as *The Forgotten Half* and *America 2000: An Education Strategy,* agreed to by political, business, and educational leaders, was a compromise document designed to promote future economic growth (Kincheloe, 1999). Kincheloe (1999) contends that

Goals 2000 and *America* 2000 are examples of a modern form of Business Efficiency

progressivism that would make Snedden and Prosser proud. These reform efforts lead to

the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS) and

the recommendations of the National Council on Education Standards and Testing

(NCEST). The purpose of SCANS was not to reform vocational education but to

entirely rethink the way we prepare students for work (Kincheloe, 1999).

SCANS developed the following generic competencies and foundational skills

suggested by business and industry to prepare students for the future workplace:

1) Competencies – effective workers can productively use:

- Resources – allocating time, money, materials, space and staff;

- Interpersonal skills – working on teams, teaching others, serving
  customers, leading, negotiating, and working well with people from
  culturally diverse backgrounds;

- Information – acquiring and evaluating data, organizing and
  maintaining files, interpreting and communicating, and using
  computers to process information;

- Systems – understanding social, organizational, and technological
  systems, monitoring and correcting performance, and designing or
  improving systems;

- Technology – selecting equipment and tools, applying technology to
  specific tasks, and maintaining and troubleshooting technologies.

2) The Foundation – competence requires:

- Basic Skills – reading, writing, arithmetic and mathematics, speaking and listening;

- Thinking Skills – thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning;

- Personal Qualities – individual responsibility, self-esteem, sociability, self-management, and integrity (U.S. Department of Labor, 1991).

In order to insure that competencies and foundational skills such as these would be considered throughout the nation, Congress established the National Council on Educational Standards and Testing (NCEST) in 1991 (Kincheloe, 1999). Since then, NCEST has proposed a national system of assessments which has begun the contentious debate over national educational standards.

Changes in educational policy and curriculum trends are in essence a result of federal mandates handed down by Congress to address the educational needs of the country. The passage of the 2001 No Child Left Behind Act (NCLB) has forced the education profession to change many practices and policies to comply with the mandates of the legislation, whether they are funded or unfunded.

This legislation requires states to set clear standards for what every child should learn and holds schools accountable for student progress by requiring annual testing of students' abilities in the areas of language arts, reading, and math. The legislation's four goals are:

> 1) increased accountability for results from states, school districts, and schools;
>
> 2) more flexibility for states and local educational agencies in how federal
> education dollars are used; 3) proven teaching methods; 4) more choices for
> parents and students attending low-performing schools (No Child Left Behind,
> 2002, Chadd & Drage, 2006).

The result of these mandatory requirements changes the way research for education is funded through federal grants and proposals. Reese (1999) quotes J. Chayce Morrison as saying: "Education for the years ahead must be characterized by more rigorous thinking, bold experimentation, and scientific appraisal." Shim (1998) suggested that "new technologies have produced a broad dissemination of cultural and economic information and a profound impact on human culture in all areas as we approach the realization of an interconnected global village" (p. 448).

> Change and the resultant agitation are especially apparent as our nation's leaders
> and scholar debate the content and processes that must be in place to insure that
> American youth and adults are adequately prepared for the realities of the
> modern workplace, contemporary society, applications from technology and the
> international arena – now and in the future (Lynch, 1996, n.p.)

Factors such as expanding advances in technology, foreign trade, and labor force participation have made the United States a vital part of a very competitive global economy (Schroedel, Watson & Ashmore, 2003).

> Policymakers, recognizing these facts, have identified education as an important
> issue, and have been keenly interested in increasing the academic and technical

skills of American students in order that these individuals can more effectively participate in an international economy as world-class workers and citizens (McCaslin & Parks, 2002, p. 97).

Over the years, there have been several initiatives for integrating vocational and academic education. Career Academies, High Schools That Work, Career Magnet Schools, Tech Prep and Work Based Learning are the recent initiatives that have been studied. Researchers found that the integration efforts have had mixed results in relation to student achievement.

Rojewski (2002) contends that by

Using the historical record to identify issues and direction for developing a conceptual framework of career and technical education reveals how little the field has actually evolved, at least in terms of philosophical, conceptual, and theoretical underpinnings, from its inception to the present. While this situation is beginning to change with the development of tech prep and academic-vocational integration models, and so forth, many of the same positions, issues, and arguments for and against school-based occupational preparation common around the time of the Smith-Hughes Act of 1917 are still common in contemporary writings (p. 32).

Castellano, Stringfield and Stone (2003) contend "that CTE reform efforts are seriously under-researched. School and district personnel are forced to make programmatic decisions in the absence of replicating studies or, often, any process or outcome studies to inform their thinking" (p. 231).

APPENDIX B

NOMINATION LETTERS TO PANELISTS

October 3, 2007

(Delivered by electronic mail)

Dear Dr.------,

The Association for Career and Technical Education (ACTE) is seeking assistance to develop a National Research Agenda[1]. The ACTE Research Committee was given the responsibility to undertake the task of creating a process to involve all constituent groups in this development process.

We need your help to identify qualified experts to participate in a five-step research process that will ultimately develop a CTE Research Agenda. The Research Agenda will be shared with all stakeholder groups and will serve as a guide for future research. We feel it is important to have your organization represented, and invite you or your nominee to participate in this important event.

The panel will be engaged for five rounds, each requiring not more that 20 minutes of analytical thought and response time using an online survey program. The first round instrument will be delivered via email by the middle of October and Model Validation Round Five will conclude by the end of November.

Your opinion is valuable, and we hope that you or your nominee will agree to participate. Please respond to Jeanea Lambeth at jmlambeth@cox.net with your nominee and their email address by October 15, 2007.

Thank you for your consideration to this investigation.

Sincerely,

Jeanea Lambeth	Jack Elliot	Richard Joerger
Doctoral Candidate	Professor	Associate Professor
bandj3@cox.net	elliot@ag.arizona.edu	djoerger@umn.edu

---

[1] This study, "CTE Research Agenda," is an effort to develop a national research agenda for Career and Technical Education. The specific information you provide is confidential and will not be reported as individual data. You may elect not to participate in this study by simply nor returning the instrument. There are no personal risks or discomforts other than completing the instruments. Participation in this research does not provide any personal benefits to you as the subject.

APPENDIX C

PANELIST CONFIRMATION LETTER

Date

Dear Dr. --------;

You have been nominated to assist the Association for Career and Technical Education (ACTE) in the development of a National Research Agenda. The ACTE Research Committee was given the responsibility to undertake the task of creating a process to involve all constituent groups in this development process.

We need your help through participation in a five-step research process that will ultimately develop a CTE Research Agenda. The Research Agenda will be shared with all stakeholder groups and will serve as a guide for future research. We feel it is important to have your organization represented, and invite you to participate in this important event.

The panel will be engaged for five rounds, each requiring not more that 20 minutes of analytical thought and response time using an online survey program. The first round instrument will be delivered via email by the middle of October and Model Validation Round Five will conclude by the end of November.

Your opinion is valuable, and we hope that you will agree to participate. Please respond to Jeanea Lambeth at jmlambeth@cox.net with your acceptance by October 15, 2007.

Thank you for your consideration to this investigation.

Sincerely,

Jeanea Lambeth	Jack Elliot	Richard Joerger
Doctoral Candidate	Professor	Associate Professor
jmlambeth@cox.net	elliot@ag.arizona.edu	djoerger@umn.edu

APPENDIX D

ROUND ONE LETTER TO PANELISTS

Date

(Delivered by electronic mail)

Dear Dr.-----------;

      Thank you for agreeing to participate in the CTE Delphi Study. Please use the link below to reach the Survey for Round 1. When returning the instrument, please be sure that you put your name of the file you submit.

<link to instrument>

If you have any questions or are having problems accessing the instrument, please feel free to email me at jmlambeth@cox.net or call me at 480-226-2900.

Thank you again for your participation in this investigation!

Jeanea Lambeth
Graduate Student
Texas A & M University/Texas Tech University

APPENDIX E

ROUND ONE SURVEY

Career and Technical Education Delphi Round One
Exit this survey >>

1. Round One

Thank you for agreeing to serve as an expert Delphi panel member to structure a CTE research agenda and identify important research activities. Your expertise is critical to the success of this collective work.

Future CTE programs are built upon today's research and development. Identifying a research agenda and the important research activities is critical for continuous development of CTE programs that meet the needs of students, industry and society.

Text boxes are included in the following questions to add your comments and opinions pertaining to CTE Research.

Please return this instrument by October 25, 2007.
1. Reflecting on your familiarity with Career and Technical Education, please list, starting with the most important, up to 10 major research problem areas that should be investigated by researchers.

Examples: Credentialing of workers in high tech industries; integration of career and technical education and academic education in secondary education; preparation of family and consumer science teachers; effective teaching strategies for technology workers in the 21st century.

1.

2.   [   ]

3.   [   ]

4.   [   ]

5.   [   ]

6.   [   ]

7.   [   ]

8.   [   ]

9.   [   ]

10.   [   ]

2. Please add any additional comments you may have regarding Career and Technical Education research.

[   ]

[Next >>]

Career and Technical Education Delphi Round One
Exit this survey >>

2. Demographics

1. Please complete the following Demographic information:

Please complete the following Demographic information: Name:

Institution:

Address:

Address 2:

City/Town:

State/Province:

ZIP/Postal Code:

Country:

*

2. What is your position?

*

3. What is your best email address?

*

4. What is your phone number including area code and extension?

APPENDIX F

ROUND TWO SURVEY

Career and Technical Education Delphi Round Two
Exit this survey >>

1. Round 2

	50%

Thank you for agreeing to serve as an expert Delphi panel member to structure a CTE research agenda and identify important research activities and objectives. Your expertise is critical to the success of this collective work.

The instrument is divided into five Research Problem Area sections. Your responses and the responses from other participants in this investigation have been organized into these sections.

Based upon your expert opinion, assign a level of importance for each statement using a five-point Likert-type scale by means of the following descriptors: "Unimportant", "Of Little Importance", "Of Moderate Importance", "Important", and "Very Important". A text box is included to add your comments or edits pertaining to the statements.

Please return this instrument by November 7, 2007.

1. Knowledge Base for Teaching and Learning

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
A. Critical	☐	☐	☐	☐	☐

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
Thinking and Problem Solving					
Metacognition	☐	☐	☐	☐	☐
Higher Order Thinking	☐	☐	☐	☐	☐
Experience	☐	☐	☐	☐	☐
Value and Importance of Work-based Learning	☐	☒	☐	☐	☐
Value and Importance of Technical Competitions	☐	☐	☐	☐	☐
Sources of Information	☐	☐	☐	☐	☐
Curricula Structure	☐	☐	☐	☐	☐
Teaching Strategies	☐	☐	☐	☐	☐
B. Individual Achievement	☐	☐	☐	☐	☐
Motivation, Self-concept, and Individual Difference	☐	☐	☐	☐	☐
Climate of the Classroom	☐	☐	☐	☐	☐
Teacher-learner Interaction	☐	☐	☐	☐	☐
Quality of Instruction	☐	☐	☐	☐	☐
Leadership and	☐	☐	☐	☐	☐

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
Organizational Development					
Impact of Career and Technical Student Organizations	☐	☐	☐	☐	☐
C. Professional Preparation and Competence	☐	☐	☐	☐	☐
CTE Teacher Education	☐	☐	☐	☐	☐
Preparation of Future Researchers and Professors	☐	☐	☐	☐	☐
Prerequisite Experience and Qualifications	☐	☐	☐	☐	☑
Career Development Theory	☐	☐	☐	☐	☐
Ethics and Values	☐	☐	☐	☐	☐
Administration and Organizational Development	☐	☐	☐	☐	☐

Additional Statements, Opinion and/or Edits

2. Curricula and Program Planning

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
A. Teaching Basic and Academic Skills	○	○	○	○	○
Literacy	○	○	○	○	○
Integration of Basic Academic Skills	○	○	○	○	○
Infusion of Science and Mathematics	○	○	○	○	○
Infusion of Communications and Language	○	○	○	○	○
Infusion of Social Values	○	⦿	○	○	○

	Unimportant	Of Low Importance	Of Moderate Importance	Importa nt	Very Important
Economics, Entrepreneurship, and Free Enterprise	☐	☐	☐	☐	☐
Success rate of CTE entrepreneurs	☐	☐	☐	☐	☐
The Development of Programs of Study	☐	☐	☐	☐	☐
Guidance and Counseling	☐	☐	☐	☐	☐
B. Needs of Future Workforce	☐	☐	☐	☐	☐
Demographic Analysis	☐	☐		☐	☐
Employment, Supply-Demand, and Nature of Workforce	☐		☐	☐	☐
Job Satisfaction	☐	☐	☐	☐	☐
Impact of CTE on Career Satisfaction	☐	☐	☐	☐	☐
Global Market Demands	☐	☐	☐	☐	☐
Student Preparation for Entrepreneurship and Economic Globalization	☐	☐	☐	☐	☐
Affect of CTE on Student Preparation for Workforce	☐	☐	☐	☐	☐
Gender, Race, and Delivery	☐	☐	☐	☐	☐
Non-traditional Students in CTE	☐	☐	☐	☐	☐

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Specific Training Needs	⊙	⊙	⊙	⊙	⊙

Additional Statements, Opinion and/or Edits

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3. Delivery Methodologies

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
A. Educational Methodologies for Learning and Teaching	⊙	⊙	⊙	⊙	⊙
Learning Style - Teaching Style Interaction	⊙	⊙	⊙	⊙	⊙

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Development of Programs of Study	◌	◌	◌	◌	◌
Cooperative Learning and Peer Teaching	◌	◌	◌	◌	◌
Experiential Methods Including Youth Groups	◌	◌	◌	◌	◌
Methods for Special Populations	◌	◌	◌	◌	◌
Best Practices for Special Populations	◌	◌	◌	◌	◌
ESL/ELL learners in CTE	◌	◌	◌	◌	◌
B. Innovative, Adoption, and Diffusion of Technology	◌	◌	◌	◌	◌
Innovative Instructional Technologies	◌	◌	◌	◌	◌
Development of On-line instruction	◌	◌	◌	◌	◌
Integration of Technology	◌	◌	◌	◌	◌

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
into CTE Classrooms and Laboratories					
Expert Systems and Knowledge Representation	☐	☐	☐	☐	☐
Learner – Client Technology Preference	☐	☐	☐	☐	☐
Articulation Strategies	☐	☐	☐	☐	☐
Articulation of Programs Between Secondary Education and Higher Education	☐	☐	☐	☐	☐
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	☐	☐	☐	☐	☐

Additional Statements, Opinion and/or Edits

4. Program Relevance and Effectiveness

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
A. History, Philosophy, Futuring, and Policy	☐	☐	☐	☐	☐
Best Practices for implementing Perkins IV	☐	☐	☐	☐	☐
Historic Perspectives and Social Change	☐	☐	☐	☐	☐

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Philosophical bases of Vocational Education/Career and Technical Education	◉	○	○	○	○
Values and Ethics	○	○	○	○	○
Future Roles	○	○	○	○	○
Viability of CTE Introductory Programs in Elementary Schools	○	○	○	○	○
Value of Middle School/Junior High Programs	○	○	○	○	○
Future CTE Program Content	○	○	○	○	○
Policy Development	○	○	○	○	○
B. Faculty and Staff Development	○	○	○	○	○
Alternate Teacher Certification	○	○	○	○	○
Needs Assessment	○	○	○	○	○
Professional Development of CTE Teachers	○	○	○	○	○
Structures and Organizations	○	○	○	○	○

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Undergraduate and Graduate Curricula	☐	☐	☐	☐	☐
Transition to Post Secondary	☐	☐	☐	☐	☐
Alignment of Secondary and Post Secondary Standards	☐	☐	☐	☐	☐
CTE Alignment with Economic Development	☐	☐	☐	☐	☐
Qualitative Results and Impact	☐	☐	☐	☐	☐
Effective Methods of Disseminating Research	☐	☐	☐	☐	☐
Perceptions, Satisfaction, and Retention	☐	☐	☐	☐	☐
Student Parent Perceptions of CTE	☐	☐	☐	☐	☐
Marketing of CTE for Rigor and Relevance	☐	☐	☐	☐	☐
Importance of CTE in Homeland Security	☐	☐	☐	☐	☐
C. Evaluation of Teaching/Programs	☐	☐	☐	☐	☐
Program Impacts	☐	☐	☐	☐	☐

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
CTE Impact on Dropout Prevention	⊙	○	○	○	○
Impact of No Child Left Behind Act on CTE	○	○	○	○	○
Impact of CTE courses on Graduation Rates	○	○	○	○	○
Impact of CTE Courses on Student Achievement	○	○	○	○	○
Proficiency of CTE Students on Standardized Tests	○	○	○	○	○
Charter Schools and CTE	○	○	○	○	○
National CTE Standardization	○	○	○	○	○
Program Change	○	○	○	○	○
CTE Alignment with Economic Development Plans	○	○	○	○	○
Relevance of CTE in Workforce Investment	○	○	○	○	○
Communications Methods	○	○	○	○	○
Recruitment of CTE Students	○	○	○	○	○

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Recruitment of CTE Teachers	☐	☐	☐	☐	☐
Recruitment of Alternatively Certified Teachers	☐	☐	☐	☐	☐
Recruitment of CTE Administrators	☐	☐	☐	☐	☐
Curricula Designs	☐	☐	☐	☐	☐
Integrating Workforce Standards	☐	☐	☐	☐	☐
Efficacy of Career Pathways as a Model	☐	☐	☐	☐	◉
Follow-up Program Completers	☐	☐	☐	☐	☐
d of Program Assessment	☐	☐	☐	☐	☐
Technical Skill Assessment	☐	☐	☐	☐	☐
Program Evaluation and Accreditation	☐	☐	☐	☐	☐
Retention of CTE Teachers	☐	☐	☐	☐	☐
Retention of Alternatively Certified CTE Teachers	☐	☐	☐	☐	☐

	Unimportant	Of Low Importance	Of Moderate Importance	Important	Very Important
Effective use of Occupational Advisory Committees	☐	☐	☐	☐	☐

Additional Statements, Opinion and/or Edits

[text box]

5. Accountability

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
High Skill, High Wage, or High Demand Occupations	☐	☐	☐	☐	☐
CTE Teacher Preparation	☐	☐	☐	☐	☐

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
Programs of Study	☐	☐	☐	☐	☐
Tech Prep	☐	☐	☐	☐	☐
High Quality of CTE Teachers	☐	☐	☐	☐	☐
No Child Left Behind Requirements	☐	☐	☐	☐	☐
CTE Teacher Professional Development	☐	☐	☐	☐	☐
Student Enrollment	☐	☐	☐	☐	☐
Funding	☐	☐	☐	☐	☐
Levels of Performance	☐	☐	☐	☐	☐
Industry Credentials for CTE Program Completers	☐	☐	☐	☐	☐
Effectiveness of Teacher Prep Programs	☐	☐	☐	☐	☐
Teacher Certification	☐	☐	☐	☐	☐
Return on Investment by State for CTE	☐	☐	☐	☐	☐
Minority, Non-traditional and Diverse	☐	☐	☐	☐	☐

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
Student CTE Populations entering High Tech Fields compared to Non-CTE Students					
Economic Impact of CTE in community Development	⊙	⊙	⊙	⊙	⊙
Number of CTE Students Enrolled Nationwide	⊙	⊙	⊙	⊙	⊙
Standard Rubrics and Performance Measurement	⊙	⊙	⊙	⊙	⊙
CTE Graduation Rate	⊙	⊙	⊙	⊙	⊙
Post-Secondary CTE Program Graduates	⊙	⊙	⊙	⊙	⊙
Jobs that Require Associate Degree or Technical	⊙	⊙	⊙	⊙	⊙

	Unimportant	Of Little Importance	Of Moderate Importance	Important	Very Important
Degree compared to Bachelor Degree					

Additional Statements, Opinions and/or Edits

Next >>

Career and Technical Education Delphi Round Two
Exit this survey >>

2. Demographics

	100%

Please complete the demographic information. The responses will be confidential.

*

1. What is your best email address?

*

2. What State or Country do you reside?

THANK YOU!

This is the end of Round Two.

We appreciate the time you spent in sharing your opinions with us.

You will be getting Round Three soon!

[<< Prev] [Done >>]

APPENDIX G

ROUND THREE SURVEY

Career and Technical Education Delphi Round Three
Exit this survey >>

1. Round Three

Thank you for your participation in this important research. Your expertise is critical to the success of this collective work.

Round Three is a compilation of the statements collected during Round One and Round Two and will be used to determine consensus. The consensus from this expert panel will be used to determine the National CTE Research Agenda Structure. The Research Agenda is divided into five Research Problem Area sections; Knowledge Base for Teaching and Learning; Curricula and Program Planning; Delivery Methodologies; Program Relevance and Effectiveness; Accountability.

Based upon your expert opinion, please rank the following statements. Mark "Agree" if you agree to keep the statement as part of the CTE Research Agenda, or "Disagree" if you believe that this statement should be removed from the CTE Research Agenda. Your opinion and additional comments are important, please feel free to comment, add edits or additional statements to this new round of inquiry in the text boxes provided.

Please return this survey by November 21, 2007.

1. Knowledge Base for Teaching and Learning

	Agree	Disagree
Critical Thinking and Problem Solving	☐	☐
Higher Order Thinking	☐	☐
Experience	☐	☐
Value and Importance of Work-based Learning	☐	☐
Curricula Structure	☐	☐
Teaching Strategies	☐	☐
Motivation, Self-concept, and Individual Difference	☐	☐
Climate of the Classroom	☐	☐
Teacher-learner Interaction	☐	☐
Quality of Instruction	☐	☐
Leadership and Organizational Development	☐	☐
Impact of Career and Technical Student Organizations	☐	☐
Professional Preparation and Competence	☐	☐

	Agree	Disagree
CTE Teacher Education	☐	☐

Additional Opinions, Edits or Comments

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2. Curricula and Program Planning

	Agree	Disagree
Teaching Basic and Academic Skills	☐	☐
Literacy	☐	☐
Integration of Basic Academic Skills	☐	☐
Infusion of Science and Mathematics	☐	☐
Infusion of Communications and Language	☐	☐
Infusion of Social Values	☐	☐
Economics, Entrepreneurship, and Free Enterprise	☐	☐
Success Rate of CTE Entrepreneurs	☐	☐

	Agree	Disagree
Needs of Future Workforce	☐	☐
Employment, Supply - Demand, and Nature of Workforce	☐	☐
Sustainability of Natural Resources	☐	☐
Impact of CTE on Career Satisfaction	☐	☐
Global Market Demands	☐	☐
Student Preparation for Entrepreneurship and Economic Globalization	☐	☐
Affect of CTE on Student Preparation for Workforce	☐	☐

Additional Opinions, Edits or Comments

3. Delivery Methodologies

	Agree	Disagree
Educational Methodologies for Learning and Teaching	☐	☐
Development of Programs of Study	☐	☐
ESL/ELL Learners in CTE	☐	☐
Innovative Instructional Technologies	☐	☐
Integration of Technology into CTE Classrooms and Laboratories	☐	☐
Articulation of Programs Between Secondary Education and Higher Education	☐	☐
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	☐	☐

Additional Opinions, Edits or Comments

4. Program Relevance and Effectiveness

	Agree	Disagree
Best Practices for Implementing Perkins IV	◻	◻
Values and Ethics	◻	◻
Value of Middle School/Junior High Programs	◻	◻
Future CTE Program Content	◻	◻
Policy Development	◻	◻
Faculty and Staff Development	◻	◻
Professional Development of CTE Teachers	◻	◻
Transition to Post Secondary Education	◻	◻
Alignment of Secondary and Post Secondary Standards	◻	◻
CTE Alignment with Economic Development	◻	◻

	Agree	Disagree
Qualitative Results and Impact	☐	☐
Perceptions, Satisfaction, and Retention	☐	☐
Student, Parent Perceptions of CTE	☐	☐
Marketing of CTE for Rigor and Relevance	☐	☐
Evaluation of Teaching/Programs	☐	☐
Program Impacts	☐	☐
CTE Impact on Dropout Prevention	☐	☐
Impact of No Child Left Behind Act on CTE	☐	☐
Impact of CTE on Graduation Rates	☐	☐
Impact of CTE Courses on Student Achievement	☐	☐
Proficiency of CTE Students on Standardized Tests	☐	☐
CTE Alignment with Economic Development Plans	☐	☐
Relevance of CTE in Workforce Investment	☐	☐
Recruitment of CTE Students	☐	☐
Recruitment of CTE Teachers	☐	☐
Recruitment of Alternatively Certified Teachers	☐	☐
Curricula Designs	☐	☐

	Agree	Disagree
Integrating Workforce Standards	⟲	⟲
Efficacy of Career Pathways as a Model	⟲	⟲
Follow-up Program Completers	⟲	⟲
End of Program Assessment	⟲	⟲
Technical Skill Assessment	⟲	⟲
Program Evaluation and Accreditation	⟲	⟲
Retention of CTE Teachers	⟲	⟲
Retention of Alternatively Certified CTE Teachers	⟲	⟲

Additional Opinions, Edits or Comments

5. Accountability

	Agree	Disagree
High Skill, High Wage or High Demand Occupations		
CTE Teacher Preparation	⟳	⟳
Programs of Study	⟳	⟳
High Quality of CTE Teachers	⟳	⟳
CTE Teacher Professional Development	⟳	⟳
Student Enrollment	⟳	⟳
Funding	⟳	⟳
Levels of Performance	⟳	⟳
Industry Credentials for CTE Program Completers	⟳	⟳
Effectiveness of Teacher Preparation Programs	⟳	⟳
Return on Investment by State for CTE	⟳	⟳
Minority, Non-traditional	⟳	⟳

	Agree	Disagree
and Diverse Student CTE Populations Entering High Tech Fields Compared to Non-CTE Students		
Economic Impact of CTE in Community Development	☐	☐
CTE Graduation Rate	☐	☐
Post-Secondary CTE Program Graduates	☐	☐
Jobs that Require Associate Degree or Technical Degree Compared to Bachelor Degree	☐	☐

Additional Opinions, Edits or Comments

Done >>

APPENDIX H

ROUND FOUR SURVEY

Career and Technical Education RESEARCH
LOGIC MODEL
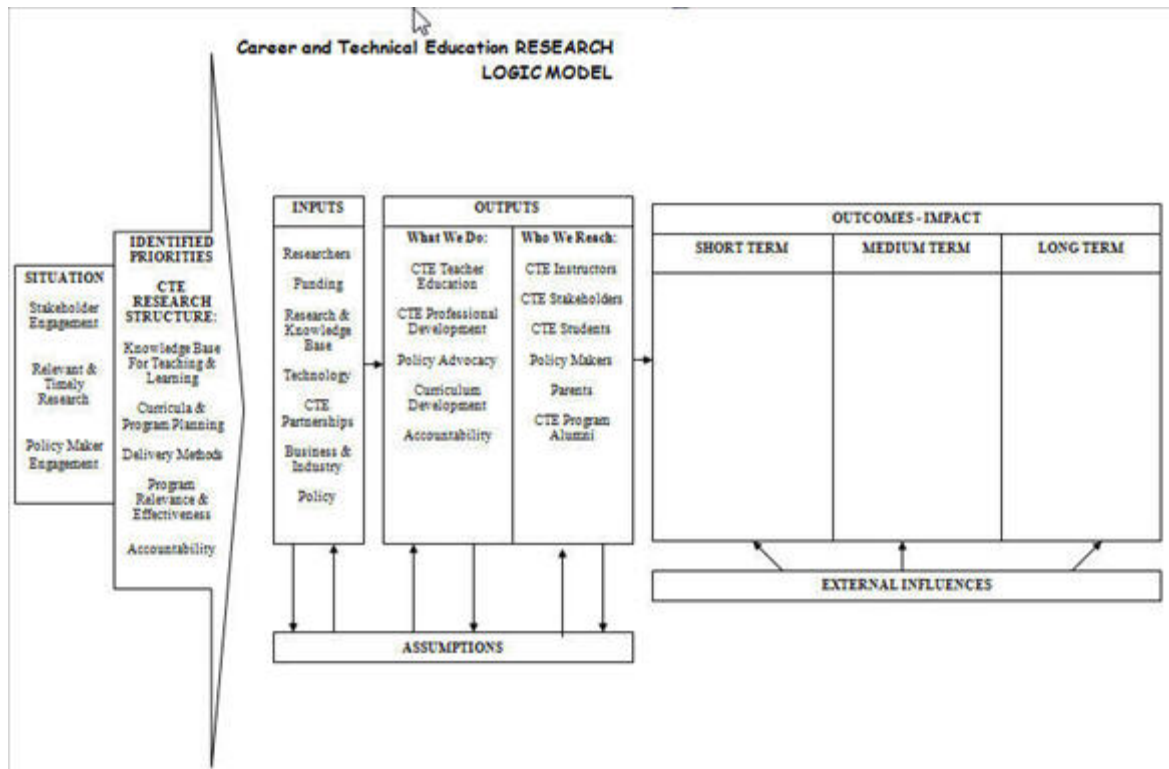
Career and Technical Education Delphi Round Four

1. ROUND FOUR

Welcome to Round Four of the CTE Delphi Study!

This logic model is adapted from Mc Cawley, P.F. (2001) The logic model for Program Planning and Evaluation. Please print the logic model from the following website so that you will have easy access to the logic model.

http://cbi.tamu.edu/Lambeth/logic.html

In this Round, you are asked to identify the Short Term, Intermediate Term, and Long Term research topics according to the list of critical research topics developed during Rounds 1, 2 and 3. Read the five compiled lists of topics carefully, if you feel there needs to be additions, corrections, deletions or edits to any of the research topics or logic model, please feel free to use the text box below. Read each section carefully!

This round will end on February 15, 2008.

1. SECTION ONE KNOWLEDGE BASE FOR TEACHING AND LEARNING
Please rank the following research topics in the order you believe they should be addressed using the following definitions:
Short Term: Should be addressed immediately;1-4 years.
Intermediate Term: Should be addressed in the next 5-10 years.
Long Term: Should be addressed after about 11-20 years.
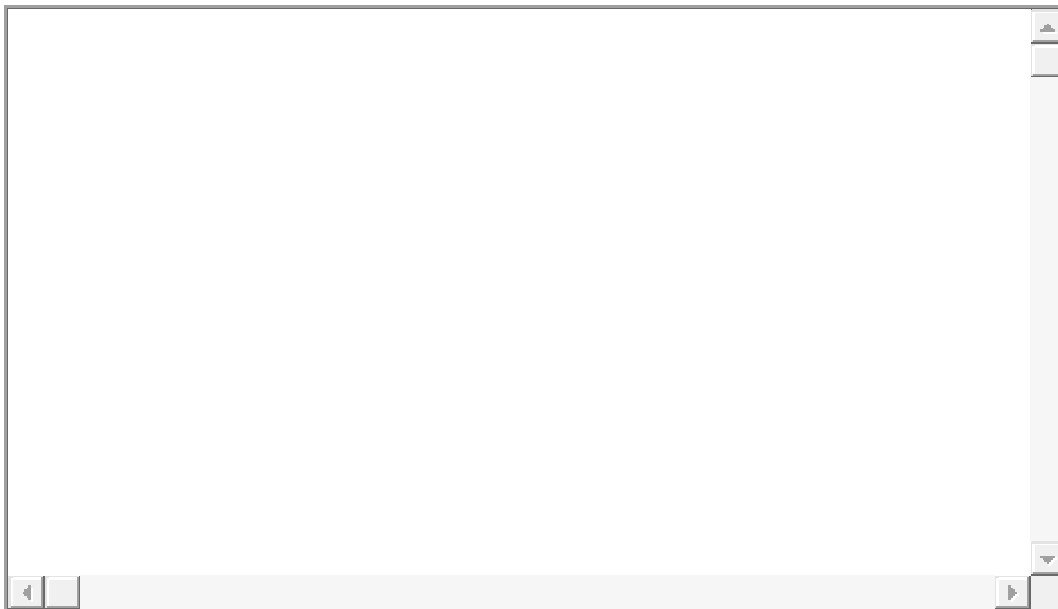
	Short Term	Intermediate Term	Long Term
Teaching Strategies	☐	☐	☐
CTE Teacher Education	☐	☐	☐
Critical Thinking and Problem Solving	☐	☐	☐
Professional Preparation and Competence	☐	☐	☐
Value and Importance of Work-based Learning	☐	☐	☐
Quality of Instruction	☐	☐	☐

	Short Term	Intermediate Term	Long Term
Higher Order Thinking	☐	☐	☐
Leadership and Organizational Development	☐	☐	☐
Teacher-Learner Interaction.	☐	☐	☐

Edits, Additions or Comments

2. SECTION TWO CURRICULA AND PROGRAM PLANNING

Please rank the following research topics in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately;1-4 years.

Intermediate Term: Should be addressed in the next 5-10 years.

Long Term: Should be addressed after about 11-20 years.

	Short Term	Intermediate Term	Long Term
Needs of Future Workforce	☐	☐	☐
Effect of CTE on Student Preparation for Workforce	☐	☐	☐
Infusion of Science and Mathematics	☐	☐	☐
Future CTE Program Content	☐	☐	☐
Infusion of Communications and Language	☐	☐	☐
Employment, Supply – Demand, and Nature of Workforce	☐	☐	☐
Student Preparation for Entrepreneurship, and Free Enterprise	☐	☐	☐
Teaching and Integration of Basic Academic Skills	☐	☐	☐
Global Market Demands	☐	☐	☐
Literacy	☐	☐	☐

	Short Term	Intermediate Term	Long Term
Curricula Designs	◌	◌	◌

Edit, Additions or Comment

3. SECTION THREE DELIVERY METHOD

Please rank the following research topics in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately;1-4 years.

Intermediate Term: Should be addressed in the next 5-10 years.

Long Term: Should be addressed after about 11-20 years.

	Short Term	Intermediate Term	Long Term
Educational Methodologies for Learning and Teaching	◌	◌	◌

	Short Term	Intermediate Term	Long Term
Articulation of Programs Between Secondary Education and Higher Education	◌	◌	◌
Innovative Instructional Technologies	◌	◌	◌
Dual Enrollment Credit Effect on Persistence in Postsecondary Education	◌	◌	◌
Alignment of Secondary and Postsecondary Education Standards	◌	◌	◌
Transition to Post Secondary Education	◌	◌	◌
CTE Teacher Preparation	◌	◌	◌
Integration of Technology into CTE Classrooms and Laboratories	◌	◌	◌
Best Practices for Implementing	◌	◌	◌

	Short Term	Intermediate Term	Long Term
Perkins VI			
Efficacy of Career Pathways as a Model	☐	☐	☐
Marketing of CTE for Rigor and Relevance	☐	☐	☐
ESL/ELL Learners in CTE	☐	☐	☐
Development of Programs of Study	☐	☐	☐

Edits, Additions or Comments

4. SECTION FOUR PROGRAM RELEVANCE AND EFFECTIVENESS

Please rank the following research topics in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately;1-4 years.

Intermediate Term: Should be addressed in the next 5-10 years.

Long Term: Should be addressed after about 11-20 years.

	Short Term	Intermediate Term	Long Term
Impact of CTE Courses on Student Achievement	◻	◻	◻
Professional Development of CTE Teachers	◻	◻	◻
Follow-up of Program Completers	◻	◻	◻
CTE Alignment with Economic Development	◻	◻	◻
Student-Parent Perceptions, Satisfaction and Retention in CTE	◻	◻	◻
Relevance of CTE in Workforce Investment	◻	◻	◻

	Short Term	Intermediate Term	Long Term
Industry Credentials for CTE Program Completers	☐	☐	☐
Impact of Career and Technical Education Student Organizations	☐	☐	☐
Integrating Workforce Standards	☐	☐	☐
Retention of CTE Teachers	☐	☐	☐
Recruitment of CTE Teachers	☐	☐	☐
Faculty and Staff Development	☐	☐	☐
Impact of No Child Left Behind Act on CTE	☐	☐	☐
Recruitment of CTE Students	☐	☐	☐
CTE Alignment with Economic Development Plans	☐	☐	☐

	Short Term	Intermediate Term	Long Term
Recruitment of Alternatively Certified CTE Teachers	☐	☐	☐
Retention of Alternatively Certified CTE Teachers	☐	☐	☐
Policy Development	☐	☐	☐
Jobs that Require Associate Degree or Technical Degree Compared to Bachelor Degree	☐	☐	☐

Edits, Additions or Comments

5. SECTION FIVE ACCOUNTABILITY

Please rank the following research topics in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately;1-4 years.

Intermediate Term: Should be addressed in the next 5-10 years.

Long Term: Should be addressed after about 11-20 years.

	Short Term	Intermediate Term	Long Term
CTE Graduation Rate	⊙	⊙	⊙
High Quality of CTE Teachers	⊙	⊙	⊙
Technical Skill Assessment	⊙	⊙	⊙
End of Program Assessment	⊙	⊙	⊙
Proficiency of CTE Students on Standardized Tests	⊙	⊙	⊙
Return on Investment by State for CTE	⊙	⊙	⊙
Economic Impact of CTE in Community Development	⊙	⊙	⊙
Postsecondary CTE Program Graduates	⊙	⊙	⊙
High Skill, High Wage or High Demand Occupations,	⊙	⊙	⊙

	Short Term	Intermediate Term	Long Term
Minority, Non-Traditional and Diverse Student CTE Populations Entering High Tech Fields Compared to Non-CTE Students			
Levels of Performance	◌	◌	◌

Edits, Additions or Comments

Done >>

APPENDIX I

ROUND FIVE SURVEY

Career and Technical Education Delphi Round Five
Exit this survey >>

1. Proposed National Career and Technical Education Research Agenda

The following questions will represent the summation of the responses from this expert panel. From the original 235 statements, this Round has 46 statements. These statements are divided into 5 Research Problem Areas (RPA), 16 Research Objectives (RO) and 46 Research Activities (RA). The RA's are suggested activities that serve as a baseline for study and are by no means the only research activities for investigation in CTE. This proposed research agenda is designed to be a fluid model.

In this final Round, assign a level of agreement for each section using the following descriptors: "Agree" or "Disagree". A text box is included to add your edits, comments or additions pertaining to each section.

The image at the end of the instrument, portrays the proposed Model for the CTE Research Agenda. The sections are not meant to divide the statements, but to organize them in a model that can be used for future study. The center of the model is the core of CTE and "drives" our thinking and scholarly activities. The inner ring, is classified as the Research Problem Areas, and the outer ring is classified as the Research Objectives. The inner ring is a rainbow of color that shows continuity rather than separation of thought. The outer ring is depicted in shades of gray to depict that all of the

objectives are interchangeable and not separate. Please rate your level of acceptance for the model using the descriptors of "Agree" and "Disagree".

Please return this instrument by April 1, 2008.

1. Research Problem Area: KNOWLEDGE BASE FOR TEACHING AND LEARNING

Research Objective: STRATEGIES

Research Activities:

Critical Thinking
Higher Order Thinking
Quality of Instruction
Teacher - Learner Interaction
Work-based Learning

Research Objective: PROFESSIONAL PREPARATION

Research Activities:

Competence
CTE Teacher Education

Research Objective: LEADERSHIP AND ORGANIZATIONAL DEVELOPMENT

Research Activities:

CTE Student Organizations
Teacher Professional Organizations

	Agree	Disagree
Accept this Section	☐	☐ Disagree

Edits, Additions or Comments

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2. Research Problem Area: CURRICULA AND PROGRAM PLANNING

Research Objective: ACADEMIC INFUSION/INTEGRATION

Research Activities:

Infusion of Communication and Language
Infusion of Math and Science
Integration of Basic Skills
Literacy

Research Objective: CURRICULA DESIGNS

Research Activities:

Needs of Future Workforce

Research Objective: FUTURE CTE CONTENT

Research Activities:

Employment, Supply-Demand, and Nature of Workforce
Entrepreneurship and Free Enterprise
Global Market Demands

	Agree	**Disagree**
Accept this Section	☐	☐

Edits, Additions or Comments

3. Research Problem Area: DELIVERY METHODS

Research Objective: BEST PRACTICES

Research Activities:

CTE Teacher Preparation
ESL/ELL Learners in CTE
Marketing for Rigor and Relevance
Methods

Research Objective: INTEGRATION OF TECHNOLOGY

Research Activities:

Innovative Instructional Technologies

Research Objective: TRANSITION TO POSTSECONDARY EDUCATION

Research Activities:

Alignment of Secondary and Postsecondary Education Standards
Articulation of Programs Between Secondary, Postsecondary and Higher Education
Dual Enrollment
Programs of Study
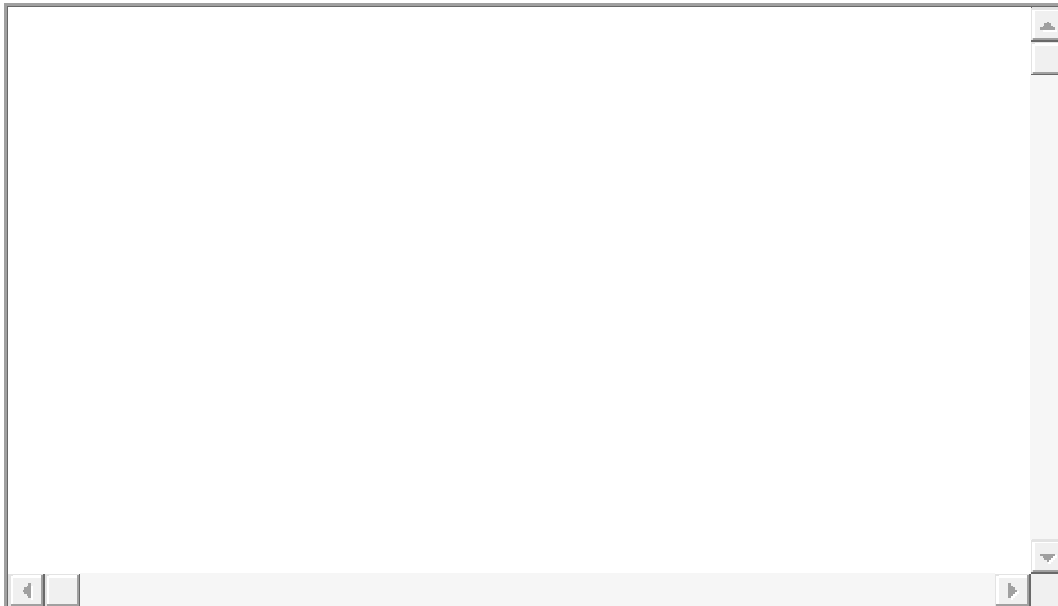
	Agree	Disagree
Accept this Section	◌	◌

Edits, Additions or
Comments

4. Research Problem Area: ACCOUNTABILITY

Research Objective: ASSESSMENT

Research Activities:

CTE Student Graduation Rate
End of Program Assessment
Impact of CTE courses on Student Achievement
Levels of Performance
Proficiency of CTE Students on Standardized Tests
Technical Skill Assessment

Research Objective: ECONOMIC IMPACT OF CTE

Research Activities:

Impact of CTE in Community Development

**High Skill, High Wage or High Demand Occupations
Return on Investment by State for CTE**

Research Objective: QUALITY OF TEACHERS

Research Activities:

**Teacher Standards
Teacher Education**

	Agree	**Disagree**
Accept this Section	☐	☐

Edits, Additions or Comments

5. Research Problem Area: PROGRAM RELEVANCE AND EFFECTIVENESS

Research Objective: FACULTY AND STAFF DEVELOPMENT

Research Activities:

Recruitment and Retention of Alternatively Certified Teachers
Recruitment and Retention of Teachers
Professional Development of Teachers

Research Objective: POLICY DEVELOPMENT

Research Activities:

Alignment with Economic Development
Workforce Investment

Research Objective: RELEVANCE OF WORKFORCE STANDARDS

Research Activities:

Follow-up Program Completers
Industry Credentials for Program Completers
Impact of Federal Education Policy
Parent and Student Perceptions, Satisfaction and Retention

	Agree	Disagree
Accept this Section	☐	☐

Edits, Additions or
Comments

Proposed Research Agenda Model
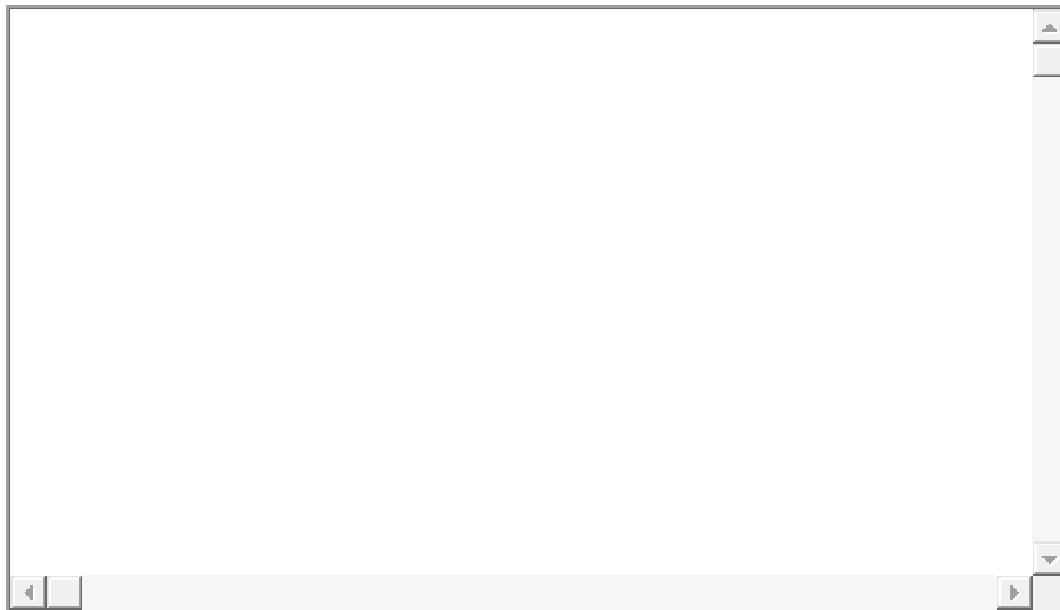
Proposed National Career and Technical Education Research Agenda
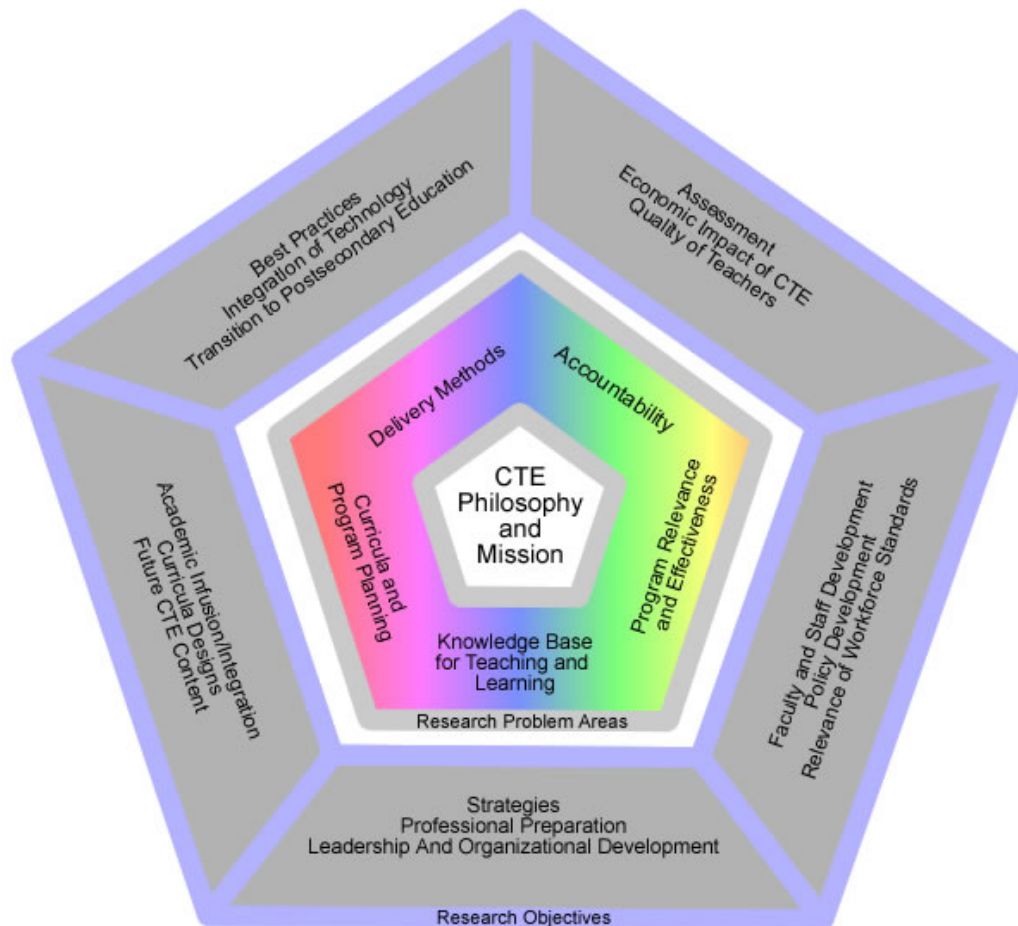
6. This is a proposed model for the CTE Research Agenda. If you have suggestions for changes, additions or comments, feel free to use the text box provided.

	Agree	Disagree
Accept the Model	☐	☐

Edits, Additions or
Comments

Next >>

Career and Technical Education Delphi Round Five

2. CTE Research Logic Model

The following Logic Model represents the results of Round Four. Each statement is classified as a Research Activity from the proposed National CTE Research Agenda. Please rank the following statements in the order you believe they should be addressed over the next 20 years.

CTE Logic Model

Career and Technical Education RESEARCH LOGIC MODEL
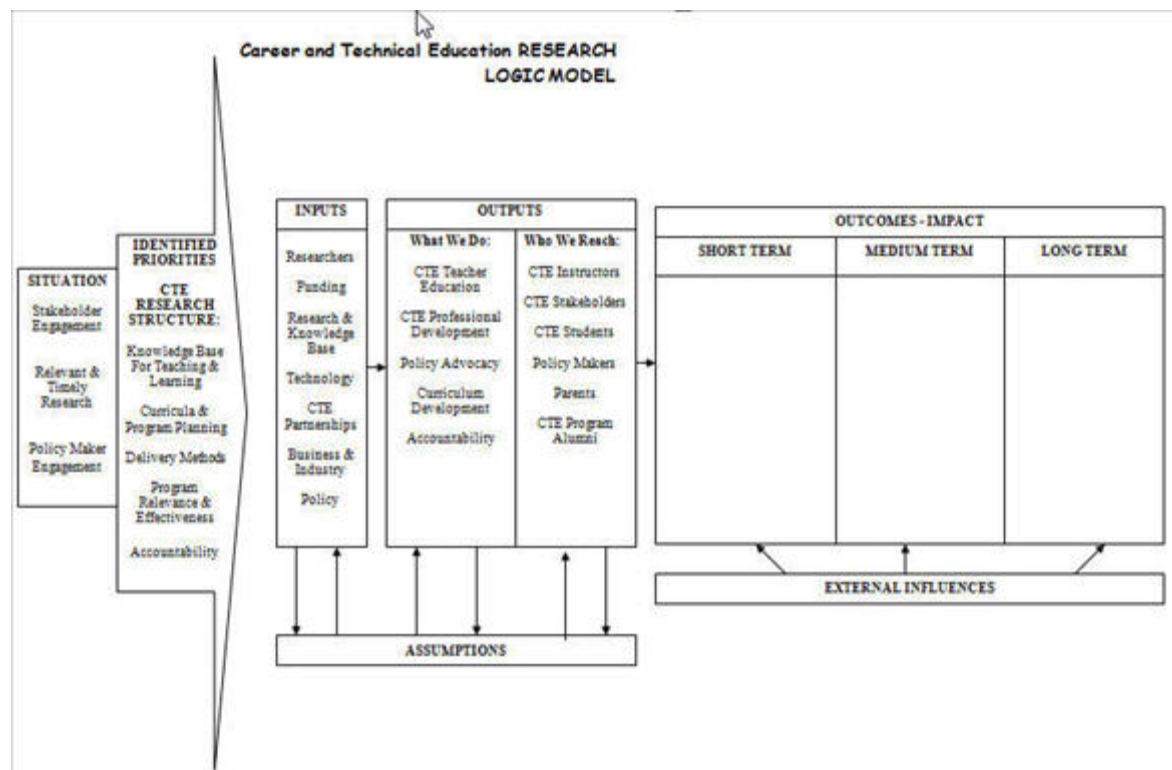
1. Please rank the following research activities in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately: 1-4 years
Intermediate Term : Should be addressed in the next 5 - 10 years. Long Term: Should be addressed after about 11 -20 years.

KNOWLEDGE BASE FOR TEACHING AND LEARNING

	Short Term	Intermediate Term	Long Term
Critical Thinking and Problem Solving	☐	☐	☐
Higher Order Thinking	☐	☐	☐
Quality of Instruction	☐	☐	☐
Teacher - Learner Interaction	☐	☐	☐
Work-based Learning	☐	☐	☐
Competence	☐	☐	☐
CTE Teacher Education	☐	☐	☐
CTE Student Organizations	☐	☐	☐
Teacher Professional Organizations	☐	☐	☐

Edits, Additions or
Comments

2. Please rank the following research activities in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately: 1-4 years
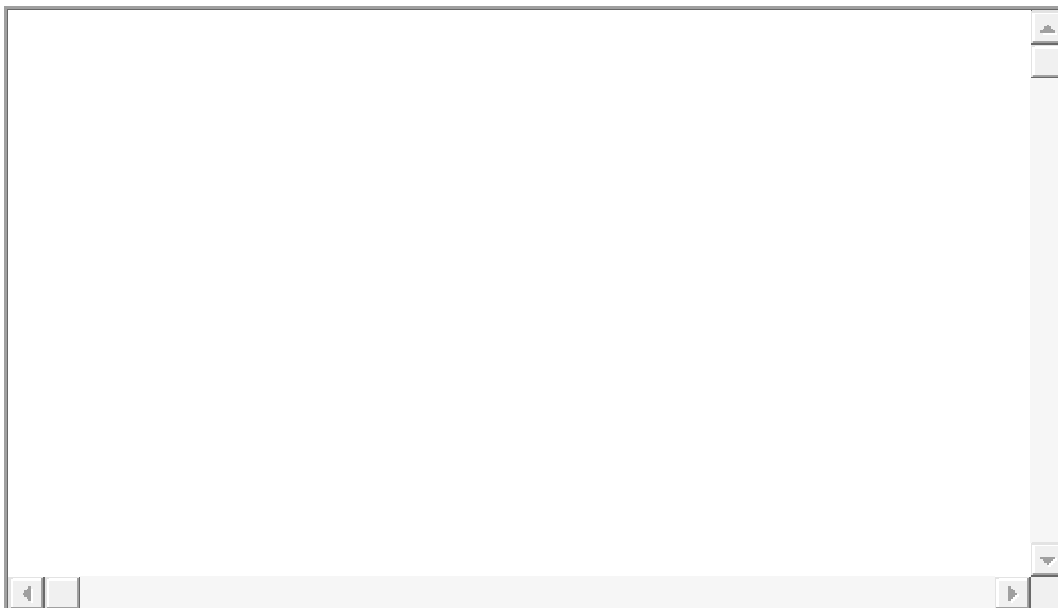**Intermediate Term : Should be addressed in the next 5 - 10 years.**
Long Term: Should be addressed after about 11 -20 years.

CURRICULA AND PROGRAM PLANNING

	Short Term	Intermediate Term	Long Term
Infusion of Communications and Language	☐	☐	☐

	Short Term	Intermediate Term	Long Term
Infusion of Math and Science	⊙	⊙	⊙
Integration of Basic Skills	⊙	⊙	⊙
Literacy	⊙	⊙	⊙
Needs of Future Workforce	⊙	⊙	⊙
Employment, Supply - Demand and Nature of Workforce	⊙	⊙	⊙
Entrepreneurship and Free Enterprise	⊙	⊙	⊙
Global Market Demands	⊙	⊙	⊙

Edits, Additions or Comments

3. Please rank the following research activities in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately: 1-4 years
Intermediate Term : Should be addressed in the next 5 - 10 years.
Long Term: Should be addressed after about 11 -20 years.

DELIVERY METHODS

	Short Term	Intermediate Term	Long Term
CTE Teacher Preparation	☐	☐	☐
ESL/ELL Learners in CTE	☐	☐	☐
Marketing for Rigor and Relevance	☐	☐	☐
Methods	☐	☐	☐
Innovative Instructional Technologies	☐	☐	☐
Alignment of Secondary and Postsecondary Education Standards	☐	☐	☐

	Short Term	Intermediate Term	Long Term
Articulation of Programs between Secondary, Postsecondary and Higher Education	⟳	⟳	⟳
Dual Enrollment	⟳	⟳	⟳
Programs of Study	⟳	⟳	⟳

Edits, Additions or Comments

4. Please rank the following research activities in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately: 1-4 years
Intermediate Term : Should be addressed in the next 5 - 10 years.
Long Term: Should be addressed after about 11 -20 years.

ACCOUNTABILITY

	Short Term	Intermediate Term	Long Term
CTE Graduation Rate	☐	☐	☐
End of Program Assessment	☐	☐	☐
Levels of Performance	☐	☐	☐
Proficiency of CTE Students on Standardized Tests	☐	☐	☑
Technical Skill Assessment	☐	☐	☐
Impact of CTE in Community Development	☐	☐	☐

	Short Term	Intermediate Term	Long Term
High Skill, High Wage or High Demand Occupations	☐	☐	☐
Return on Investment by State for CTE	☐	☐	☐
Teacher Standards	☐	☐	☐
Teacher Education	☐	☐	☐

Edits, Additions or Comments

5. Please rank the following research activities in the order you believe they should be addressed using the following definitions:

Short Term: Should be addressed immediately: 1-4 years
Intermediate Term : Should be addressed in the next 5 - 10 years.
Long Term: Should be addressed after about 11 -20 years.

PROGRAM RELEVANCE AND EFFECTIVENESS

	Short Term	Intermediate Term	Long Term
Recruitment and Retention of Alternatively Certified Teachers	◌	◌	◌
Recruitment and Retention of Teachers	◌	◌	◌
Professional Development of Teachers	◌	◌	◌
Alignment with Economic Development	◌	◌	◌
Workforce Investment	◌	◌	◌
Follow-up Program Completers	◌	◌	◌

	Short Term	Intermediate Term	Long Term
Industry Credentials for Program Completers	☐	☐	☐
Impacts of External Program Standards and Accreditation	☐	☐	☐
Parent and Student Perceptions, Satisfaction and Retention	☐	☐	☐

Edits, Additions or Comments

<< Prev   Next >>

Career and Technical Education Delphi Round Five

3. THANK YOU!

Thank you for your participation in this investigation. I want to be sure that all of the Professional Organizations are properly recognized.

1. Demographics

Name: [   ]

Occupation: [   ]

Professional Organization you represent for this study (please name them all) [   ]

[<< Prev] [Done >>]

APPENDIX J

THE PROPOSED NATIONAL CTE RESEARCH AGENDA

RPA: 1 Knowledge Base for Teaching and Learning

RO 1.1 Instructional Strategies

RA 1.1.1 Critical Thinking and Problem Solving

RA 1.1.2 Higher Order Thinking

RA 1.1.3 Quality of Instruction

RA 1.1.4 Teacher – Learner Interaction

RA 1.1.5 Work-based Learning

RO 1.2 Professional Preparation

RA 1.2.1 Teacher Competence

RA 1.2.2 Career and Technical Education Teacher Education

RA 1.2.3 CTE Leader Preparation

RO 1.3 Leadership and Organizational Development

RA 1.3.1 Career and Technical Education Student Organizations

RA 1.3.2 Teacher Professional Organizations

RA 1.3.3 CTE Administrator Professional Organizations

RPA: 2 Curricula and Program Planning

RO 2.1 Academic Infusion/Integration

RA 2.1.1 Infusion of Communications and Language

RA 2.1.2 Infusion of Mathematics and Science

RA 2.1.3 Integration of Basic Skills

RA 2.1.4 Literacy

RO 2.2 Curricula Designs

RA 2.2.1 Needs of Future Workforce

RA 2.2.2 Work-based Learning

RO 2.3 Future Career and Technical Education Content

RA 2.3.1 Employment, Supply-Demand and Nature of Workforce

RA 2.3.2 Entrepreneurship and Free Enterprise

RA 2.3.3 Global Market Demands

RPA: 3 Delivery Methods

RO 3.1 Best Practices

    RA 3.1.1 Career and Technical Education Teacher Preparation

    RA 3.1.2 ESL/ELL Learners in Career and Technical Education

    RA 3.1.3 Marketing for Rigor and Relevance

    RA 3.1.4 Educational Methods

    RA 3.1.5 Career and Technical Education Student Organizations

    RA 3.1.6 Parent and Student Perceptions, Satisfaction and Retention

RO 3.2 Integration of Technology

    RA 3.2.1 Innovative Instructional Technologies

    RA 3.2.2 Distance Education and Technology

RO 3.3 Transition to Postsecondary Education

    RA 3.3.1 Alignment of Secondary and Postsecondary Education

        Standards

    RA 3.3.2 Articulation of Programs between Secondary, Postsecondary

        and Higher Education

    RA 3.3.3 Dual Enrollment

    RA 3.3.4 Programs of Study

RPA 4: Accountability

RO 4.1 Assessment

RA 4.1.1 Career and Technical Education Student Graduation Rate

RA 4.1.2 End of Program Assessment

RA 4.1.3 Impact of CTE courses on Student Achievement

RA 4.1.3 Levels of Performance

RA 4.1.4 Proficiency of Career and Technical Education Students on

Standardized Tests

RA 4.1.5 Technical Skill Assessment

RO 4.2 Economic Impact of Career and Technical Education

RA 4.2.1 Impact of Career and Technical Education in Community

Development

RA 4.2.2 High Skill, High Wage or High Demand Occupations

RA 4.2.3 Return on Investment by State for Career and Technical

Education

RO 4.3 Quality of Teachers

RA 4.3.1 Teacher Standards

RA 4.3.2 Teacher Education

RPA 5: Program Relevance and Effectiveness

RO 5.1 Faculty and Staff Development

RA 5.1.1 Recruitment and Retention of Alternatively Certified Teachers

RA 5.1.2 Recruitment and Retention of Teachers

RA 5.1.3 Professional Development of Teachers

RA 5.1.4 Recruitment and Retention of CTE Administrators/Local

Directors

RO 5.2 Policy Development

RA 5.2.1 Alignment with Economic Development

RA 5.2.2 Alignment with Federal Education Policy

RA 5.2.3 Workforce Investment

RO 5.3 Relevance of Workforce Standard

RA 5.3.1 Follow-up Program Completers

RA 5.3.2 Industry Credentials for Program Completers

RA 5.3.3 Impacts of External Program Standards and Accreditation

APPENDIX K

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

TEXAS A&M UNIVERSITY
VICE PRESIDENT FOR RESEARCH - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU   979.458.1467
College Station, TX 77843-1186   FAX 979.862.3176
1500 Research Parkway, Suite B-150   http://researchcompliance.tamu.edu

Institutional Biosafety Committee	Institutional Animal Care and Use Committee	Institutional Review Board

DATE: 26-Sep-2007

MEMORANDUM

TO: LAMBETH, JEANEA M

          77843-3578

FROM: Office of Research Compliance

          Institutional Review Board

SUBJECT: Initial Review

Protocol Number:	2007-0575
Title:	The Development of a National Research Agenda for Career and Technical Education
Review Category:	Exempt from IRB Review

The Institutional Review Board (IRB) has determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

TEXAS A&M UNIVERSITY
VICE PRESIDENT FOR RESEARCH - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU	979.458.1467
College Station, TX 77843-1186	FAX 979.862.3176
1500 Research Parkway, Suite B-150	http://researchcompliance.tamu.edu

Institutional Biosafety Committee	Institutional Animal Care and Use Committee	Institutional Review Board

DATE: 18-Oct-2007

MEMORANDUM

TO: LAMBETH, JEANEA M

77843-3578

FROM: Office of Research Compliance

Institutional Review Board

SUBJECT: Amendment

Protocol Number:	2007-0575
Title:	The Development of a National Research Agenda for Career and Technical Education
Review Category:	Exempt from IRB Review

The Institutional Review Board (IRB) has determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

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Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

VITA

Name: Jeanea Marie Lambeth

Address: 507 East Tremaine Avenue, Gilbert, Arizona 85234

Email Address: jmlambeth@cox.net

Education: B.S., Agricultural Education, The University of Arizona, 1990
                 M.A., Agricultural Education, The University of Arizona, 2002

Publications: Lambeth, J. M., Elliot, J., & Joerger, R. (2008). *Where do we go from here? Research foci defined by an expert panel.* Poster session presented at the Western Regional Conference of the American Association of Agricultural Education, Reno, NV.

                 Lambeth, J. M., & Murphrey, T. P. (2008). Virtual simulations for technical training: Opportunities for both domestic and international settings. [Abstract] *Proceedings of the Association for International Agricultural and Extension Education, Costa Rica, 24, 546.*