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

Editor's Note

James P. Greenan
Purdue University

I am pleased to introduce Volume 33 of *Career and Technical Education Research*. Howard D. Gordon at the University of Nevada-Las Vegas will serve as Associate Editor. Additionally, I will be working again with an excellent Editorial Board and dedicated reviewers. The Editorial staff, Editorial Board, and I welcome you to Volume 33, Issue 1.

Janet Zaleski Burns examined those teaching competencies that new trade and industrial (T&I) teachers learn formally and informally. Further, the study determined if a relationship existed between formal or informal learning and teachers' perceived transfer of learning of particular core teaching competencies. The study was based on a solid theoretical foundation that was well supported by the literature and research with respect to formal and informal learning and transfer of learning. The research questions that were posited include: (a) To what extent do new T&I teachers enrolled in an alternative certification program learn the program's core teaching competencies through formal or informal learning? (b) To what extent do new T&I teachers enrolled in an alternative certification program perceive their transfer of learning of the program's core teaching competencies? and (c) What is the relationship between perceived transfer of learning and the extent of informal learning or formal learning for new T&I teachers? The study's findings contribute to theory and practice related to formal, informal, and transfer learning in career and technical education.

Marisa Castellano, Linda Harrison, and Sherrie Schneider investigated the status of secondary career and technical education (CTE) standards systems in the states across the nation. The study's conceptual framework was predicated on the components of educational reform, policy, and legislative initiatives and analysis. The central research questions were: (a) Has the state developed a system of CTE standards? (b) What state funding is available for secondary CTE programs? (c) Have the state academic standards been crosswalked or integrated into CTE courses? (d) Are the CTE standards aligned with the state's postsecondary technical standards? and (e) How does the state ensure that the established standards are reflected in practice? The results impact current and future policy and practice in regard to CTE curriculum, instruction, and teacher preparation.

Marsha Rehm examined high school CTE teachers' dispositional stances toward the challenges, rewards, difficulties, and teaching strategies involved when working with linguistically and culturally diverse students. Specifically, the study identified CTE teachers' perceptions of selected rewards, difficulties, and useful

teaching strategies in culturally diverse classes. The theoretical framework was grounded strongly in the literature and based on a disposition of openness towards cultural differences, special needs, and diversity that informs teaching practice to assist all learners to self-actualize. The major research questions formulated in the study include: (a) To what extent do CTE teachers perceive cultural and language diversity as difficult and rewarding? (b) To what extent do CTE teachers report difficulty in maintaining high academic standards and creating a sense of community in culturally diverse classes? (c) What are CTE teachers' perceptions of outcomes for diversity in terms of success and creativity and frustration and stress? and (d) How do CTE teachers describe their challenges, rewards, and useful teaching strategies in culturally diverse classrooms? The study has strong implications and offers helpful recommendations for working with diverse student populations and the improvement of teaching and learning in CTE.

The articles presented in this issue were well grounded in the literature, provided strong rationales, and were guided by strong theoretical and conceptual foundations. They communicate and, therefore, should resonate well with the research community, policymakers, and practitioners. Accordingly, the studies' findings, implications, and recommendations should impact theory, policy, and practice in the field of CTE.

JPG

Informal Learning and Transfer of Learning: How New Trade and Industrial Teachers Perceive Their Professional Growth and Development

Janet Zaleski Burns
Georgia State University

Abstract

This study is an examination of the extent to which new inservice trade and industrial (T&I) teachers, enrolled in an alternative certification program, engaged in formal learning through structured experiences and informal learning related to 25 core competencies at their school (work) site. The study also investigated the degree to which the new T&I teachers transferred each of the 25 core teaching skills on the job. The study found that while T&I teachers-in-training reported learning most competencies formally, they perceived that they use those competencies learned informally more often than those learned formally. New perspectives are offered regarding the importance of alternative certification programs acknowledging and integrating informal learning in teacher education programs.

Introduction

Trade and industrial (T&I) teachers take on numerous roles to work effectively in schools. Among their many roles they are, like all teachers, program managers, instructional designers, facilitators of learning, and student advisors. To successfully perform these roles, teachers master a myriad of complex skills that fall into at least four categories. Danielson (1996) defined these categories as planning and preparation of instruction, creating a supportive learning environment, engaging the students in instruction, and assuming professional responsibilities outside of and in addition to those in the classroom.

Customarily, new teachers complete formal training programs through coursework, workshops, student teaching, and other structured events before they obtain certification or licensure. These formal training programs are designed to produce explicit knowledge (Knight, 2002). Explicit knowledge can be expressed in formal and systematic language and is shared in forms such as data, scientific formulas, and specifications (Nonaka, Toyama, & Konno, 2001). This knowledge is intended to prepare new teachers to accept all the roles required of them in their classrooms and laboratories. Traditionally, some teacher educators may have assumed that teaching skills are learned through formal programs. However, research

from corporate training settings has suggested that many job skills are learned on the job through more informal methods (Enos, Kehrhahn, & Bell, 2003).

Theoretical Development and Research

Formal Versus Informal Learning

Formal learning is defined as learning based on direct instruction in which learners engage in lectures, discussions, simulations, role-plays, and other structured activities. These activities are based on specific learning objectives and designed to enable students to master predetermined outcomes. Typically, such instruction is removed from the day-to-day work setting (Enos et al., 2003). Prior to the student teaching experience, preservice teachers enrolled in traditional teacher training programs spend the majority of their time engaged in these types of formal learning activities.

In contrast, informal learning is predominately unstructured and occurs outside an institution of learning. Informal learning occurs spontaneously within the context of real work and is not focused on specific learning objectives, nor does it lead to predetermined outcomes (Marsick & Volpe, 1999). Informal learning happens through trial and error, mentoring, networking, and other self-directed learning modes. It is learning composed of action and reflection (Watkins & Marsick, 1992) and is the result of individuals making sense of experiences they encounter during their daily work lives (Marsick & Volpe, 1999).

In recent years, there has been growing criticism of traditional teacher education programs that some critics contend embrace a theoretical approach that leaves graduates ill-prepared for the realities of the classroom (Hartocollis, 2005). Other critics indicate that there is a lack of formal teacher training programs for in-demand content areas such as mathematics, science, foreign language, and special education, as well as a lack of graduate faculty to train teachers in these critical need areas (Committee on Education and the Workforce, 2007). Still, others have noted that current teacher training programs are simply not able to provide the number of teachers needed in American schools. According to Simon (2005):

In the last five years, 500,000 new teachers have taken jobs in the nation's elementary and secondary school classrooms. In the next five, a half million more will be needed as the student population swells and aging boomers accelerate their march to retirement. (p. 27)

The federal No Child Left Behind Act of 2001 called for a qualified teacher in every classroom by the end of the 2005-2006 school year. Challenges such as these have led to a movement towards alternative methods of teacher certification. Currently, 47 states and the District of Columbia offer alternative routes to teacher certification, with programs, such as Teach for America, that detour from traditional training and fast-track prospective teachers into the classroom (Hartocollis, 2005). In

some states, new methods of teacher certification allow prospective teachers to obtain certification by passing a standardized content and pedagogy test, therefore, side-stepping traditional teacher training programs. These alternative teacher education models tend to be mentor-based with learning taking place mostly at the school site and away from colleges of education ([Georgia Professional Standards Commission, 2007](#)).

With these innovations in teacher training, it seems likely that increasing numbers of teachers will earn their teacher certification outside of traditional, formal learning environments and possibly garner the necessary teaching skills through informal learning methods. While research focused on the impact of informal learning in the corporate workplace is on the rise ([Marsick & Volpe, 1999](#); [Marsick & Watkins, 1997](#); [Watkins & Marsick, 2003](#)), there is a lack of investigation regarding its impact in the school environment. Research on informal learning in the corporate environment began appearing in the literature in the 1980s ([Edwards & Usher, 2001](#)). Several studies have suggested that informal learning is pervasive in the workplace ([Enos et al., 2003](#)). Other research has suggested that while some structured workplace learning occurs, informal learning comprises the majority of workplace learning ([Fox, 1997](#); [Leslie, Aring, & Brand, 1998](#); [Lohman, 2000](#)). However, despite the recognition of the part played by informal learning in the corporate environment, little research has been conducted in the area of informal learning in teacher education programs, specifically in the area of T&I teacher education. The literature has revealed only one exploratory study of T&I teachers enrolled in an alternative teacher certification program ([Burns & Schaefer, 2003](#)). The study concluded that T&I teachers learned informally at their school workplace while enrolled in formal university education coursework.

In the [Burns and Schaefer \(2003\)](#) study, provisionally certified T&I teachers reported that they had engaged in informal learning during their first year on the job. The informal learning ranged from practical “how to” techniques for classroom management to more subtle awareness of their particular schools’ cultures. The teachers also reported learning skills informally that helped them maintain their own personal and emotional balance. The informal learning in this study was categorized as instrumental, emotional, and political ([Brookfield, 1995](#)). Instrumental learning covered topics pertaining to classroom management and instructional competence. Skills that aided in preserving personal and mental balance were in the category of emotional learning. Those skills that helped teachers develop an understanding of the underlying culture that forms a school’s political agenda were categorized as political learning. Participants in the study indicated that in their first year of teaching, some form of informal learning had occurred in each of the three categories. The initial study established that although informal learning occurs for new T&I teachers, it is stimulated and augmented through formal learning techniques. Burns and Schaefer found that “while informal learning plays a role in the lives of new T&I teachers,

informal learning is not a substitute for structured training or education, and often learning is much more productive if it is planned and facilitated” (p. 21).

Transfer of Learning

Transfer of learning refers to the extent to which individuals can apply what was learned in one situation to another situation and has been defined as the degree to which trainees apply the knowledge, skills, and attitudes they gain in training for their jobs (Holton, Bates, Seyler, & Carvalho, 1997). Transfer of learning can be categorized in at least two ways, near transfer and far transfer. Near and far are defined and compared by the relationship between the training content and work task as well as by the training design. The concepts of near and far transfer are often discussed in terms of objectives and learning requirements. Clark & Voogel (1985) suggested that the distinction between the types of transfer is related to the types of skills being transferred. They contrasted procedural learning objectives, such as something that can be learned as a step-by-step sequence of behaviors, with conceptual learning objectives, which are related to information and knowledge, solving problems, making predictions, and other intellectual aspects of learning. These distinctions suggest that procedural objectives lend themselves to near transfer while conceptual objectives are more likely to contribute to far transfer.

Specifically, near transfer requires a close match between training and task content, between the training and task outcomes, and an emphasis on specific concepts and skills. Training design encompasses specific concepts, procedures, problem solving, and decision making (Kim & Lee, 2001). Far transfer, in contrast, calls for an approximate match between training and task content, between training and task outcomes, and emphasis on general concepts and skills. Training design encompasses general concepts, broad principles, problem solving rules, and decision making rules (Kim & Lee). Far transfer suggests that by learning the fundamental aspects of something along with specific skills, there is a greater chance for applying that information to more than one setting.

The literature revealed two distinct transfer theories. Goldstein (1993) described the two theories for explaining near and far transfer as the identical elements theory and transfer-through-principle theory. The identical elements theory posits that transfer occurs when the material being acquired during the training is identical to that which the trainee performs in an actual context. According to this theory, transfer is maximized to the extent to which the tasks, equipment, tools, and environment at the training setting are similar to those encountered at the actual work setting. Some research has suggested that the greater the similarity between the two settings, the greater the likelihood transfer of learning will occur (Baldwin & Ford, 1988; Stolovitch & Yapi, 1997).

In contrast, the transfer-through-principle theory proposes that the general principles necessary to learn a task should be emphasized in training to solve

problems related to the transfer task. The transfer-through-principle theory is not highly concerned with the similarities between the training environment design and the actual work setting. Near and far transfer of learning entail different learning requirements. The requirements for near transfer depend mostly on the similarities between training and the task. However, achieving far transfer requires additional considerations. For example, [Laker \(1990\)](#) suggested that far transfer depends on whether the training includes information about the assumptions underlying the skills and behaviors trainees are learning. In addition, a number of studies have suggested that the more trainees practice in different contexts and use novelty in the practice exercises, the more effective is far transfer ([Baldwin & Ford, 1988](#); [Ellis, 1965](#); [Goldstein, 1986](#)). [Clark and Voogel \(1985\)](#) stressed the importance of incorporating a variety of situations and problems to develop and apply skills when trying to achieve far transfer with trainees. Therefore, near transfer enables learners to meet the relatively known predictable conditions of their jobs and apply their knowledge and skills, while far transfer expects learners to comprehend concepts and principles for dealing with situations not always encountered during the training experience.

There has been much attention paid to the transfer of learning in business organizations since they attempt to ensure that trainees will be able to use what was learned during training on their jobs ([Kim & Lee, 2001](#)). However, transfer of learning research has focused primarily on the transfer of skills learned during formal training and has largely ignored informal learning ([Rouiller & Goldstein, 1993](#)). In the field of T&I teaching, no studies have investigated informal learning and its relationship to transfer of learning. This lack of research has left T&I teacher educators with unanswered questions about ways to ensure that teachers apply what they learn informally. Accordingly, this study investigated if the skills learned informally could be more readily transferred than skills learned in formal training contexts, with the idea that skills learned informally are likely to share similar features with transfer tasks in terms of context and content.

Purpose

Trade and industrial teachers enter the classroom as content level experts who may have acquired their expertise through a combination of formal industry training and informal on-the-job experiences. When they make the career transition from industry to teaching, they must acquire professional teaching competencies. Like the content competencies, these teaching competencies may also involve formal and informal learning experiences, particularly because the majority of T&I teachers are employed by schools and begin teaching while simultaneously attending alternative teacher preparation programs. For new T&I teachers, formal teacher training in the area of pedagogy before entering the school workplace is the exception rather than the norm ([Crawford-Self, 2001](#)).

The purpose of this study was to contribute to the body of research regarding informal learning and transfer of learning by focusing on the school workplace rather than the corporate workplace. Secondly, this study was designed to examine those teaching competencies that new T&I teachers learn formally and those competencies they learn informally, and if a relationship exists between formal or informal learning and teachers' perceived transfer of learning of core teaching competencies. The following research questions were, therefore, addressed in this study:

1. To what extent do new T&I teachers enrolled in an alternative certification program learn the program's core teaching competencies through formal or informal learning?
2. To what extent do new T&I teachers enrolled in an alternative certification program perceive their transfer of learning of the program's core teaching competencies?
3. What is the relationship between perceived transfer of learning and the extent of informal learning or formal learning for new T&I teachers?

Methodology

Population and Sample

An "availability sampling" approach (Keppel, Saufley, & Tokunaga, 1991) was used to represent the target population in this study. This approach permitted exploration of the perceptions of a group of T&I teachers who were completers from two separate years of the same year-long alternative teacher training program administered at a major university located in the southeastern United States. The program was considered as alternative because it enrolled T&I teachers who were provisionally certified and teaching in a public high school, although they had not yet fulfilled the state requirements of formal teacher education to obtain a "Clear Renewable" teaching certificate (Georgia Professional Standards Commission, 2007). All of the 48 participants in the study had at least 12 years of education, 2 years of occupational experience, and industry licensing in their field. Additionally, all participants in the study were employed as full-time teachers in the T&I fields of automotive service technology, broadcast and video production, construction, cosmetology, electronic technology, engineering drawing and design, graphic communication, information technology, manufacturing and engineering sciences, professional foods, public safety, or welding technology. The participants' teaching experience in a T&I secondary education program ranged from one to three years. All subjects were adult learners who ranged in age from 28 to 54 years. The sample consisted of 39 males and 9 females. The alternative certification program included 15 semester hours of coursework structured through formal learning experiences on a university campus. An additional nine semester hours consisted of a field practicum in the schools where the teachers were employed. The field practicum was designed to foster reflective practice (Schön, 1996) and informal learning opportunities.

Teaching Competencies

In the field of education, there is a variety of sets of competencies for the various content areas. A general set of competencies applicable for teachers in all disciplines and grade levels has been developed by the Interstate New Teacher Assessment and Support Consortium (INTASC; [Campbell, Cignetti, Melnyzer, Nettles, & Wyman, 2001](#)). The competencies are organized in a set of 10 numbered standards: Standard 1, knowledge of subject matter; Standard 2, knowledge of human development and learning; Standard 3, adapting instruction for individual needs; Standard 4, multiple instructional strategies; Standard 5, classroom motivation and management skills; Standard 6, communication skills; Standard 7, instructional planning skills; Standard 8, assessment of student learning; Standard 9, professional commitment and responsibility; and Standard 10, partnerships (cited by [Campbell et al.](#)).

In an effort independent of the present study, the researcher, who was the primary T&I educator responsible for the alternative teacher certification program, conducted interviews with T&I teacher supervisors and held focus group interviews with T&I teachers to identify essential T&I teaching competencies. Further, the researcher examined lists of both general teacher competencies and state-specific T&I teacher competencies to develop a set of fundamental T&I teaching competencies. This process resulted in a list of 25 distinct core competencies associated with successful teaching in the T&I area. The advantage of using the T&I-specific list was that it enhanced the content validity of measures in a way that a pre-established list of more generic teaching competencies could not. A questionnaire was developed consisting of the 25 core teaching competencies (see [Table 1](#)). The 25 core competencies were selected to address each of the 10 INTASC teaching standards as well as the curriculum standards outlined and required by the Georgia Professional Standards Commission for certification in the area of T&I education ([Georgia Professional Standards Commission, 2007](#)). Additionally, these competencies were specifically associated with successful completion of the alternative T&I teacher certification program in which the participants were enrolled. Because the 25 core teaching competencies were those that the program was designed to address, the participants had opportunities to acquire the competencies through both formal methods in the academic setting of the university and informal methods on the job. This provided them a basis from which to evaluate the extent to which each of the 25 competencies had been learned by either method.

Table 1
Core Teaching Competencies for Trade and Industrial Teachers

| Item | Competency |
|------|---|
| 1. | Write instructional objectives at different levels of cognitive, affective, and psychomotor domains of learning. |
| 2. | Develop lesson plans based on vocational content, county curriculum, and state mandated Quality Core Curricula. |
| 3. | Analyze a learning task and include all prerequisite knowledge as well as all steps. |
| 4. | Set up a grading system. |
| 5. | Maintain records and paperwork. |
| 6. | Develop evaluation techniques and measures. |
| 7. | Implement a classroom and/or laboratory management plan that includes student participation. |
| 8. | Use pro-active classroom/lab management strategies versus reactive strategies. |
| 9. | Recognize ways to involve students through social, interactive, and active participation. |
| 10. | Establish an environment conducive to learning in a vocational program. |
| 11. | Handle discipline problems. |
| 12. | Set up a variety of activities such as whole class discussion, small group discussions, panel discussions, brainstorming, buzz groups, task groups, cooperative learning groups, role-play, case studies, and laboratory experiences. |
| 13. | Develop questions at various learning levels. |
| 14. | Demonstrate basic teaching competencies including transfer, establishing set, managing a block of instruction, and providing closure and transfer at the completion of a block of instruction. |
| 15. | Understand how students learn and how to help students develop intellectually, socially, and personally. |
| 16. | Plan a year long vocational course. |
| 17. | Use various multimedia learning tools in presenting a lesson. |
| 18. | Control and maintain equipment, tools, and supplies in a vocational laboratory. |
| 19. | Display professional teacher behavior. |
| 20. | Examine personal beliefs about teaching and begin to develop a personal teaching philosophy. |
| 21. | Differentiate between best practices and poor teaching practices. |
| 22. | Understand teacher liability and laws relating to teachers. |
| 23. | Establish or maintain a vocational advisory committee. |
| 24. | Understand the relationship between vocational and academic programs. |
| 25. | Implement and provide a safe laboratory environment. |

Extent of Formal Versus Informal Learning

The measure of the extent of formal and informal learning was obtained using a questionnaire that asked participants to rate the degree to which they perceived learning each of the core teaching competencies through formal or informal learning activities. A four-point scale developed and validated by Enos et al. (2003) was used. The response alternatives included: (a) learned only from formal learning activities, (b) learned mostly from formal learning activities, (c) learned mostly from informal learning activities, and (d) learned only from informal learning activities. The current researcher provided a definition of formal and informal learning for the participants as, “formal training means competencies/skills learned in the teacher certification program, another academic course, or a staff development course, while informal means on the job, through trial and error, or by suggestion from other teachers and colleagues.” Prior to this study, the validity of the instrument was established. First, there was an initial screening for content validity by previous T&I teacher program completers, followed by a pilot test with previous program completers who did not participate in the study. The responses to the twenty-five items in the instrument yielded high internal consistency reliability (Cronbach’s alpha = .92). From the raw data, a mean value for each of the items was calculated. In addition, for each core competency item, the percentage of responses that fell in each value of the four-point scale was calculated (see Table 2).

Table 2
New T&I Teachers’ Assessment of the Extent to Which They Learned Core Teaching Competencies through Formal Versus Informal Learning

| Competency | Rating Value | | | | | | | | M |
|----------------------------------|----------------|-----|----------------|-----|----------------|-----|----------------|-----|------|
| | ^a 1 | | ^b 2 | | ^c 3 | | ^d 4 | | |
| | n | % | n | % | n | % | n | % | |
| 1. Write objectives | 32 | .67 | 14 | .29 | 1 | .02 | 0 | .00 | 1.34 |
| 2. Develop lesson plans | 19 | .40 | 19 | .40 | 9 | .19 | 1 | .02 | 1.83 |
| 3. Analyze task | 22 | .46 | 18 | .38 | 8 | .17 | 0 | .00 | 1.71 |
| 4. Develop grading system | 14 | .29 | 20 | .42 | 13 | .27 | 1 | .02 | 2.02 |
| 5. Maintain records/paperwork | 3 | .06 | 9 | .19 | 33 | .69 | 3 | .06 | 2.75 |
| 6. Develop evaluation techniques | 13 | .27 | 30 | .63 | 4 | .08 | 1 | .02 | 1.85 |
| 7. Manage classroom | 25 | .52 | 17 | .35 | 5 | .10 | 0 | .00 | 1.57 |
| 8. Use pro-active strategies | 14 | .29 | 28 | .58 | 5 | .10 | 0 | .00 | 1.80 |
| 9. Involve students | 5 | .10 | 26 | .54 | 15 | .31 | 1 | .02 | 2.24 |
| 10. Set learning environment | 6 | .13 | 27 | .56 | 13 | .27 | 1 | .02 | 2.20 |
| 11. Handle discipline | 3 | .06 | 19 | .40 | 25 | .52 | 0 | .00 | 2.47 |

Table 2 (continued)

| Competency | Rating Value | | | | | | | | <i>M</i> |
|---|----------------|-----|----------------|-----|----------------|-----|----------------|-----|----------|
| | ^a 1 | | ^b 2 | | ^c 3 | | ^d 4 | | |
| | n | % | n | % | n | % | n | % | |
| 12. Use multiple learning modalities | 27 | .56 | 21 | .44 | 0 | .00 | 0 | .00 | 1.44 |
| 13. Access multiple learning levels | 34 | .71 | 14 | .29 | 0 | .00 | 0 | .00 | 1.29 |
| 14. Show basic teaching competencies | 38 | .79 | 10 | .21 | 0 | .00 | 0 | .00 | 1.21 |
| 15. Develop students | 17 | .35 | 24 | .50 | 5 | .10 | 1 | .02 | 1.78 |
| 16. Plan course | 15 | .31 | 17 | .35 | 12 | .25 | 3 | .06 | 2.07 |
| 17. Use multimedia | 9 | .19 | 14 | .29 | 20 | .42 | 4 | .08 | 2.43 |
| 18. Maintain equipment | 4 | .08 | 8 | .17 | 23 | .48 | 12 | .25 | 2.92 |
| 19. Display professional behavior | 5 | .10 | 14 | .29 | 26 | .54 | 3 | .06 | 2.56 |
| 20. Develop teaching philosophy | 11 | .23 | 24 | .50 | 11 | .23 | 2 | .04 | 2.08 |
| 21. Differentiate best teaching practices | 15 | .31 | 27 | .56 | 6 | .13 | 0 | .00 | 1.81 |
| 22. Understand legalities | 22 | .46 | 25 | .52 | 0 | .00 | 0 | .00 | 1.55 |
| 23. Have advisory committee | 24 | .50 | 17 | .35 | 5 | .10 | 1 | .02 | 1.66 |
| 24. Relate T&I to academics | 6 | .13 | 32 | .67 | 8 | .17 | 1 | .02 | 2.07 |
| 25. Provide safe lab | 8 | .17 | 15 | .31 | 21 | .44 | 2 | .04 | 2.38 |

Note. Percentage may not total 100% due to rounding. *N* = 48 for 12 of the 25 items.

^a1 = Learned only from formal learning activities. ^b2 = Learned mostly from formal learning activities. ^c3 = Learned mostly from informal learning activities. ^d4 = Learned only from informal learning activities.

Transfer of Learning

Participants also used a questionnaire to rate the degree to which they applied each of the 25 core teaching skills on the job. Respondents were asked to consider how often they used each core competency skill and to rate themselves on a five-point scale developed by Enos et al. (2003). The response alternatives included: 1, never; 2, rarely; 3, sometimes; 4, very often; and 5, always. The internal consistency reliability estimate of the Transfer of Learning responses was acceptable (Cronbach's alpha = .88). The researcher provided a definition of transfer of learning as, "how often each of these skills is applied in your profession." Participants were asked to consider whether they used the skills on a rare or regular basis. A mean value for each item and the percentage of responses that corresponded to each value on the instrument scale were calculated (see Table 3).

Table 3
New T&I Teachers' Assessment of Their Transfer of Learning of Core Teaching Competencies

| Competency | Rating Value | | | | | | | | | | |
|--------------------------------------|----------------|-----|----------------|-----|----------------|-----|----------------|-----|----------------|-----|----------|
| | ^a 1 | | ^b 2 | | ^c 3 | | ^d 4 | | ^e 5 | | <i>M</i> |
| | n | % | n | % | n | % | n | % | n | % | |
| 1. Write objectives | 1 | .02 | 3 | .06 | 16 | .34 | 24 | .51 | 3 | .06 | |
| 2. Develop lesson plans | 1 | .02 | 0 | .00 | 3 | .06 | 24 | .51 | 19 | .40 | 4.32 |
| 3. Analyze task | 1 | .02 | 1 | .02 | 9 | .19 | 29 | .62 | 7 | .15 | 3.72 |
| 4. Develop grading system | 0 | .00 | 2 | .04 | 1 | .02 | 16 | .34 | 28 | .60 | 4.36 |
| 5. Maintain records/paperwork | 0 | .00 | 0 | .00 | 4 | .09 | 16 | .34 | 27 | .57 | 4.55 |
| 6. Develop evaluation techniques | 0 | .00 | 1 | .02 | 5 | .11 | 21 | .45 | 20 | .43 | 4.36 |
| 7. Manage classroom | 0 | .00 | 3 | .06 | 4 | .09 | 18 | .38 | 22 | .47 | 4.27 |
| 8. Use pro-active strategies | 1 | .02 | 0 | .00 | 5 | .11 | 18 | .38 | 23 | .49 | 4.18 |
| 9. Involve students | 1 | .02 | 0 | .00 | 10 | .21 | 18 | .38 | 18 | .38 | 4.14 |
| 10. Set learning environment | 0 | .00 | 0 | .00 | 2 | .04 | 25 | .53 | 20 | .43 | 4.40 |
| 11. Handle discipline | 0 | .00 | 2 | .04 | 3 | .06 | 16 | .34 | 26 | .55 | 4.55 |
| 12. Use multiple learning modalities | 2 | .04 | 6 | .13 | 12 | .26 | 15 | .32 | 12 | .26 | 3.77 |
| 13. Access multiple learning levels | 1 | .02 | 5 | .11 | 17 | .36 | 19 | .40 | 5 | .11 | 3.27 |
| 14. Show basic teaching competencies | 1 | .02 | 3 | .06 | 7 | .15 | 24 | .51 | 12 | .26 | 3.86 |
| 15. Develop students | 1 | .02 | 1 | .02 | 8 | .17 | 22 | .47 | 15 | .32 | 3.91 |
| 16. Plan course | 3 | .06 | 2 | .04 | 10 | .21 | 18 | .38 | 14 | .30 | 3.64 |
| 17. Use multimedia | 1 | .02 | 1 | .02 | 6 | .13 | 17 | .36 | 22 | .47 | 3.95 |
| 18. Maintain equipment | 0 | .00 | 0 | .00 | 3 | .06 | 15 | .32 | 29 | .62 | 4.55 |
| 19. Display professional behavior | 0 | .00 | 0 | .00 | 0 | .00 | 8 | .17 | 39 | .83 | 4.82 |
| 20. Develop teaching philosophy | 0 | .00 | 3 | .06 | 10 | .21 | 21 | .45 | 13 | .28 | 3.88 |

Table 3 (continued)

| Competency | Rating Value | | | | | | | | | | <i>M</i> |
|---|----------------|-----|----------------|-----|----------------|-----|----------------|-----|----------------|-----|----------|
| | ^a 1 | | ^b 2 | | ^c 3 | | ^d 4 | | ^e 5 | | |
| | n | % | n | % | n | % | n | % | n | % | |
| 21. Differentiate best teaching practices | 0 | .00 | 0 | .00 | 8 | .17 | 23 | .49 | 16 | .34 | 4.32 |
| 22. Understand legalities | 0 | .00 | 5 | .11 | 7 | .15 | 20 | .43 | 15 | .32 | 4.05 |
| 23. Have advisory committee | 2 | .04 | 6 | .13 | 18 | .38 | 13 | .28 | 8 | .17 | 3.59 |
| 24. Relate T&I to academics | 0 | .00 | 2 | .04 | 19 | .40 | 20 | .43 | 6 | .13 | 3.59 |
| 25. Provide safe lab | 0 | .00 | 0 | .00 | 2 | .04 | 11 | .23 | 34 | .72 | 4.82 |

Note. Percentage may not total 100% due to rounding. *N* = 47.

^a1 = Never use this skill. ^b2 = Rarely use this skill. ^c3 = Sometimes use this skill. ^d4 = Very often use this skill. ^e5 = Always use this skill

Procedures

The two survey instruments were distributed to and completed by the participants at the close of the final program seminar for each of the two consecutive years. Potential participants were assured that their decision to complete the questionnaire was entirely voluntary and independent of any grading procedures for the program. Participants were not identified by name on the questionnaires and were also assured that the content of their responses would remain strictly confidential and be reported in aggregate form only. Of the 55 teachers completing the teacher training program over the course of the two-year study, 48 completed all sections of the questionnaires.

Data Analysis

The numerical values of the survey instruments were used to determine whether a respondent had acquired a competency more or less formally or whether a respondent felt he or she was able to apply a competency on a more or less regular basis. The means were calculated to summarize the participants' ratings of the 25 core competencies. The mean values were used to analyze how the respondents believed they had acquired each of the competencies through formal or informal learning methods. Additionally, the respondents' perceptions regarding how they were able to transfer these (formally or informally) learned skills to their professional teaching environments were also analyzed. The relationship of perceived formal and informal learning to perceived transfer of learning was examined using the Pearson product-moment correlation coefficient.

Results

Formal Versus Informal Data

The respondents used a value of 1 to indicate a competency they felt they had acquired only through formal learning activities. They used a value of 4 to indicate a competency they perceived they had learned only through informal methods. Therefore, the lower the mean score, the more formally the respondents, as a group, perceived they had acquired that core competency.

The lowest scoring competencies on the formal versus informal learning questionnaire were items 1, 13, and 14 (see [Table 2](#)). Item 14 (Show basic teaching competencies) yielded the lowest overall value with a mean of 1.21. Item 13 (Access multiple learning levels) revealed a mean of 1.29. The mean for item 1 (Write objectives) was 1.34. The competencies that scored highest on the formal versus informal learning questionnaire were items 5, 11, 17, 18, and 19 indicating respondents tended to feel they had learned these skills largely through informal methods. Item 18 (Maintain equipment) had the highest mean, 2.92. Item 5 (Maintain records/paperwork) had a mean of 2.75, and the mean for item 19 (Display professional behavior) was 2.56. The means for items 11 (Handle discipline) and 17 (Use multimedia) were 2.47 and 2.43, respectively.

Transfer of Learning Data

The rating scale for perceived transfer of learning ranged from 1 to 5, with 5 representing the highest perceived transfer of learning (i.e., “always use this skill”) and 1 representing the lowest (i.e., “never use this skill”). In the transfer of learning survey instrument, items 5, 18, 19, and 25 received the highest ratings (see [Table 3](#)). The highest scoring competencies, items 19 (Display professional behavior) and 25 (Provide safe lab) both had a mean of 4.82. The means for items 5 (Maintain records/paperwork), 11 (Handle discipline), and 18 (Maintain equipment) were 4.55. Items 1, 13, 23, and 24 scored the lowest in perceived transfer of learning. Item 13 (Access multiple learning levels) had a mean of 3.27, the lowest transfer of learning value. The mean for item 1 (Write objectives) was 3.55. Items 23 (Have advisory committee) and 24 (Relate T&I to academics) both had a mean of 3.59.

Relationship Between Formal/Informal Learning and Transfer of Learning Data

The data in this study were treated as interval data, and a Pearson product-moment correlation coefficient matrix was constructed to examine how the variables related to each other in terms of strength and direction. The guidelines were satisfied for the use of parametric procedures by assessing normality in distribution of data for each variable and the linearity between the variables. The statistical null hypothesis tests were set at the $p = .05$ level of significance. The scatterplot in [Figure 1](#) reveals

that teaching competencies learned predominately through informal learning are positively related ($r = 0.67$, significant at $p < .0003$, scatter plot equation is $y = 0.6070x + 2.906$) to transfer of learning.

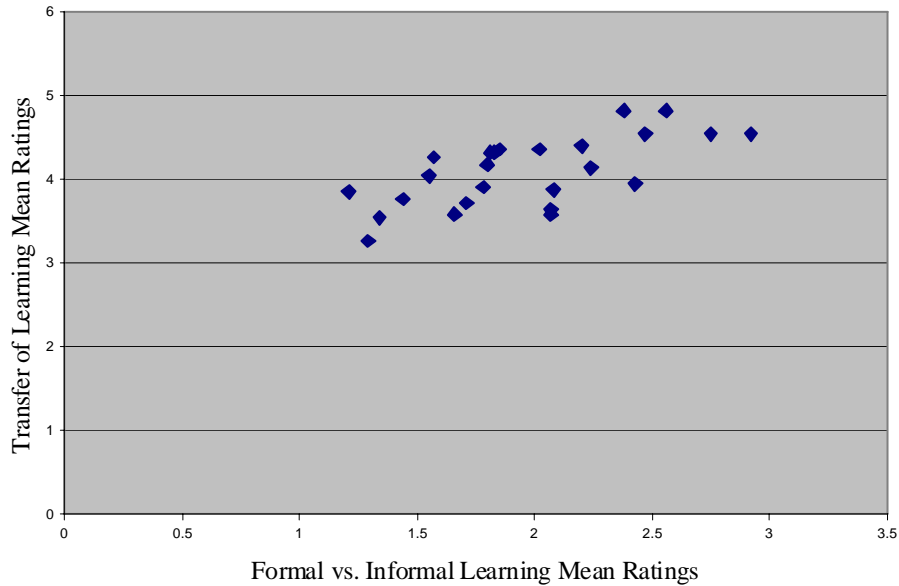


Figure 1. Correlation Between Formal vs. Informal Learning Mean Ratings and Transfer of Learning Mean Ratings.

Discussion and Conclusions

A low score on the formal versus informal learning rating scale indicated that the survey respondents, in general, perceived they had learned the corresponding competency largely through formal learning methods. Both item 1 (Write instructional objectives at different levels of cognitive, affective, and psychomotor domains) and item 13 (Develop questions at various learning levels), which revealed low scores on the formal versus informal questionnaire, are competencies that are theoretical in nature and, therefore, are more likely to be learned in formal settings. Although item 14 (Demonstrate basic teaching competencies including transfer, establishing set, managing a block of instruction, and providing closure and transfer at the completion of a block of instruction) is a less theoretical competency, the wording of this item utilized language specific to the T&I alternative certification program in which the participants were enrolled. It is possible that the phrasing itself may have cued survey participants to rank item 14 as learned in the formal training program even if the respondents had, in fact, learned aspects of it on the job.

Items with high means on the formal versus informal learning rating scale represent competencies that, overall, the survey participants felt they had learned more through informal learning. Examination of the four highest scoring items revealed some possible explanations for the relatively high means. Item 5 (Maintain records and paperwork) and item 18 (Control and maintain equipment, tools, and supplies in a vocational laboratory) both pertain to classroom organization and the maintenance of records or supplies, skills that are more likely to be learned by trial and error than in a formal classroom setting. Item 17 (Use various multimedia learning tools in presenting a lesson) is an instructional skill that may involve technical expertise or the use of program-specific equipment such as interactive whiteboards or computer programs developed for particular T&I fields. When rating this item on the questionnaire, respondents may have considered these specialized tools rather than the use of more generic audio-visual taught in the formal teacher training program. Item 19 (Display professional teacher behavior) relates to school culture and is possibly acquired more frequently through mentoring and modeling, therefore, making it a largely informally learned competency. Item 11 (Handle discipline problems) data may indicate that T&I teachers need more training in the area of classroom management, that the methods of delivering this training need to be improved, or that the challenges of classroom management are diverse and ongoing.

The competencies that received the highest transfer of learning ratings by the survey respondents also suggest closer examination. One of the two items that received the highest transfer of learning rating, item 19 (Display professional behavior) is most likely a result of T&I teachers modeling the behavior of their teacher educators and peers at their school workplace settings. The high transfer of learning mean score for this item suggests that respondents can readily adapt and apply their instrumental knowledge of professional behavior to the school workplace. Similarly, for item 25 (Implement and provide a safe laboratory environment) for item 18 (Control and maintain equipment, tools, and supplies in a vocational laboratory), the T&I teachers are likely to have acquired these competencies in their previous professional lives prior to entering the teaching profession. Thus, they perceived themselves as being readily able to transfer their mastery of these competencies to the school setting. These findings lend support to the theory of far transfer since T&I laboratories are at best an approximate match to the settings the teachers experienced in industry workplaces. Trade and industrial teachers bring their understanding of the fundamental principles of operating a safe work environment and are able to apply this knowledge to their school laboratory settings. Similar to competencies 18 and 19, which received high transfer of learning ratings, item 5 (Maintain records and paperwork) was also perceived to have been learned mostly informally.

The lowest transfer of learning ratings belonged to competencies 1, 13, 23, and 24. Item 13 (Develop questions at various learning levels), which had the lowest

mean, requires a high degree of skill, training, and experience. This competency was addressed and practiced using general content in the T&I teachers' formal training program. Accordingly, this finding suggests that learning transfer might increase by utilizing near transfer of learning with a more content-specific approach to professional training in the area of questioning techniques. For example, automotive teachers should work with automotive content, and cosmetology teachers should work with cosmetology content. Item 1 (Write instructional objectives at different levels of cognitive, affective, and psychomotor domains of learning) is a competency that was extensively threaded through the alternative certification program. Why the T&I teachers perceived that they were not transferring this competency daily through lesson planning and sequencing instruction is worthy of further investigation. Item 23 (Establish and maintain an advisory committee) requires outreach, coordination, and management tasks beyond the realm of the day-to-day classroom setting. Therefore, despite having an understanding of the purpose, organization, and function of an advisory committee, T&I teachers may find it difficult to apply this knowledge given the inherent demands of forming and sustaining an advisory committee. Item 24 (Understand the relationship between vocational and academic programs) is an important competency in the career and technical education environment, and it would be beneficial to investigate how to facilitate transfer in this area.

Research question one asked, "To what extent do new T&I teachers enrolled in an alternative certification program learn the program's core teaching competencies through formal or informal learning?" The results of this study revealed that 13 of the 25 competencies (52%) had mean values greater than 1.20 and less than 2.00, indicating they were perceived as being learned completely or mostly formally. The remaining 48% of the competencies had means greater than 2.00, indicating the respondents felt they had learned these skills mostly informally.

Research question two posited, "To what extent do new T&I teachers enrolled in an alternative certification program perceive their transfer of learning of the program's core teaching competencies?" The study results showed that 100% of the competencies had mean scores of 3.27 or above, indicating at least average ("sometimes use") on perceived transfer of learning on all 25 items. Nineteen of the competencies received mean scores between 3.50 and 4.50; therefore, 76% of the competencies were ranked above average ("often use") on perceived transfer of learning. Only item 13, or 4% of the competencies, ranked in the average ("sometimes use") transfer of learning range. The remaining five items received ratings in the excellent ("always use") transfer of learning range. These relatively high transfer of learning ratings may suggest that when planning alternative T&I teacher training programs, where T&I teachers are already on the job, program designers need to ensure that they are covering critical content. The vital objective of an alternative certification program is to enable teacher trainees to function on their jobs with at least satisfactory proficiency in core teaching competencies.

Research question three examined the relationship between perceived transfer of learning and the extent of informal learning or formal learning for new T&I teachers. The data suggested that competencies learned informally may be used more often. However, there may be several unidentified factors other than the method by which a skill or competency is acquired that may have an affect on transfer of learning. Items 5, 18, 19, and 25, which had the highest mean values for transfer of learning, were also between learned mostly formally to learned mostly informally. Conversely, items 1, 13, 23, and 24, which received the lowest transfer of learning ratings, had scores that skewed towards the formal rating continuum. These findings, while far from definitive, may suggest that competencies learned both in formal and informal settings may lead to higher rates of perceived transfer of learning than those learned strictly through formal methods.

Implications and Recommendations

The results of this study are limited in several ways. First, the relatively small number of teachers in the sample limits generalizability. Secondly, the results were intended to describe only the group of T&I teachers who participated in the study. Therefore, the results offer an understanding of this particular group and some insights about their informal learning. Finally, the study design prevents drawing any inferences concerning cause and effect. This study provided evidence to support the conclusion that informal workplace learning occurs with new T&I teachers. Additionally, the T&I teachers participating in this study indicated, as did those in the earlier study (Burns & Schaefer, 2003), that some form of informal learning occurs during an alternative teacher certification program. The 2003 study used data reconstruction to capture categories of informal learning; the current study respondents reported perceptions of formal or informal learning based on program-specific core competencies.

The results of this exploratory study suggested that new T&I teachers tended to learn the core teaching competencies more often through formal methods than through informal learning activities. These results differed from those of studies conducted with employees in corporate settings. Studies in corporate settings indicated that informal learning was the more prevalent of the two forms of learning (Fox, 1997; Leslie et al., 1998; Lohman, 2000). Perhaps a factor in explaining why teachers reported learning more through formal than through informal methods may be the differences in corporate and school environments. When one considers a teacher's typical workday, it may be vastly different from the standard workday of an employee in a corporate setting. For example, most T&I teachers work alone in their classrooms or laboratories and, for the majority of their day, interact largely with students. Their days are often spent isolated from other teachers or school employees. Conversely, employees in a corporate environment tend to have more interaction with other employees during the course of a day and may even perform their work in

teams or groups. The tenets of social learning and social practice theories have suggested that the limited interaction of teachers with other teachers may restrict their opportunities for informal learning in the workplace. Social learning theory suggests that informal learning is accomplished through social modeling (Bandura, 1986). The tenets of social practice theory (Lave & Wenger, 1991) propose that learning is a social process that occurs through participation in communal work activities that cannot occur in isolation. It is conceivable that there are too few opportunities for social interaction among teachers in the workplace to promote informal learning for the majority of teaching competencies. This situation might be remedied by affording novice teachers opportunities to work collaboratively with veteran teachers, for example, through team teaching or integrated curriculum partnering.

Various other factors could have played a part in explaining the results and may not have been adequately controlled in this study. Factors such as where and how T&I teachers use a particular skill or competency in their workdays may have affected how they viewed the extent of formal versus informal learning. Trade and industrial teachers may have considered competencies that rely on interpersonal skills or those that must be applied in the schoolwork environment on a regular basis as being learned informally, even when some degree of formal learning actually occurs. Competencies unrelated to more familiar industry skills, although acquired informally, may have been viewed as being learned through formal methods. Additionally, the wording of the competency may have prompted respondents to score a competency item higher or lower on the formal or informal end of the rating scale. Complicated sentence structure or new and unfamiliar vocabulary and phrases such as “cognitive, affective, and psychomotor domains” might have skewed a respondent towards the formal end of the scale. Conversely, direct, simple sentences such as “Display professional teacher behavior” might have focused the respondent towards the other, more informal side. In future studies, these factors should be considered in the design of survey instruments.

Additional research is needed to understand the complex role that formal and informal learning play towards the acquisition of teaching skills in T&I teacher education programs. For example, studies should be replicated in other alternative teacher certification programs in T&I and other fields. This study revealed that both methods of learning occurred and suggested that T&I teacher education programs should incorporate activities that facilitate both types of learning experiences. Since informal learning does occur with new T&I teachers, it should stimulate and complement formal learning experiences. To employ informal learning effectively, future research is needed to discover which teacher education competencies are best learned informally. Further, if future teacher education programs rely more heavily on workplace learning, education researchers must investigate how a school’s learning culture and climate affect informal learning. The new T&I teachers in this study, while engaging in informal learning, acquired 52% of the core competencies

in their training program through formal learning methods. Accordingly, the integration of both formal and informal learning could be an effective approach for professional development and personal growth of T&I teachers.

With regard to transfer of learning, this study suggested that competencies learned informally are perceived to be used more often. It seems likely that alternative teacher certification training programs for T&I teachers will continue to be the norm rather than the exception. Therefore, based on the findings, it is suggested that teacher educators develop a more comprehensive understanding of which competencies are more transferable based upon whether they are learned formally or informally. Furthermore, T&I teachers-in-training do acquire competencies informally. Consequently, opportunities aimed at informal learning such as interactions with other teachers in the workplace, observing others, and mentoring should be integrated as part of alternative T&I teacher training programs.

It is recommended that this study be replicated with larger, stratified groups of teachers based on their fields of expertise (e.g., automotive technology, cosmetology, graphic communication), size of student population in teachers' schools, and school setting (i.e., urban, suburban, rural) to determine if differences exist. Additionally, new T&I teachers should be afforded the time and opportunity to reflect upon their informal learning experiences under the direction of professional teacher educators. Further research is desirable in the area of instructional design focusing on near and far transfer of learning in alternative T&I teacher certification programs. Further exploration of T&I teacher training methods that utilize both formal and informal learning activities and tasks is recommended. Trade and industrial teacher educators and teacher educators in other content areas should explore these phenomena in their teacher preparation programs. It is hoped that this study will contribute to the theory base regarding other teacher populations and informal learning. However, teacher educators should use caution in over-reliance on either formal or informal training programs in T&I teacher education.

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State Secondary Career and Technical Education Standards: Creating a Framework from a Patchwork of Policies

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Abstract

Many states are currently working to define secondary career and technical education (CTE) content standards that specify the knowledge and skills students are expected to master in CTE program areas. This study explores the progress and status of states in developing statewide secondary CTE standards systems. An exhaustive online query of CTE standards systems across the 50 states and the District of Columbia was conducted in 2006, proceeded and validated by targeted follow-up interviews with state officials. The results show that Louisiana, Mississippi, North Carolina, and Ohio are at the forefront of CTE standards development in ways consistent with recent federal legislation. The article also describes the relationship between the CTE standards system and other standards systems in each state (e.g., secondary academic standards, postsecondary technical standards). Overall, there is a great deal of variation in the secondary CTE standards systems across states, thwarting cross-state comparisons for both researchers and policymakers.

Introduction

Content standards for career and technical education (CTE), sometimes called skill standards, have long been a part of the policy discussion regarding secondary CTE. Developing skill standards for CTE involves the work and collaboration of industry and education. This study documents the progress and status of secondary CTE standards development across the states.

Spill (2002) articulated a common definition for the term skill standards: “performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace” (p. 3). Spill noted that national skill standards promote education and training consistency as well as worker mobility, because the certificates workers earn are recognized elsewhere. Skill standards are

industry-driven, determined by methodologically appropriate research or analysis, and carefully validated by employers in the region in which they are applied.

In education, standards are important elements of school accountability because standards articulate expectations for student performance. Whether focused on academic or CTE courses, standards clarify expectations for measuring student performance through a sequenced curriculum, so that students either progress to more advanced skill levels or their progression is slowed or stopped if adequate competence is not demonstrated through testing (Rahn, O'Driscoll, & Hudecki, 1999; Wills, 1993).

Conceptual Framework

This study began with the assumption that content standards, whether in academic or CTE subjects, are a component of education reform that changes practice through various policy means, including the development of curriculum frameworks around the standards, providing professional development to teachers so that they can incorporate the standards into their teaching, and requiring that schools be held accountable for student mastery of the standards, usually through assessment (Swanson & Stevenson, 2002). The implementation of standards-based reform necessitates such a broad policy framework.

Content standards in high school were first articulated as a priority and developed for academic subjects. Many state education agencies developed academic content standards in earnest after the publication of *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983), which decried the U.S. education system's inability to prepare young people for work compared to the education systems of competitor nations. Following individual state initiatives, the Improving America's Schools Act of 1994 required states to establish academic content and performance standards and to implement assessments that measured student achievement. By the time of the No Child Left Behind (NCLB) Act of 2001, all 50 states and the District of Columbia already had some type of academic standards and assessment system for their K-12 schools (Goertz, Duffy, & Carlson Le Floch, 2001).

High school CTE has a separate historical development and federal legislative stream from that of secondary academic education. However, the shift towards standards and accountability as policy drivers occurred in CTE as in academic areas. Another influential report, *America's Choice: High Skills or Low Wages* (Commission on the Skills of the American Workforce, 1990), claimed that the nature of work and technology were changing in ways that required more judgment and responsibility on the part of front-line workers. These changes necessitated changes to the constellation of knowledge, skills, and attitudes that entry-level workers needed. This report identified the lack of clear standards in career and technical training as one of several barriers to achieving a highly skilled workforce in

the U.S. Only with a strong system of standards and assessment could academic preparation, CTE, and other workforce development efforts better fit employer needs and expectations.

The subsequent reauthorization of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, the federal legislation supporting CTE, required states to develop a standards system as well as performance measures. At that time, however, compliance with the law was limited to state reports on the progress of the development of such an accountability system. Even so, by 1993, all 50 states reported that they already had or were developing performance measures and standards for secondary CTE. However, the standards varied greatly from state to state (McCaslin & Headley, 1993).

The first reauthorization of federal CTE legislation after the passage of NCLB was the Carl D. Perkins Career and Technical Education Act of 2006 (hereafter, Perkins IV). This law reflected NCLB's strong emphasis on accountability and results. The federal government required states to report on technical skill attainment using assessments aligned with industry-recognized standards where available. Sanctions for failing to satisfy the law's requirements became more specific than in previous Perkins legislation. In addition, Perkins IV required states and localities to provide sustained professional development, integrate related academic subject matter, and to align with postsecondary programs, all consistent with the policy framework of standards-based education.

Problem Statement

As with academic education, there has been a shift in emphasis to more standards-driven policies in CTE. This new direction for CTE, in which students must demonstrate mastery of rigorous industry standards, is in line with current educational trends and with public expectations (Lynch, 2000). However, little detail is known about the CTE standards systems across the states: the extent of their alignment with secondary academic standards and postsecondary technical standards, and how states monitor the implementation of their CTE standards policy. As a first step in examining this new direction and its impact on practice, the extent to which standards exist at the state level needs to be determined. This study, therefore, documented the status of secondary CTE standards systems as the era of Perkins IV began.

Research Questions

The main purpose of this study was to describe what is known about the secondary CTE standards system of each state, as a first step to conducting research on whether and how standards-based reform has changed practice in secondary CTE programs. A broad set of research questions guided the study and were examined in

each state (Castellano, Harrison, & Schneider, 2007); only a subset of those questions are presented and include:

1. Has the state developed a system of CTE standards?
2. What state funding is available for secondary CTE programs?
3. Have the state academic standards been crosswalked or integrated into CTE courses?
4. Are the CTE standards aligned with the state's postsecondary technical standards?
5. How does the state ensure that the established standards are reflected in practice?

Methodology

In order to explore the progress and status of states in developing secondary CTE standards systems, the study's design included searches of state departments of education (DOE)¹ Web site content for information on each state's CTE standards system. The results of the searches were then validated through targeted follow-up interviews with state officials.

Data Collection

The target population consisted of the 50 states and the District of Columbia. Most states with CTE standards systems have posted the standards for each program area online. After the online resources for each state were exhausted, the state CTE directors were contacted to set up appointments for interviews. Some state directors made referrals to other specialists in the agency or included those specialists in the interviews. An official from each participating state was interviewed, focusing on the information still missing for each state but also verifying the Web site content that had been gathered.

Throughout the summer and fall of 2006, the team continued conducting Web searches of state DOE Web sites and conducting interviews with state CTE officials. Despite repeated attempts, it was neither possible to interview nor to include two states (i.e., Alabama and New Jersey).

Validity and Reliability

The validation of the data collected occurred in two ways. First, the descriptions of the secondary CTE standards systems were compared to the most

¹ In some states, CTE is not a part of the K-12 state DOE: it is either located in a separate agency dedicated to CTE, housed in a postsecondary education agency, or part of the state workforce development agency. However, for simplicity, the relevant agency is referred to as the DOE.

recent literature for consistency (Klein & Charner, 2005; MPR Associates, Inc. & Academy for Educational Development, 2005). Most of the information that was gathered, however, was more recent than this literature. Accordingly, a random subset of states was assigned to more than one researcher and outcomes were compared (Mechur Karp, Bailey, Hughes, & Fermin, 2005). Only minor inconsistencies were found and it was concluded that the collected information was valid.

The interviews with state officials served to validate and clarify the accuracy of the information found online. The officials provided detail and context on the actual implementation of the standards system, providing a different type of validity. In addition to this validation, a random subset of nine (18%) state summaries were sent to the interviewees as a check on accuracy. While some state representatives made minor changes to the summaries, it was determined that the summaries had not been incorrect, although some were incomplete or perhaps unclearly worded. One example of the kind of change that a state contact made involved the state technical endorsement that students may earn in New York state. The state contact noted that in addition to passing three parts of a technical endorsement assessment (i.e., written examination, project, and demonstration of technical skills), students must also pass the five Regents exams in academic areas in order to earn the New York technical endorsement.

Reliability was addressed in the beginning phases of the analysis. During data collection, each of the three study team members was assigned approximately one-third of the states. During data analysis, each member was responsible for one-third of the questions. In this way, each of the team members examined certain details for all states. Inconsistencies sometimes led team members to the source of the information (either the Web site or the state contact). This process served as a reliability check.

Data Analysis

By the end of the data collection period, 49 of the 51 states (including the District of Columbia) had been completed. The 49 states were categorized into three groups: A, B, and C. Group A (30 states) had completed or nearly-completed statewide standards systems. Group B (11 states) consisted of states in the process of developing their statewide standards systems or with incomplete, unmaintained, or alternate statewide standards systems (i.e., competency lists). The cutoff for assigning a state to Group A or B was the breadth of information available. If there were few answers to the interview questions, the system was not sufficiently developed to be in Group A. States in Group C (8 states) did not have statewide standards systems; however, these states were not devoid of CTE standards. In some cases, the state mandated that local agencies develop local CTE standards and in other cases, local agencies did so voluntarily. If a state had many sets of locally-

developed standards, information was not gathered on all of them. The analysis was restricted to statewide standards systems.

In order to analyze the data, notes from each state's Web search and interview were synthesized into state summaries. Excel spreadsheets were created for each question. The states were listed along with their responses to the question. These responses were then standardized as much as possible across states without changing any answers. The first question provided descriptive information on the existence and status of the state standards systems, and, once copied onto the spreadsheets for the remainder of the questions, it became a major sorting tool. The spreadsheets for the remaining questions were first sorted by state group (i.e., A, B, or C), and then summarized into tables.

Findings

The information reported is like a snapshot from a specific period in time. Some of the details could be out of date, particularly for states that were in the process of developing their standards systems during the study. The passage of Perkins IV during the period of this research accentuated the transitory nature of the findings, because states were in flux both anticipating and then responding to new mandates. However, the information remains useful for researchers and policymakers interested in understanding the current status of the states in developing CTE standards systems.

There was a great deal of variability in the types of standards systems developed or being developed across the 50 states and the District of Columbia. The states' responses to the queries are summarized in text and tabular form. More detail is provided on states that reported doing something different from most other states in that regard.

Description of Statewide Secondary CTE Standards System

Of the 48 states and the District of Columbia contacted, 30 reported that they had a statewide secondary CTE standards system (see [Table 1](#)). These states represent Group A. Eleven states were either in the process of developing or had partially developed such a system. These states comprised Group B. Group C consisted of 8 states that did not have a statewide CTE standards system, although they did have local CTE standards. All of the findings are presented in terms of these three groupings.

Group A: States with a statewide standards system. Thirty states reported having a statewide secondary CTE standards system in place. Of course, these systems look quite different from one another. For instance, some of these states have had CTE standards (or some previous version) for decades (e.g., Florida, Ohio, Virginia, West Virginia), while others began to develop them in the 1980s or 1990s,

or more recently (e.g., Kansas, Missouri, Utah). In some states, the CTE standards are part of a comprehensive accountability system including academic and employability standards (e.g., Kentucky, Massachusetts, Ohio).

Table 1
State Groupings With Respect to Statewide Secondary CTE Standards Systems

| <i>Group A states^a</i> <i>n = 30</i> | <i>Group A states^a</i> <i>(continued)</i> | <i>Group B states^b</i> <i>n = 11</i> | <i>Group C states^c</i> <i>n = 8</i> |
|--|---|--|---|
| Arizona | New Hampshire | Georgia | Alaska |
| Arkansas | New York | Hawaii | Colorado |
| California | North Carolina | Idaho | District of Columbia |
| Connecticut | Ohio | Illinois | Maryland |
| Delaware | Oklahoma | Maine | Michigan |
| Florida | Oregon | Nevada | Minnesota |
| Indiana | South Carolina | New Mexico | Montana |
| Iowa | Tennessee | North Dakota | Pennsylvania |
| Kansas | Texas | Rhode Island | |
| Kentucky | Utah | South Dakota | |
| Louisiana | Virginia | Vermont | |
| Massachusetts | Washington | | |
| Mississippi | West Virginia | | |
| Missouri | Wisconsin | | |
| Nebraska | Wyoming | | |

Note. The sample consisted of the 49 states (including the District of Columbia) that responded to the telephone interview.

^aGroup A states have complete or nearly complete statewide standards systems. ^bGroup B states are in the process of developing a statewide standards system or have an unmaintained system.

^cGroup C states have either mandated that local agencies develop standards or local agencies have done so voluntarily.

Group B: States with an incomplete statewide standards system. Table 1 lists the 11 states in Group B, which were either in the process of developing a statewide CTE standards system or had an alternate statewide system. For instance, Georgia and Hawaii were revamping their CTE programs to align with academic standards revisions and were approximately one-third completed at the time of the data collection. Maine planned to implement national standards; however, there were various sets of national standards available for many program areas, and local agencies were free to choose from among these standards. North Dakota had anticipated completion dates for its remaining program areas posted online. New Mexico had created some CTE standards and forwarded them to educators for comment. In Nevada, standards development is an ongoing process. They had developed a system of standards at the program area level, but found that this did not

provide sufficient guidance. The goal became to develop standards for every CTE course. Rhode Island appeared to be the least far along among the states in Group B, reporting that they were at “the very early stages” of creating a CTE program approval process that would have standards embedded within it. South Dakota was in the process of creating or updating all of its CTE standards, making the exact status of the system difficult to discern.

Idaho did not have a legally-adopted standards system for CTE. Idaho had program standards that specified a curriculum for many course sequences, and those included competency profiles and task lists. However, according to the state director, these competency lists were not referred to as standards. Furthermore, the competencies either were not complete, not thorough, outdated, or otherwise not used in some program areas.

Illinois had created an Occupational Skills Standards Credentialing Council in the late 1990s, and it developed standards for several CTE program areas. However, political issues and government downsizing resulted in the Council being discontinued in 2005. The skill standards it created are still available, but there is no further movement at the state level to continue developing additional statewide CTE standards.

Vermont is similar to Idaho in that it had competency lists that were old, not used consistently, and not maintained. The state was beginning to convert from competencies to standards, with the hope that by moving to broader standards, there would be less need for updating than with the more specific, detailed competencies. The state planned to focus on higher-order skills and leave many of the details to local curriculum.

Group C: States with a local as opposed to statewide standards system.

The states in Group C had locally developed CTE standards but did not have a statewide system. For instance, Michigan, Minnesota, and Pennsylvania had mandated that local agencies develop or adopt CTE standards.

Both Alaska and Maryland have some state-developed standards, but local districts can create or select others. In Alaska, there has not been any legislative authority to develop statewide standards. Maryland required that local agencies include standards in their CTE programs, but the state did not mandate which standards. In addition, Maryland developed its own model CTE programs that are standards-based. When local agencies implement these model programs, known as “Fast Track” programs, they are automatically approved.

The states of Colorado and Montana did not have statewide systems of CTE standards. Local agencies have developed standards on their own in some cases. The only statewide system in Montana is a set of workplace standards, but these are generic to all CTE program areas. Colorado is currently beginning the process of developing a statewide system, but many districts have developed their own local

standards. Finally, the District of Columbia eliminated its vocational education system in the 1990s and a new system has not been developed to replace it.

States with Ongoing Categorical State Funding for CTE

All states receive federal Perkins funding supporting CTE. However, it funds only approximately 5% of most states' secondary CTE expenditures. Most CTE funding comes from state sources. Some states allocate funding to secondary CTE through what is called categorical (i.e., specifically targeted) funding, while other states provide more general K-12 education funding to local education agencies which then distribute the funds among many local programs including CTE. As noted by Klein (2001), determining whether a state CTE funding source is ongoing or not can be difficult because states also provide grants or supplements for CTE activities, thus providing targeted but inconsistent funds. The contacts assisted in the classification of each state with respect to state CTE funding.

Of the 30 states in Group A, 22 reported that they provided ongoing categorical state funding for secondary CTE programs (see Table 2). No information was collected about the amount of state funding provided, but several state officials attributed the development of the CTE standards system to a steady source of funding. However, it must be noted (see Table 2) that 9 of the 11 states in Group B also received ongoing categorical state funding, yet they have not fully developed a CTE standards system. This finding suggests that ongoing categorical state funding can assist a state to develop its CTE standards system, but it is not a sufficient condition. Clearly, standards development and a statewide system for its implementation requires investments of time and money.

Alignment of the Secondary CTE Standards System with Postsecondary Technical Standards

The extent of alignment between a state's CTE standards system and postsecondary education and training programs was also examined. Twelve of the 30 states in Group A reported that they had a statewide postsecondary technical standards system in addition to their secondary standards system (see Table 3). Of these 12 states, 10 had aligned the two systems. Kentucky and Nebraska both indicated that they were working towards this goal. Two other states, Delaware and Utah, reported that they had aligned secondary CTE standards in some program areas with relevant baccalaureate programs as well. Finally, two states (Florida and Ohio) had no distinction between secondary and postsecondary standards, they are simply all CTE standards.

Table 2
States with Ongoing Categorical State Funding for CTE

| Group A states ^a n = 22 of 30 | Group A states ^a (continued) | Group B states ^b n = 9 of 11 | Group C states ^c n = 5 of 8 |
|---|--|--|---|
| Arizona | Ohio | Georgia | Alaska |
| Connecticut | Oklahoma | Hawaii | Colorado |
| Florida | South Carolina | Idaho | Michigan |
| Indiana | Tennessee | Illinois | Montana |
| Iowa | Texas | Maine | Pennsylvania |
| Kansas | Utah | North Dakota | |
| Louisiana | Virginia | Rhode Island | |
| Massachusetts | Washington | South Dakota | |
| Mississippi | West Virginia | Vermont | |
| Missouri | Wisconsin | | |
| North Carolina | Wyoming | | |

Note. The sample consisted of the 49 states (including the District of Columbia) that responded to the telephone interview.

^aGroup A states have complete or nearly complete statewide standards systems. ^bGroup B states are in the process of developing a statewide standards system or have an unmaintained system. ^cGroup C states have either mandated that local agencies develop standards or local agencies have done so voluntarily.

Table 3
Group A States with Postsecondary CTE Standards and Their Alignment to Secondary CTE Standards

| States that have a statewide postsecondary technical standards system n = 12 of 30 | States that have aligned secondary and postsecondary standards n = 10 of 12 |
|---|--|
| Arkansas | Arkansas |
| Delaware | Delaware |
| Florida | Florida |
| Kentucky | -- |
| Louisiana | Louisiana |
| Mississippi | Mississippi |
| Nebraska | -- |
| North Carolina | North Carolina |
| Ohio | Ohio |
| Oklahoma | Oklahoma |
| Texas | Texas |
| Utah | Utah |

Note. The sample consisted of the 30 states in Group A, that is, those states that have complete or nearly complete statewide standards systems.

Alignment of Secondary Academic Standards with CTE Programs

The integration of specific state academic standards into CTE courses and coursework is called crosswalking. States identify the academic skills addressed in each CTE program area, then these skills become an explicit part of the curriculum. Therefore, the purpose of crosswalking is to demonstrate the academic foundations of CTE. While some might argue that the time expended on academic skills takes away from the time needed to master the skills of the CTE program area, most CTE program areas do incorporate important foundational academic skills. In the current climate of strong accountability for academic achievement, high school program areas that contribute to academic achievement may be more highly valued than others.

An example of crosswalking would be welding students in Louisiana who were learning and following safety and inspection procedures from manuals and other texts. While learning in a CTE context, these students were also meeting academic standards, such as the following English Language Arts standard: “Interpreting complex texts with supportive explanations to generate connections to real-life situations and other texts” (Louisiana Department of Education, n.d., p. 67).

Eighteen of the 30 states in Group A and 4 of the 11 states in Group B had crosswalked their academic standards to their CTE courses. Interestingly, some states that had not even completed their CTE standards development had already crosswalked academic standards to CTE courses. Table 4 shows which states had crosswalked their academic standards to their CTE programs.

Table 4
States That Have Crosswalked Their Secondary Academic Standards to Their CTE Programs

| Group A states ^a <i>n</i> = 18 of 30 | Group A states ^a <i>(continued)</i> | Group B states ^b <i>n</i> = 4 of 11 |
|--|---|---|
| Arkansas | Nebraska | Georgia |
| Arizona | New Hampshire | Nevada |
| California | New York | North Dakota |
| Delaware | North Carolina | Vermont |
| Kansas | Ohio | |
| Kentucky | Texas | |
| Louisiana | Virginia | |
| Mississippi | Washington | |
| Missouri | Wisconsin | |

Note. The sample consisted of the 41 states (including the District of Columbia) in Groups A and B.
^aGroup A states have complete or nearly complete statewide standards systems. ^bGroup B states are in the process of developing a statewide standards system or have an unmaintained system.

Ensuring that the CTE Standards are Reflected in Practice

Part of the policy framework for standards-based education is the need for student assessment. The contacts were asked how the states ensured that the standards were reflected in practice. The officials could have more than one response. The most common response ($n = 19$) was that assessment was or was intended to be the primary means by which states would ensure that the standards indeed guided local practice (see Table 5).

Table 5
States Using Assessment or Professional Development to Ensure Standards are Used in Practice

| Assessment ensures standards implementation ($n = 19$ states) | | |
|--|-----------------------------|-----------------------------|
| Group A states ^a | Group B states ^b | Group C states ^c |
| $n = 12$ of 30 | $n = 4$ of 11 | $n = 3$ of 8 |
| Connecticut | Hawaii | District of Columbia |
| Florida | Maine | Maryland |
| Kentucky | Rhode Island | Pennsylvania |
| Louisiana | Vermont | |
| Massachusetts | | |
| Mississippi | | |
| North Carolina | | |
| New York | | |
| Ohio | | |
| Oklahoma | | |
| Utah | | |
| West Virginia | | |
| Professional development ensures standards implementation ($n = 12$ states) | | |
| Group A states ^a | Group B states ^b | Group C states ^c |
| $n = 7$ of 30 | $n = 1$ of 11 | $n = 4$ of 8 |
| California | Nevada | Colorado |
| Connecticut | | Maryland |
| Massachusetts | | Minnesota |
| Missouri | | Montana |
| Nebraska | | |
| South Carolina | | |
| Wisconsin | | |

Note. The sample consisted of the 49 states (including the District of Columbia) that responded to the telephone interviews. States could report more than one process.

^aGroup A states have complete or nearly complete statewide standards systems. ^bGroup B states are in the process of developing a statewide standards system or have an unmaintained system. ^cGroup C states have either mandated that local agencies develop standards or local agencies have done so voluntarily.

Of those 19 states, 10 states were using assessments at the time of the data collection (Connecticut, Kentucky, Louisiana, Massachusetts, Mississippi, New York, North Carolina, Ohio, Utah, West Virginia). These assessments varied widely, from end-of-program assessments (Kentucky) to end-of-course assessments (Utah), from online assessments (West Virginia) to hands-on demonstrations (New York), and from state-developed exams (Utah) to state-specific vendor-developed exams (Connecticut). The remainder of the 19 states (District of Columbia, Florida, Hawaii, Maine, Maryland, Oklahoma, Pennsylvania, Rhode Island, Vermont) planned to include assessment as part of their standards system but had not done so at the time of the interviews.

Professional development was, along with site visits, the next most frequently mentioned means of ensuring that the standards were implemented in practice. The theoretical and policy framework for this study suggested that standards-based reform required connecting teacher preparation to student standards. In 12 states, professional development was the primary or only means of ensuring implementation of CTE standards (see [Table 5](#)). Connecticut, Maryland, and Massachusetts reported that both assessment and professional development were used to implement their CTE standards policy.

Synthesis of Findings

This examination of the development of state CTE standards systems in ways consistent with Perkins IV included variables such as state funding, alignment with other standards systems in the state, and whether the state uses assessments to ensure standards implementation. These categories are found in [Table 6](#).

The analysis began with the 30 states in Group A, which consists of the states with completed or nearly completed statewide standards systems. Of those, 22 provided ongoing categorical state funding for CTE, which probably helped these states accomplish the massive task of developing the CTE standards system. Similarly, it is certain to assist these states to implement Perkins IV mandates. Fewer states ($n = 18$) had crosswalked their academic standards to their CTE programs, although these states represented more than one-half of the Group A states. Crosswalking is important because Perkins IV requires reporting of academic achievement using the state's NCLB assessment. If states outline which academic standards are addressed in CTE courses and programs, teachers are more likely to incorporate those standards and students are more likely to work on those standards and satisfy them.

Only 10 of the 30 states in Group A had aligned their CTE standards with postsecondary technical standards. As noted earlier, in two states (Florida, Ohio), there was only one set of CTE standards that covers both secondary and postsecondary education. But the most common situation was that the postsecondary systems had not yet developed statewide technical standards. Several state secondary

Table 6
Summary of States with Complete or Nearly Complete Statewide Standards Systems

| Group A states | Ongoing categorical state funding provided | Academic standards crosswalked to CTE | Standards aligned with postsecondary technical standards | Assessment ensures implementation of standards |
|----------------|--|---------------------------------------|--|--|
| | <i>n</i> = 22 of 30 | <i>n</i> = 18 of 30 | <i>n</i> = 10 of 30 | <i>n</i> = 11 of 30 |
| Arizona | X | X | | |
| Arkansas | | X | X | |
| California | | X | | |
| Connecticut | X | | | X |
| Delaware | | X | X | |
| Florida | X | | X | |
| Indiana | X | | | |
| Iowa | X | | | |
| Kansas | X | X | | |
| Kentucky | | X | | X |
| Louisiana | X | X | X | X |
| Massachusetts | X | | | X |
| Mississippi | X | X | X | X |
| Missouri | X | X | | |
| Nebraska | | X | | |
| New Hampshire | | X | | |
| New York | | X | | X |
| North Carolina | X | X | X | X |
| Ohio | X | X | X | X |
| Oklahoma | X | | X | X |
| Oregon | | | | |
| South Carolina | X | | | |
| Tennessee | X | | | |
| Texas | X | X | X | |
| Utah | X | | X | X |
| Virginia | X | X | | |
| Washington | X | X | | |
| West Virginia | X | | | X |
| Wisconsin | X | X | | |
| Wyoming | X | | | |

Note. The sample consisted of the 30 states in Group A, that is, those states that have complete or nearly complete statewide standards systems.

officials noted this, saying that the community and technical colleges in their states were “very resistant to standards,” or they had “just recently discovered CTE standards” or had “not taken as strict a stance” on standards, or were simply “not as

standards-driven” as secondary education. Such attitudes among some postsecondary boards or institutions can be a hindrance to one of the goals of Perkins IV: the linking of secondary and postsecondary CTE into a seamless system.

The 10 states that reported alignment across secondary and postsecondary standards are making progress towards providing seamless, standards-based CTE from secondary to postsecondary education. Other states reported “hundreds” of articulation agreements spanning secondary and postsecondary education; however, sometimes a state lacked an overarching organization for community or technical colleges, making statewide postsecondary standards development challenging.

Eleven Group A states reported that they used assessment as the means of ensuring that CTE standards were being implemented. This allowed these states to objectively monitor student achievement of CTE standards. These 11 states have an advantage over other states with respect to Perkins IV mandates, particularly regarding its requirement that states use valid and reliable measures to assess the technical skill achievement of their CTE students. Perkins IV states that core indicators of performance must, among other things, measure “student achievement on technical assessments that are aligned with industry-recognized standards, if available and appropriate” (Perkins IV, §113).

As indicated in [Table 6](#), four states (Louisiana, Mississippi, North Carolina, and Ohio) appeared to be the most advanced in their development of a CTE standards system with respect to the variables presented. These states appear in every column of the table, representing important variables in light of the Perkins IV legislation. Three other states came close to being in every column, but missed by one: Texas does not require CTE student assessments, and Oklahoma and Utah have not crosswalked their academic standards to CTE. The set of state CTE standards systems remains a work in progress. However, most states are in Group A. This synthesis has shown that many if not most of the states could be said to be progressing towards goals that align well with the federal vision in Perkins IV.

Conclusions and Discussion

The data and information in this study may be useful to both federal and state government officials interested in improving CTE by implementing standards-based reform. The results of this study can certainly inform future federal evaluation activities, provide states with information about other states’ efforts and strategies, and more fully describe the CTE standards landscape for researchers in the CTE field and beyond.

This study has established a baseline of information about state progress in developing CTE standards. It has presented several areas that pose challenges while moving forward into the Perkins IV era. However, CTE has already made a unique contribution to education by bringing industry input into secondary coursework

through CTE standards.² This is the end result of the activity that began after the publication of the commission reports cited previously, which decried the disconnect between school and the larger economy. A national set of structures has been developed to bring the education and industry sectors into greater alignment, and this could not have occurred in academic subjects or any other part of the high school curriculum except CTE. Industry has always assumed an advisory role for CTE programs. Currently, however, standards and accountability, the language of academic subjects and NCLB, have been brought to bear on CTE. While it may seem obvious that industry would align more easily with CTE than with traditional academic subjects, this tends to get lost in discussions of the relative importance of various curricular areas present in high schools. At a time when high school program areas are being examined for their contribution to secondary education, CTE provides unique and important added value to the high school experience. The challenge now, with the development of standards systems and the passage of Perkins IV, is to move towards greater accountability and comparability in CTE without adding so many mandates that CTE can no longer provide that added value.

The results from this study provide a snapshot regarding the status of each state's secondary CTE standards system. There was a great deal of variation in the types of standards systems developed or being developed across the 50 states and the District of Columbia. This variation appears to be driven by each state's unique philosophies, policies, and practices.

Most states (30 of 51) have developed a statewide CTE standards system. The others were either in the process of developing statewide standards or have a locally developed standards system. Louisiana, Mississippi, North Carolina, and Ohio were at the forefront with respect to ongoing categorical state CTE funding, academic and postsecondary technical standards integrated with secondary CTE standards, and the use of CTE technical assessment measures, followed by Oklahoma, Texas, and Utah.

In other states, some of the dimensions that were examined are likely to present challenges in their ability to satisfy the requirements of Perkins IV. For instance, in many states, secondary and postsecondary education agencies have historically operated with surprisingly little communication with each other. Few states had crosswalked their academic standards to CTE programs. Similarly, only a small number of states use technical skill assessments to measure student technical proficiency gained from CTE course taking. Presumably the number of states responding to these mandates will increase, but incentives might be needed to motivate states to move away from approaches undertaken before the details of Perkins IV were revealed.

² Thank you to Neil Knobloch for this insight.

Policy Recommendations and Directions for Future Research

The variation in CTE standards systems across the country thwarts cross-state comparisons. There are advantages to standardizing the CTE standards (and assessments to the extent feasible) across states. For example, students moving across state lines would encounter similar expectations in CTE programs. Additionally, Perkins monitoring would become much easier. Further, differences in outcomes across states could more easily be measured because there would be some comparability. However, the reality is that the states have invested time and money in developing their systems and may be resistant to revisiting and changing their CTE standards systems merely to standardize them across states. Some states that were in the process of developing their standards systems reported that they were modeling their standards after other state systems. Still other states have created new systems to respond to their specific needs, contributing to the variation.

It is unlikely that the federal government could “standardize the standards” across states to have comparable accountability systems. Perkins funding provides only a small amount of the total support for CTE compared to what most states and localities expend, so there is currently little incentive to change state practices that required great effort to develop. The best course of federal action may be to monitor and help states collect valid and reliable data during the early years of Perkins IV, examine those data, and then determine the next steps. Just as some states are finding to be the case in academic subjects, voluntarily aligning secondary academic education across states has benefits ([Achieve, 2008](#)). Perhaps states will recognize that similar benefits may accrue if they align CTE standards more closely across states as well. In short, many challenges remain to creating a more national system of secondary CTE accountability.

There are many avenues for future research. For example, to increase understanding of how standards-based CTE reform is being developed in the states, it would be useful to investigate the other policy elements of reform such as curriculum frameworks, professional development around the curriculum and standards, and student assessments. Although there has been little systematic work on these topics, the passage of Perkins IV should drive both practice and research in these areas.

The data presented in this study could be further analyzed to discover more about the current state of CTE standards in the U.S. Research could continue to follow the development of the systems, because so many are still under development. As states begin to complete their CTE standards systems, a more stable baseline of information should become available.

There are fruitful avenues for research on the topic of CTE funding and its relationship to developing secondary CTE standards in accordance with Perkins IV. As noted, the states varied as to whether they provided ongoing categorical state funding for CTE. Future research could monitor states that direct fewer resources to secondary CTE. Such work could determine whether continued inadequate funding

impedes success in these states. Such work could also identify states that appear to satisfy Perkins IV mandates with less funding compared to other states, and learn lessons from them that can help all states.

In states where the standards systems are completed and being implemented, studies could be designed to determine if the standards are having an effect on student learning. This study has laid the groundwork to allow other researchers to identify states that have completed standards systems and that could participate in such a study of student outcomes. Teacher professional development, attitudes, and practices could be examined in such a study as well.

Finally, now that the standards systems have been documented, relationships can be explored and promising practices can be identified. Perhaps states in which secondary and postsecondary CTE standards and programs are aligned have more students continuing to postsecondary education than states without such alignment. All states could benefit from further research into promising practices with respect to the myriad of issues in CTE standards development.

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Career and Technical Education Teachers' Perceptions of Culturally Diverse Classes: Rewards, Difficulties, and Useful Teaching Strategies

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Abstract

The purpose of this study was to identify CTE teachers' perceptions of selected rewards, difficulties, and useful teaching strategies in culturally diverse classes. The sample was comprised of 41 trade and industrial, business technology, and family and consumer sciences teachers who taught students from 30 cultural backgrounds. The data were analyzed in light of a theory of openness of disposition and using descriptive statistics, the chi-square test, and content analysis. Language and cultural differences posed challenges to teachers, with language differences slightly more challenging. Maintaining high standards was somewhat more difficult than building community, but teachers generally perceived success with both challenges. Culturally diverse classes were rated significantly more rewarding and creative than problematic and conflict-ridden. Teachers used visual aids, handouts, demonstrations, hands-on projects, and cooperative learning as teaching strategies. While the results generally reflected positive beliefs among CTE teachers, there were some indications that further professional development in multicultural education is warranted.

Background of the Study

Senior high school students vary widely regarding cultural backgrounds, racial and ethnic identities, and even languages spoken, leading to culturally diverse career and technical education (CTE) classrooms across the nation (Adams, Sewell, & Hall, 2004; Rehm, 2004). In 1998, African American high school students earned the highest (4.3 credits) and Asian students earned the fewest (3.2) number of vocational credits. Hispanic, Native American, and White students averaged 4.0 credits. Additionally, there were differences in the programs chosen. For example, African American students were more likely to concentrate in health and food service and Hispanic students were more likely to concentrate in agriculture. Students with limited English proficiency (LEP) averaged 3.2 vocational credits (Silverberg, Warner, Fong, & Goodwin, 2004). Furthermore, there is a mismatch of demographic characteristics between the largely white teacher population (75.4%) and the widely diverse student population (Florida Department of Education, 2005, 2008).

Career and technical education teachers face a number of challenges related to understanding the complexities of cultural diversity among their students. At the

same time that most teachers want to succeed with their students, they often possess only a superficial understanding about varying cultural contexts and lack knowledge about how to respond appropriately (Banks, 1996, 1997). Many teachers equate “cultural difference” with “cultural deficiency,” a stance that typically leads them to stereotype students as having problems to “fix” and may lead to less satisfaction and sense of success in teaching (Gitlin, Buendía, Crosland, & Doumbia, 2003; Gutiérrez & Rogoff, 2003).

Although CTE teachers “have always faced the challenge of educating students with diverse needs and abilities” (Reese, 2005, p. 15), there is limited empirical research on how rewarded or stressed they feel in terms of addressing cultural issues that affect their students’ work knowledge and skill development. One example of a potentially challenging work issue is that fundamental CTE concepts of “work” and “career” have varying meanings and degrees of salience in different cultures. Business and industry traditions in the United States foster competition and reward independence; whereas, other cultures favor cooperation and reward loyalty to the group (Yopp, 1993).

Another challenge involves communicating with students who speak first languages other than English. High stakes testing works against students who do not speak English proficiently or understand the nuances of American culture (Fear-Fenn, 1993; Wonacott, 2000). Career and technical education teachers face special challenges in providing fundamental work-related information because citizens with limited English proficiency (LEP) often suffer the lowest wages, lowest levels of vocational skills, and highest rates of unemployment (Friedenberg, 1995). Teachers might find it difficult to help LEP students learn the complicated material demanded by industry standards and acquire the conceptual understanding needed to fully participate in the economic system (Samper & Lakes, 1994).

Career and Technical Education teachers also play a key role in ensuring that students of diverse backgrounds can work together and demonstrate teamwork skills while maintaining their individuality (Austin, 1999; Yopp, 1993). However, the complexities of cultural values quite naturally lead to conflicts and disagreements, which can render team cohesion difficult in the daily life of the classroom (Desai, 2000; Pierce, 1993). Tensions in meaning between different cultural groups must be negotiated sensitively, reconfigured into common goals, resolved by participants who share power, and used for creative innovations (Schreiber, 1996). More knowledge regarding teachers’ sense of success in the challenges they face such as resolving conflict and promoting cooperation, maintaining high standards, and generally meeting the needs of students with linguistic and cultural differences would be valuable so that CTE can continue to advance productive work in a pluralist economic system.

Theoretical Framework

According to Banks (1996), a teacher's *positionality* or perceptions, attitudes, beliefs, and normative frames of reference is a significant quality that shapes the environment and outcomes of culturally diverse classrooms. Garmon (2004) found that the most important feature predicting a teacher's success with culturally diverse students is a disposition towards openness, appreciation of differences, and eagerness to engage in new experiences. A disposition is defined as "the tendency or propensity for responding in specific ways to particular circumstances" (Eberly, Rand, & O'Connor, 2007, p. 31). Therefore, this study is based on a theory that emphasizes a disposition of openness towards cultural differences that consistently guides caring actions in pursuit of human flourishing (Fowers & Davidov, 2006).

Dispositions of openness and positive tendencies to appreciate others are important to a thriving dynamic of multiculturalism in any classroom. More specifically, openness includes awareness, sensitivity, and respect for others' cultures. It involves fascination, interest, and delight in cultural differences. A disposition of openness encompasses authentic emotions and well-meaning motivations over manipulative or selfish goals. It becomes beneficial in that a teacher continues to pursue information for understanding, affirmation of individuals, and socially just action "out of a genuine, abiding interest in cultural matters" (Fowers & Davidov, 2006, p. 591).

Openness to difference entails numerous benefits. It enhances self-exploration concerning personal values, biases, limitations, and strengths by contrast with multiple other views. Openness allows questioning the adequacy of presumptions, clarifying our commitments, and courageously facing and overcoming our biases (Fowers & Davidov, 2006). As individuals acquire the virtue of openness as a disposition, sensitivity and other qualities that connect people to each other begin to permeate their actions as a meaning system and matter of habit (Eberly et al., 2007).

In practical terms, CTE teachers with a genuine openness in cultural matters are different than those teachers who grudgingly cope with cultural diversity. For example, flexibility in using responsive teaching strategies is one of many forms of interacting well with students. Teachers with a disposition of openness would more likely use strategies intended to bring different cultural perspectives into the classroom dynamic and workforce, attempt diverse approaches to meet common goals, and teach in a way that enable students to flourish. Dispositions will affect the process of accommodating individual differences, communicating with culturally and linguistically different students, building a sense of community, and facilitating student achievement (Eberly et al., 2007; Fowers & Davidov, 2006). The dispositions of CTE teachers are likely to influence either a rewarding and positive classroom experience or a difficult and negative classroom experience. In an increasingly pluralistic educational system and workforce, the openness of the CTE teacher will be even more important in the future.

Review of the Literature

Although cultural diversity has not been given as much scholarly attention in CTE as it has in academic education (Rios, 1992), several empirical studies and reports on classroom experiences have indicated that CTE teachers are well aware of cultural issues. A survey by Adams and Hall (2000) showed that business and marketing education teachers reflected positive attitudes toward equal opportunities for all students, multicultural values, and the need for CTE to be representative of a wide variety of cultures. However, approximately 10% of those surveyed viewed cultural diversity as a negative force in society and disagreed that CTE needed to change to reflect diverse students.

Another survey by Adams et al. (2004) reported mostly positive attitudes among family and consumer sciences teachers, however, less than one-half of the respondents indicated that they would likely change their teaching methods to support cultural diversity and almost one-third experienced uncomfortable feelings with cultural diversity. These findings differed from those of another survey of family and consumer sciences teachers in which 90% had changed their teaching methods, and more than 70% had adapted instruction and time for assignments, grouping of students, how they communicated and interacted with students, and grading/testing (Rehm & Allison, 2006). One interesting aspect of the study is that the 83 respondents taught students from 37 different cultural backgrounds and who spoke 19 languages in addition to or instead of English. Given that these teachers seemed immersed in cultural diversity in a vivid way, they likely were faced with an imperative and direct need to adapt.

One of the key attributes of successful workplaces and CTE classrooms is that they assume the form of a rich community emerging from dynamic, productive, and supportive relationships. Career and technical education teachers sometimes must adapt their interpersonal approaches regarding communication, interaction, and cooperation. As Fuller (2003) noted, teachers are challenged to weigh a “dizzying pastiche of cultural communities against the persisting importance of shared and unifying values” (p. 22). Career and Technical Education teachers need to help students learn to work together as future citizens because diverse customers, employees, and markets are the keys to workplace and economic success for all persons (Pierce, 1993). However, building community among students with divergent traditions can be challenging (Goodwin, 1997; Kleinfeld, 1998; Lesko & Bloom, 1998).

Career and Technical Education teachers can successfully deal with interpersonal challenges by creating environments for mutual learning, modeling respect for all students, and tapping into the unique possibilities of inclusion and diversity (Allison & Rehm, 2006; Banks, 1997). Training and support can improve their abilities to succeed with multicultural education (Bell, 1997). For example, a longitudinal study of agriculture and family and consumer sciences student teachers reported that a planned practicum focused on cognitive, affective, and behavioral

proficiencies in culturally diverse settings made a notable impact on participants' perceptions of teacher-student relationships. The directed experience and analysis improved recognition of personal bias, the ability to recover from cultural mistakes, and the use of alternative assessments, all actions that can improve relationships with diverse students. Schoolwide partnerships that integrate academic and vocational curriculum, include employers with culturally diverse environments, and create diversity-themed projects appear to support individual teachers' growth in understanding multiculturalism (Blassingame, 2000; Mischel, 2005; Trybus & Li, 1998).

Another multicultural issue that challenges CTE teachers is how to deliver instruction, while simultaneously respecting differences and avoiding deficit thinking so students achieve high standards (Fuller, 2003). Students from non-majority cultures do not always have the linguistic background or contextual understanding to do well on standardized tests of achievement and traditional indicators of success (Austin, 1999; Pierce, 1993). A number of alternative strategies have been suggested to assist such students learn fundamental information. Some strategies include: (a) use materials and role models from students' cultures to assist in their understanding, (b) adopt cooperative learning to enable students to help each other learn, (c) use small group projects and demonstrations to satisfy different learning styles, and (d) adopt alternative methods of assessment to allow students to demonstrate their abilities in various ways (Fear-Fenn, 1993; Rehm & Allison, 2006).

Research has identified principles that enhance the learning of students with LEP. Teachers can supplement CTE class content with language instruction, use visuals and graphic organizers to illustrate meanings, use case studies for cultural context, and incorporate hands-on projects that showcase skills and processes (Banks, 1997; Friedenber, 1995; Jennings & Smith, 2002; Kleinfeld, 1998; Platt, 1996; Wonacott, 2000). Each teacher faces a unique challenge to identify appropriate instructional options relevant to particular students, find additional resources, and bring students of varying language skill levels into the life of the classroom.

In summary, existing trends and studies have indicated that CTE teachers in the twenty-first century must approach their teaching with sensitivity to students from diverse linguistic and cultural backgrounds, build cooperative and dialogical skills, teach essential knowledge to students with various levels of proficiency with English, and maintain industry and educational standards. Although these challenges can seem daunting, individuals and the nation will benefit if teachers assume them with awareness and understanding. Career and Technical Education is poised for an opportunity to make an important impact on the vocational and personal success of individuals from many backgrounds, but it would be helpful to know more about the dispositions of CTE teachers toward diversity. Specifically, little is known about how satisfied or frustrated CTE teachers are in attempting to teach LEP and culturally diverse students, building community, maintaining standards, and adapting teaching strategies.

Purpose of the Study

The purpose of this study was to examine high school CTE teachers' dispositional stance towards the challenges, rewards, difficulties, and teaching strategies involved with linguistically and culturally diverse students. The specific research questions included:

1. To what extent do CTE teachers perceive cultural and language diversity as difficult and rewarding?
2. To what extent do CTE teachers report difficulty in maintaining high academic standards and creating a sense of community in culturally diverse classes?
3. What are CTE teachers' perceptions of outcomes for diversity in terms of success and creativity and frustration and stress?
4. How do CTE teachers describe their challenges, rewards, and useful teaching strategies in culturally diverse classrooms?

Methodology

The study was conducted in Florida, a state with a diverse population. It drew from a state database to obtain labels for high school programs (grades 9-12) in trade and industrial education, business technology, and family and consumer sciences in 6 of 67 counties. The three program areas were selected because they had traditional CTE status yet provided variety in the knowledge and skill base. The counties were selected to represent different geographical areas (panhandle, northeastern coastal, southeastern coastal, western Gulf coastal, and central) with the highest minority populations, all of them over 50% ([Florida Department of Education, April, 2008](#)).

The database was one year old, and it included one label for each of the three program areas within each high school in the six counties. One-hundred eighty labels (60 from each of the three CTE program areas) were randomly selected from 330 total labels (110 from each area), and surveys were mailed to the programs listed on the labels. Some programs may have been inactive due to a state teacher shortage, however, there was no way to determine it with certainty.

A survey instrument was designed and developed. The items were derived and constructed from the literature, study's conceptual framework, and variables. They included both quantitative ratings and open-ended questions. Content and face validity were estimated using a common survey as a standardized stimulus, asking the same question several comparable ways, and using an ANOVA test that revealed no significant differences between the three content areas ([Patten, 2001](#)). The internal consistency reliability of the instrument was estimated using Cronbach's coefficient alpha for the items pertaining to difficult challenges with cultural diversity and language (coefficient alpha = 0.79) and the items regarding positive challenges

(coefficient alpha = 0.71). One colleague and one research assistant assisted in refining and clarifying the items.

Demographic information was requested concerning gender, program/courses taught, cultural background, and student languages/cultures represented in classes during the spring semester prior to the survey. Teachers rated the degree of challenge with respect to teaching students with cultural differences, handling language differences, maintaining consistent and high standards, and building a sense of community. They also rated items with respect to the degree of reward and success or difficulty and frustration experienced when teaching students with different languages and different cultures. There were 15 Likert items with statements such as “It is difficult to apply consistent expectations and high standards in culturally diverse CTE classes,” “Classes with high levels of diversity involve success, creativity, learning,” and “Overall, I experience rewards from teaching culturally diverse classes.” All ratings were based on a 5-point scale, from 1 indicating “strongly disagree” to 5 indicating “strongly agree,” with 3 indicating neutrality or uncertainty. The open-ended questions allowed teachers to write comments about their greatest challenges, greatest rewards, and most useful teaching techniques.

Descriptive statistics were tabulated to describe the sample and obtain mean ratings of teachers' perceptions of challenges and rewards. The chi-square test was used to determine statistical independence between categories of challenges and rewards. Categories of challenge, reward, and the most useful teaching strategies were identified through content analysis (Leedy & Ormrod, 2005; Patten 2001, 2004).

Sample Characteristics

The sample was comprised of 14 business technology, 17 family and consumer sciences (6 in wage-oriented programs), and 10 trade and industrial education teachers; and 36 females and 5 males. The sample also included 18 European Americans/Caucasians (43.9%), 8 African Americans (19.5%), 5 Cuban Americans (12.2%), 2 Caribbean Americans, and 8 individuals from cultural backgrounds such as African American-European American, French Canadian, Jamaican, Mexican American-Puerto Rican American, and Native American. Teachers were not compared on these particular characteristics in the analysis due to the relatively small sample size.

During the spring semester prior to the survey, teachers' enrollments ranged between 28 and 160 students. Their students represented a total of 30 different cultural backgrounds. Twenty-two teachers taught students from three to five different cultural backgrounds during the semester. Eight teachers had students from eight or more cultural backgrounds, and one teacher had students from 16 cultural backgrounds. The most common student backgrounds and those represented in the classes of all teachers were African American and European American/Caucasian; 15

teachers listed Cuban, 11 listed Haitian, and 10 listed Puerto Rican cultural backgrounds. The remaining 25 cultural backgrounds of students included Chinese, Colombian, Creole, French, Haitian, Italian, Honduran, Jamaican, Mexican, Nicaraguan, Philippine, Portuguese, Puerto Rican, Russian, Seminole, and Vietnamese. Additionally, 12 teachers had no students specifically designated as needing English instruction because they spoke other languages, and 6 teachers had 20 or more LEP students. Although government classifications of students (African American, Asian/Pacific Islander, American Indian/Alaskan Native, Hispanic, and White) are useful for certain purposes, the sample indicated that such categories did not present a detailed description of the full range of diversity in CTE classes.

Results

Research Question 1: To what extent do CTE teachers perceive cultural and language diversity as difficult and rewarding?

Respondents identified how strongly they agreed or disagreed with statements related to the degree of difficulty and reward of challenges concerning general language and cultural differences. Ratings for each statement are summarized in [Table 1](#).

Table 1
Perceptions of Difficulty and Reward with Cultural and Language Differences

| Perception Ranking | Strongly Disagree | | | | | Strongly Agree | |
|---------------------|------------------------|----|---|----|----|----------------|-----------|
| | 1 | 2 | 3 | 4 | 5 | | |
| | Frequency Distribution | | | | | <i>M</i> | <i>SD</i> |
| Difficult: Language | 1 | 3 | 3 | 19 | 14 | 3.95 | 0.99 |
| Difficult: Culture | 1 | 13 | 3 | 16 | 8 | 3.41 | 1.20 |
| Rewarded: Language | 1 | 6 | 6 | 19 | 8 | 3.68 | 1.05 |
| Rewarded: Culture | 1 | 2 | 7 | 22 | 8 | 3.85 | 0.89 |

Note. Some cells are missing data.

The mean ratings, all above 3.00, indicated that it was somewhat difficult to accommodate cultural differences, but it was even more difficult to accommodate language differences. At the same time, it is interesting that 14 teachers disagreed that cultural differences were difficult, and 4 teachers disagreed that language

differences posed difficulty. Although the data revealed that the perceived difficulty of teaching students with language diversity was greater than the difficulty of teaching cultural diversity, the chi-square test revealed that the difference was not statistically significant, $\chi^2(4, N = 41) = 8.132, p = .087$.

At the same time that the respondents somewhat agreed that making accommodations to address both language and cultural differences was difficult, they also indicated that these challenges can be rewarding. Teachers rated the difficulty of accommodating language differences more difficult than rewarding, but the difference was not statistically significant, $\chi^2(4, N = 41) = 3.636, p = .458$. However, accommodating cultural differences was statistically more rewarding than difficult at the .05 level, $\chi^2(4, N = 41) = 10.603, p = .031$.

Research Question 2: To what extent do CTE teachers report difficulty in maintaining high academic standards and creating a sense of community in culturally diverse classes?

The respondents identified how strongly they agreed or disagreed with statements related to the difficulty of applying consistent expectations and high standards and building a sense of community in culturally diverse classrooms (see Table 2). In terms of mean ratings, the teachers slightly disagreed that the challenges of maintaining consistent standards and building community were difficult. Although the respondents rated the maintenance of high standards more difficult than building community, the difference was not statistically significant as indicated by the chi-square test, $\chi^2(4, N = 41) = 1.993, p = .737$. Although more than one-half of the respondents disagreed that maintaining high standards and community were difficult, there was a bimodal trend; more than one-fourth of the respondents agreed that these challenges were difficult.

Table 2
Perceptions of Difficulty with Standards and Community

| Difficulty Ranking | Strongly Disagree | | | Strongly Agree | | M | SD |
|--------------------|------------------------|----|---|----------------|---|------|------|
| | 1 | 2 | 3 | 4 | 5 | | |
| | Frequency Distribution | | | | | | |
| High standards | 4 | 17 | 4 | 10 | 6 | 2.93 | 1.29 |
| Community | 8 | 17 | 3 | 9 | 4 | 2.71 | 1.30 |

Research Question 3: What are CTE teachers' perceptions of outcomes for diversity in terms of success and creativity and frustration and stress?

The respondents identified how strongly they agreed or disagreed with statements related to specified outcomes in culturally diverse classrooms (see Table 3). The teachers agreed that diverse classes led to creativity and learning success ($M = 3.83$, $SD = 0.89$), however, they tended to disagree that they are frustrating and stressful ($M = 2.27$, $SD = 1.12$). The chi-square test revealed that teachers perceived diverse classes as significantly more creative and dynamic than conflict-ridden, $\chi^2(4, N = 41) = 39.50$, $p < .0001$. Diverse classes also were rated significantly more rewarding than stressful, $\chi^2(4, N = 41) = 30.46$, $p < .0001$.

Table 3
Perceived Outcomes of Diversity

| Outcomes | Strongly Disagree | | Strongly Agree | | | <i>M</i> | <i>SD</i> |
|-----------------|------------------------|----|----------------|----|----|----------|-----------|
| | 1 | 2 | 3 | 4 | 5 | | |
| | Frequency Distribution | | | | | | |
| Frustration | 9 | 21 | 5 | 3 | 3 | 2.27 | 1.12 |
| Success | 1 | 2 | 8 | 22 | 8 | 3.83 | 0.89 |
| creativity | | | | | | | |
| I experience | 0 | 3 | 3 | 23 | 12 | 4.07 | 0.82 |
| rewards | | | | | | | |
| I experience | 7 | 17 | 6 | 8 | 3 | 2.59 | 1.20 |
| stress, tension | | | | | | | |

In summary, the respondents viewed diversity as challenging and sometimes difficult, but perceived the challenges more positively than negatively. The teachers generally showed an open disposition towards diversity in that they felt capable of consistently maintaining high standards, building community, and experiencing personal rewards. However, some teachers acknowledged more difficulty in maintaining high standards and building community, and admitted feeling frustrated with diverse classes. Although frustration could easily indicate a relatively close-minded disposition, it may be that such teachers simply were more open about admitting they were not yet achieving success.

Research Question 4: How do CTE teachers describe their challenges, rewards, and useful teaching strategies in culturally diverse classrooms?

The survey provided teachers with opportunities to provide open-ended comments and describe their challenges, rewards, and useful teaching strategies.

Their comments added further insights into the ways teachers think about culturally diverse classrooms.

Challenges with Limited English Proficiency. When asked to provide their two greatest challenges with teaching culturally diverse classes, the most common category mentioned by 30 teachers was "language barriers." Teachers felt that meeting the needs of students with different languages was somewhat difficult in itself and more difficult than cultural differences. Language difficulties were believed to (a) contribute to students' failure to grasp fundamental course knowledge, (b) relate to a corresponding difficulty in staying motivated to learn, and (c) cause frustration due to lack of understanding essential information. Examples of individual comments were:

They fail because they don't understand.

They seem to give up, join forces with other students with similar difficulties, or shut down.

It is difficult watching the frustration of students who do not understand the language.

Whereas most respondents focused on the difficult language challenges experienced by students, five also mentioned their own limitations in assessing students, using familiar activities, or working with families as indicated in selected comments below:

It is hard to know how to fairly assess students who speak limited English or don't understand the social aspects of English.

I can't always use language-intense learning activities that I'd like such as writing or oral presentations.

I would like to know how to get parents more involved.

Challenges with Interpersonal and Cultural Differences. Sixteen teachers identified issues related to interpersonal relationships and community in the classroom. They reported difficulty in satisfying the needs of students with a wide range of levels of English within the larger classroom dynamic and its human context:

It is hard balancing the needs of students who can't speak English and keeping a motivating pace for other students.

Slowing down curriculum without losing other students' interest is a challenge.

Some are shy about expressing themselves in the class.

Five teachers noted biases among students and the need to help students appreciate each other's differences:

There is some tension and frustration when students have preconceived notions about other students' cultures.

Students disagree with other students' traditions without understanding their ideas are based on their cultures.

They want to stay only with their own group.

One teacher was concerned that some students "take a long time to open up," and another was concerned that "they stick with others like themselves." It appears that teachers preferred that students participate actively and outside their own cliques. However, students sometimes resisted mingling and interactions across cultural groups.

Four teachers mentioned challenges related to differences in meanings and interpretations:

It is difficult when students put up walls because they think you don't understand them.

You have to be careful with communication styles that might offend or trigger emotions.

Concepts and activities that are acceptable or common in American culture may not be so in other cultures.

One teacher indicated awareness that his or her own background and viewpoints could be biased or interpreted as biased: "I try not to impose my own values and philosophy on students. I only hope they accept those that are helpful to them in their lives."

Rewards of Diverse Perspectives. When given the opportunity to describe the most rewarding aspects of culturally diverse classes, teachers overwhelmingly noted the benefits of varying perspectives upon creativity, inspiration, quality of life, and sharing and exchange:

It is rewarding to help students appreciate and accept each other's differences.

Diversity brings different views, traditions, ideas to the class climate.

It is a joy to see their understanding of key concepts, discovering their unique talents, and their strong work ethic as an example for all.

They are kind and courteous and appreciative of public education.

In my CTE classes they are all equal, yet they bring different aspects to enhance creativity.

Four teachers indicated how they were personally "inspired" by the stories and experiences of their students. One stated, "They have stretched my comfort levels to

make me a better teacher and a better person." Others felt rewarded when they taught new information and later saw students "succeed with a class project or in everyday life," or when they could "introduce vocations that will increase the students' quality of life."

Teachers identified a number of useful strategies that can ease language barriers: visual aids, extra handouts, repetition with technical concepts, demonstrations, hands-on projects instead of oral presentations and written papers, practice of new skills, inclusion of examples from representative cultures, dividing processes into smaller segments, graphic organizers, and concept maps. Individualized attention from the teacher or another student was also described as valuable. As one teacher stated, "Teaching to the 'whole child' and accepting cultural and academic differences makes the students feel comfortable."

Fourteen teachers named cooperative strategies such as small group tasks, laboratory projects, and teamwork as valuable, perhaps because working together facilitates both high standards and the sense of community. Whereas three teachers more specifically mentioned grouping students from the same cultural background, one teacher liked to group students to maximize cultural variety.

Certainly the daily reality of teaching CTE subjects to students with varying degrees of English proficiency and diverse cultural traditions and viewpoints can be challenging and exhausting. However, despite the difficulties, all but one teacher wrote one or more comments related to specific rewards in teaching culturally diverse students. Teachers indicated that diverse classes create interesting and lively CTE classroom dynamics, extend personal growth on the part of students and teacher, and enhance learning and understanding.

Conclusions and Discussion

This study suggested that CTE teachers have various dispositions regarding culturally diverse classes. Most teachers perceived challenges in building community and ensuring consistently high standards, but they tried a variety of ways to satisfy the challenges and reported feeling rewarded. The highest mean rating of any item on the survey related to the sense of satisfaction and success, and the lowest mean rating corresponded to the sense of frustration and stress. It appears that the CTE teachers generally viewed the challenges of diversity as a positive feature in their classrooms.

A small number of teachers indicated a high degree of stress and frustration with the challenges they faced. The teachers might have had negative dispositions toward diversity if they felt little satisfaction at the end of the school day and semester. Another possibility is that stressed teachers might have been open to diversity, but nevertheless struggled to succeed because they did not have the necessary skills. Such teachers might be open to professional development, have support from administrators, or have assistance from a mentor teacher.

Even when culturally diverse classes are perceived as successful and rewarding, teachers deal with difficulties that present obstacles to achieving classroom goals. In this study, language barriers emerged as the greatest challenge for teachers. In light of state mandates for all students to attain specific achievement goals regardless of their language of origin (Austin, 1999; Fuller, 2003), teachers likely felt pressure for their students to perform well on state tests regardless of their English skills. Teachers indicated concern when students failed to achieve, gave up, lost motivation, or lost opportunities to get to know other students due to a lack of understanding or fluency with the language.

It might be expected that the respondents' somewhat high rating of language as a difficult challenge would correspond to similarly high ratings of difficulty with maintaining high standards in the classroom. Interestingly, this was not the case for the majority of teachers who disagreed or strongly disagreed that it was difficult for them to maintain standards. There are several plausible explanations. Perhaps the challenge of helping students with limited English proficiency achieve high standards was difficult in a general sense, but teachers were open and sensitive enough to find successful ways to teach important concepts through visual aids and graphic organizers, hands-on projects, demonstrations, and a variety of assessment methods. Or perhaps high standards comprised the guiding force that shaped classroom expectations, and language differences were but one of many obstacles that they were able to resolve. Open and optimistic teachers simply might have believed that students aspire to and reach the highest level when they are expected to do so.

Cultures have different meanings, values, and traditions in work and family (Allen, & Hermann-Wilmarth, 2004; Austin, 1999) which can add conflict and tension to discussions and make teamwork problematic (Banks, 1997; Goodwin, 1997; Gutiérrez & Rogoff, 2003; Jennings & Smith, 2002; Kleinfeld, 1998). Therefore, it might be expected that the teachers' overall ratings of culturally diverse classes as difficult would correspond to high ratings of difficulty with building community. However, this was not the case, with twice as many teachers disagreeing as those agreeing that building community was difficult. Interestingly, they felt rewarded by interactions among students of different cultures at the same time cultural diversity generally was rated as a difficult challenge. For hopeful and open teachers, differences in values and behaviors likely added interesting possibilities for creativity that far outweighed any negative tensions such as frustration or stress.

Teachers felt successful when students communicated with each other, shared views, appreciated differences, and worked together for positive outcomes. It is noteworthy that CTE teachers suggested many of the same teaching strategies recommended by others (Allison & Rehm, 2006; Banks, 1996, 1997; Fear-Fenn, 1993; Friedenber, 1995) to build and nurture a cohesive community. Teamwork, pairing, sharing, laboratory projects, discussions, and applications to daily life were mentioned frequently. Certainly, teachers who help students learn to work together in the classroom and build skills for their future careers contribute to their ability to

work with diverse customers, coworkers, employees, and employers. However, the teachers' comments did not indicate the use of critical thinking, advocacy, or debate that might challenge elements of culture or economic structures as recommended by previous research (Davenport, 2003; Pierce, 1993; Samper & Lakes, 1994; Yopp, 1993). The teachers appeared to value a classroom of learning and good relationships over a classroom with provocation and risk associated with cultural critique. Their openness to student diversity might not have extended to political or controversial levels.

Implications and Recommendations for Practice and Research

The results of this study are based on a relatively small sample and a 23% response rate which limits the generalizability of the findings. Further, it is possible that the respondents were more favorably inclined towards cultural diversity than the nonrespondents. Despite these limitations and in light of the study's purpose, the respondents were drawn only from counties with extensive diversity in their student populations. Given that the 41 participants were diverse and taught diverse classes, their perspectives provided an initial view into what it is like to teach in culturally diverse classrooms. They contributed tentative but valuable insights. The ratings and open-ended comments provided an initial understanding in regard to CTE teachers' dispositions toward culturally diverse classrooms. However, the problem should be investigated further with larger samples, with larger and validated surveys, and in other states (Patten, 2004).

Although most of the CTE teachers in this sample viewed diversity positively, their comments indicated that some dealt with cultural conflicts among students and their own uncertainty about how to deal with differences. A small number appeared to be struggling and frustrated more than rewarded in their teaching. The large percentage of nonrespondents suggested the possibility that many teachers did not respond due to a lack of openness to diversity. Teacher educators, curriculum developers, and professional development workshop leaders should appreciate and utilize positive attitudes, but they also should focus on providing a larger repertoire of practical experiences and strategies for success. Topics that address cultural issues could include fair assessment, dialogue to resolve cultural tensions, and balancing common standards with individuality (Allen & Hermann-Wilmarth, 2004; Austin, 1999; Bell, 1997; Davenport, 2000; Desai, 2000). Support teams could be developed for teachers to share stories and ideas with each other, and mentors could be assigned to those who desire such assistance.

A specific challenge involves teaching students with limited English proficiency. To prevent limited English students from remaining in low wage jobs (Friedenberg, 1995), teachers need to provide extra assistance in developing combined academic and CTE skills. Teacher training should include courses in theory and methods of teaching students with a range of English proficiency levels.

Additionally, it should include a range of practical experiences with instruction, tutoring, and assessment. Professional workshops could provide practical tips, language resources, and cultural resources specifically designed to develop greater understanding and skills for working with LEP students. Collaborations of CTE and academic educators, businesses, and students who are learning English could lead to mutually beneficial projects and activities (Friedenberg, 1995; Platt, 1996).

The challenges inherent in culturally diverse classes have a profound impact on interpersonal understanding, misunderstanding, and other human relationship issues (Lesko & Bloom, 1998; McAllister & Irvine, 2000). Although the teachers in this study were open to helping students work together as a team, all CTE teachers could benefit from additional practical tips, examples, and experiences that enhance their abilities to facilitate positive interactions and creatively respond to conflict. Business owners, managers, and employees should gain experience with diverse workplaces early in teacher education programs. Practical experiences with conflict resolution, problem solving, communication regarding different values, building common goals, and critical reflection would be invaluable (Banks, 1997; Bell, 1997; Brown, 2001; Rehm & Allison, 2006).

The teachers in this study viewed the challenges of cultural diversity more positively than negatively, and they believed that they were somewhat successful in building a sense of community by using team projects and cooperative learning. However, some respondents perceived the difficulties as frustrating and stressful rather than rewarding. Comparative studies are needed to determine specific factors such as teaching attitudes, approaches in the classroom, previous experience, wider school environment, and student relationships that contribute to dispositions that encourage success and reward rather than failure and stress. This study was limited by the small sample of teachers, small number of CTE programs, and selected counties in one state. Therefore, similar studies should be conducted with larger samples of teachers, CTE programs, and states.

Although teachers reported using hands-on practice, demonstration, visual aids, and pairing students to help those with limited English proficiency, such approaches may differ in success rates and need to be empirically verified through further research. Studies using direct observation and measures should examine the relationships between different teaching approaches with workplace skills and knowledge gained by students from diverse cultures and with varying levels of English proficiency. Studies could determine students' views regarding their sense of inclusion by the teacher, academic success, and engagement with other students. Furthermore, post-graduation longitudinal studies are needed to document success with jobs and the family lives of students educated in diverse CTE classrooms.

Research focused on the depth of understanding with respect to the richness of diversity and its relationship to both dispositions and actions is limited. The next logical stage is to conduct ethnographic and case study research within CTE classrooms. Answers to the following questions could be gleaned through

observations and in-depth interviews: (a) What is the process of building cohesion and dealing with differences in diverse classrooms? (b) What is it like to be a CTE student who does not speak English proficiently? (c) Who comes from a culture that is distinctly different from that of other students? and (d) Can negative dispositions toward cultural diversity be changed, and if so, how? Additionally, critical studies should be conducted to assess if and how CTE teachers nurture students' participatory skills to engage in critical discourse and advocate new ideas in the workplace (Allen & Hermann-Wilmarth, 2004; Lesko & Bloom, 1998; McAllister & Irvine, 2000; Pierce, 1993; Samper & Lakes, 1994; Yopp, 1993).

Career and technical educators face the challenge of preparing the future workforce (Brown, 2001), often within classrooms brimming with cultural and language diversity. This study suggested that cultural diversity is a positive challenge for CTE teachers. Most teachers felt successful in building a sense of community and maintaining high standards in diverse classes; they experienced rewards much more frequently than frustrations. However, some teachers felt frustrated and uncertain and indicated a need for practical and emotional support from CTE teacher educators, administrators, and other leaders. Career and technical education teachers must develop the necessary dispositions and skills to assist all their students to become productive workers, citizens, and family members.

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