Full Length Research Paper

Help wanted: Professional development and training for career and technical education faculty

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Career and technical education (CTE) instructors teach in an environment that requires simultaneous academic and occupational instruction that integrates theoretical and hands-on knowledge while working with a unique student population that has distinct learning needs. These instructors have the industry experience and in-depth content knowledge that is critical in the vocational classroom, but they are missing an important piece of instruction: basic knowledge of pedagogical theory. It is clear that CTE schools must provide initial and ongoing training opportunities for instructors; however, it is difficult for these schools to identify what type of training is most appropriate (Cannon et al., 2011). Since few studies have been conducted to determine teacher in-service needs in CTE, finding training programs that fit the specific needs of CTE instructors is a significant challenge. However, this is a need that must be met because of the impact CTE can have on the economic vitality of our nation. The purpose of this research study was to uncover the thoughts and recommendations of CTE instructors and administrators at three post-secondary technical schools regarding pedagogical training for CTE faculty.

Key words: Career and technical education, pedagogy, faculty training, pedagogical training, vocational education, professional development, hands-on learning, adult learning.

INTRODUCTION

As the world changes and global economies evolve, a new way of thinking is necessary in order for the U.S to sustain its position as a leader in innovation. In the 20th century, industry was booming and manual workers and their production equipment were key elements to the workforce. In the 21st century the economy has shifted from industrial to information or knowledge-based. In a knowledge-based economy, knowledge is a tool and is considered to be just as important as other economic resources (Foray and Lundvall, 1996). Knowledge is now recognized as a driver of productivity and economic growth (Johnston and Rolf, 1998). Coined by Drucker (1999), the term "knowledge worker" refers to any employee that performs non-repetitive tasks that require the worker to obtain, translate, manipulate and apply information in a specialized area to solve problems. He further described these individuals as high-level employees with the ability to transform theoretical knowledge into new products or services.
It is argued that CTE plays a vital role in the training of

knowledge workers. According to Wilson (2005), there is a high demand for properly trained knowledge workers that is driving educational reform, specifically, an increased focus on vocational and educational training. Holt (1974) stated:

There is great and crying need for providing vocational education of this character for every part of the United States-to conserve and develop our resources; to promote a more productive and prosperous agriculture; to prevent the waste of human labor; to supplement apprenticeship; to increase the wage earning power of our productive workers; to meet the increasing demand for trained workmen; to offset the increased cost of living. Vocational education is therefore needed as a wise investment for this nation, because our national prosperity and happiness are at stake and our position in the markets of the world cannot otherwise be maintained.

The Association for CTE asserts that CTE programs play an important role in the expansion of workforce readiness by helping students in applying for academic and

employability skills (ACTE, 2008). Further, The Virginia Association for Career and Technical Education (VACTE) found that workforce readiness skills that are taught in CTE courses are a clear priority for Virginia's employers even more so than standard academic grades (VACTE, 2010).

As the global economy continues to gain strength, industries will increasingly seek employees with high levels of expertise, which is why there is a national movement to ensure a steady supply of skilled workers will be available. To support this need there have been multiple proposals advocating the need for focused research programs to strengthen and document the performance of CTE (Lewis, 2001; Pearson and Champlin, 2003; Rojewski, 2002). The National Assessment of Career and Technical Education proposed one of the most recent pushes for high-quality research in this area. According to Lambeth et al. (2008), the proposed national research agenda was accepted by the Association for Career and Technical Education as the model for the future. It is also important to note that the push for research in the area of CTE is in response to the Congressional mandates in the No Child Left Behind Act of 2001 and the Perkins Career and Technical Education Act of 2006. These Acts mandate further research agendas that clearly assess and document the impacts of CTE on students, industry, society and the economy (McCharen and High, 2010).

As the public becomes more aware of the significance and impact of CTE, enrollment in CTE programs continues to grow. With enrollments on the rise, CTE schools have the immediate challenge of recruiting, hiring, and training additional faculty members. Unfortunately, CTE administrators are struggling to find qualified instructors. There are several factors to consider when examining the reasons that CTE instructor positions are challenging to fill. First, career and technical education instructors are typically content experts who have acquired their knowledge through formal industry training and on-the-job experience (Burns, 2008). Since CTE teachers are subject-matter-experts (SMEs) and must have practical work experience in their field of instruction, they rarely have any pedagogical training or teaching experience. Therefore, it is extremely difficult to find an individual with a combination of content knowledge and pedagogical training. Further, CTE instructor candidates are often discouraged from the teaching profession because they have no prior teacher training and are not confident in their abilities to teach (Whiteman, 2004). Another powerful disincentive for CTE instructor candidates is the fact that they can typically earn more money if they continue to work in business or industry than they can earn as teachers (Lewis, 2001). This means that even when an ideal candidate is found, he will often decline the position due to the lower earnings that are paid in academia compared to in the field.

Industry experts with an interest in teaching can enroll in a CTE teacher preparation program. However, these programs are currently on the decline or in some areas, non-existent. The Philadelphia Youth Network (PYN, 2007) conducted an analysis of CTE Schools in Philadelphia and found that there were no professional development offerings at any of the eight schools involved that addressed the specific needs of CTE teachers. It was recommended that, in order to deliver relevant CTE instruction, all CTE schools in the area create professional development centers that provide high-quality training. In a study of CTE teacher preparation programs completed in 1990, Lynch identified 432 higher-education institutions that had vocational teacher education programs (Lynch and Hartley, 1996; Lynch, 1990). Ten years later, in a study completed by Bruening et al. (2001), researchers were only able to identify 385 CTE teacher preparation programs, which represents an 11% decrease in a 10 years period. It is surprising that CTE teachers are in high demand yet programs to train these individuals are diminishing. According to Twomey (2002):

External factors can also be cited for the inattention to the impending shortage of career and technical education teachers; rapid changes in technology and its application to vocational fields; the diffusion of information technologies within general work skills and academic disciplines to the extent that its existence as a separate program became indistinct; and rapid loss of educational funding nationwide, which has contributed to regular seasonal layoffs of career and technical education teachers who generally teach in subject areas considered electives, and thus are easily cut in times of economic hardship.

The combination of increasing enrollments in CTE schools, a shortage of qualified candidates, and the diminishing number of teacher preparation programs has forced CTE administrators to fill teaching positions with any available candidate and not necessarily the best one. The current environment presents CTE schools with the challenge of properly introducing individuals that are strictly content experts to their new roles as educators. Bruening et al. (2001) found that the CTE teacher-training dilemma can also be attributed to the existence of teacher education programs that are very traditional in nature. As a result of the lack of formal teacher training upon hiring, traditional training programs do not typically work for CTE instructors. According to Lynch (1998), traditional teacher training programs are not effective for CTE instructors because the traditional programs assume prior knowledge or experience in the education field. For example, most educational professional development programs focus on models or jargon that is beyond the knowledge level of new CTE teachers (Szuminski, 2003). It is becoming well known that CTE instructors need tailored training programs to meet their specific instructional needs. Unfortunately, very few studies have been conducted to determine these needs, which makes

it difficult for CTE schools to identify the most appropriate content to include in the training (Cannon et al., 2011).

Research by Joerger and Bremer, University of Minnesota, and funded by the National Dissemination Center for Career and Technical Education (2001) found that the challenge of teaching might be particularly difficult for new CTE teachers as they must be able to meet the needs of a special student population. CTE instructors are in a unique position where they must provide academic and occupational instruction while integrating theoretical and hands-on knowledge and preparing students for the workplace. This type of instruction is referred to as "linked learning" by the Alliance for Excellent Education (AEE, 2010). In a linked learning environment instruction is focused on both academic and career preparation. Further, the AEE (2010) has determined that teacher preparation programs for instructors that are responsible for both academic and career preparation must include unique training objectives. For example, the AEE states that, beyond basic pedagogical and subject area knowledge, CTE instructors must learn to design lessons that include problem- and project- based learning, coordinate industry specific experiences for students (such as guest speakers from the community, field-trips, and internships), develop innovative approaches to engaging students, and expand their own knowledge so that they remain current in their respective field (AEE, 2010).

Phelps (1998) further sanctions the idea that in addition to the theoretical knowledge that CTE teachers must impart upon their students, these instructors have the responsibility of understanding the role of academics in business, industry, and in the community so they can align their curriculum with the needs of the current workplace (Phelps, 1998). According to the Association for Career and Technical Education, CTE instructors must: Engage students in specific career-related to learning experiences that equip them to make well-informed decisions about further education and training and employment opportunities; and prepare students who may choose to enter the workforce directly after high school with levels of skill and knowledge in a particular career area that will be valued in the marketplace (ACTE, 2006). Many states have adopted the Career Clusters model, which provides the core skills that are considered necessary in CTE for the future success of students in the workforce (NRCCTE, 2010). These skills have been identified as:

1. Knowledge and skills in related academics,
2. Communications,
3. Problem solving and critical thinking,
4. Information technology applications,
5. Safety, health, and environmental.
6. Leadership and teamwork,
7. Ethics and legal responsibilities,
8. Employability and career development,
9. Technical skills.

The Career Clusters model was developed for CTE teachers at the secondary level and is not enforced at the post-secondary level (NRCCTE, 2010). However, post-secondary CTE instructors should focus on successfully integrating these skills into CTE courses within their programs since they have been identified as the essential proficiencies for workforce readiness. In a recent study aimed to uncover the perceived training needs of CTE instructors, Heath-Camp and Camp (1990) found that CTE instructors requested training on how to deal with low student motivation and undesirable behaviors, low self-efficacy, and time management and organizational skills. Further, Flores (2001) found that many CTE instructors needed assistance with time management but were hesitant to ask for help. CTE instructors teach in an environment that requires simultaneous academic and occupational instruction that integrates theoretical and hands-on knowledge while working with a unique student population with distinct learning needs. These instructors need tailored pedagogical training programs that prepare them for the learning environment that they are about to enter. While it appears that the need for tailored pedagogical training programs has been recognized, the movement toward the development and implementation of these types of programs is still in the infancy stage.

The purpose of this mixed methods action research study was to uncover the perspectives of CTE faculty and administrators in relation to pedagogical training. Further, the researcher intends to use the data to later develop an extensive training program for faculty members at post-secondary career and technical schools. The need for this study was based on an extensive review of the related literature in conjunction with the researcher's personal experience as a CTE faculty member and later as the Director of Education at a post-secondary CTE School. The researcher intends to use the final results of this study to aid in the later development an extensive CTE faculty training program. It is important to note that the researcher is not implying that a single workshop will solve all of the issues within CTE faculty training; however, by testing the content and methods in a trial workshop, the researcher expects to uncover valuable information to assist in subsequent research efforts. The following research questions guided the study:

1. What are the critical pedagogical components of a training program for CTE instructors?
2. What are the specific educational needs of CTE students and are these needs addressed in CTE faculty training programs?

METHODOLOGY

The researcher employed an action research design in order to address the research questions. Action research is a process in which participants are encouraged to examine their own educational practice, using the techniques of research (Ferrance,

2000). According to Watts (1985), action research is based on the following assumptions:

1. Teachers work best on problems they have identified themselves.
2. Teachers are more effective when they are encouraged to examine and assess their own work.
3. Teachers help each other by working collaboratively.
4. Working with other teachers helps faculty members in their professional development.

In this research study, participants were given the opportunity to express their thoughts and ideas regarding pedagogical training practices in CTE and how the current state of CTE instructor training has affected their own educational practice. The participants were made to be aware of the fact that their input would be valuable in the development of training that would help other CTE teachers in similar situations, which is congruent with the ideals of action research. This study utilized an investigative style multi-case study approach in which the researcher conducted in-depth interviews at three post-secondary career and technical schools. Case study research is an ideal methodology when a holistic, in-depth investigation is needed (Feagin et al., 1991). A case study design is also appropriate for capturing the essence and details of phenomena in a rigorous manner (Stake, 1995; Yin, 2003). Semi-structured interviews were conducted consisting of open-ended questions designed to answer the research questions and to allow informants to share their expertise in a way to help enlarge the researcher's understanding of the need for pedagogical training. Specifically, the questions were designed to identify the components of faculty training programs that are essential for career and technical school instructors as they relate to the specific educational needs of CTE students.

The researcher probed the participants for more information in cases where initial responses did not provide adequate data to answer the research questions. The researcher began her analysis by coding the interview data through a generic coding strategy that utilized Microsoft Word and Excel. Commonalties in data across all participants were color coded to identify and organize emergent themes. The researcher's primary goal in this process was to find meaning in the data and to link the data to the research questions. Then, the researcher continuously compared and contrasted participant responses and made connections in relation to the research questions. The next step in this qualitative analytical process was to identify concepts and themes that addressed and illuminated the research questions. In order to complement the coding process, salient quotes were delineated to amplify and further describe participants' responses. It was this dual strategy as well as a description of researcher reflexivity as a participant observer, that the rich data became useful for both learning about the perspectives of participants. Finally, the researcher conducted respondent validation (Merriam, 2009), where she requested additional comments from interview participants and also for clarification of answers to some of the previous interview questions. Manning (Taylor and Bogdan, 1998), states, "Though it is hardly an ethical requirement, it also seems appropriate to provide people with an opportunity to react to what has been written about them as a matter of fairness."

RESULTS

The researcher conducted nine interviews in which CTE instructors and administrators were asked various questions about training and professional development programs. The data gathered in this phase were analyzed the following four themes were constructed

from the interview data:

Theme 1. While lesson planning is an important pedagogical element for CTE instruction, effective lesson planning strategies are not typically included in faculty training agendas.
Theme 2. Teachers are expected to move around the classroom, engage students, and go beyond lecturing yet, most professional development workshops rely exclusively on direct instruction and lectures.
Theme 3. Instructors are aware that CTE students have unique learning needs but they do not know how to incorporate appropriate activities that address these needs into each lesson.

CTE students are adult learners with many things going on in their lives and instructors felt that strategies for managing the adult classroom should be different than the strategies used in a traditional classroom.

Tables 1 to 4 illustrate the salient quotes that were captured during the interview process and were the source of the themes that emerged. Table 5 depicts the three common characteristics of CTE students as described by the participants and illustrates which participants discussed each characteristic.

DISCUSSION

After interpreting the results of the study, the researcher has drawn several conclusions. First, CTE instructors need training programs that are tailored to their specific needs and are eager to participate in these programs. This researcher therefore strongly recommends that, before administrators develop or adopt new curricula, they need to base these decisions on the specific needs of CTE teachers and their students and that training should also be aligned accordingly. CTE instructors who have no background in pedagogy need to first learn the basics of instructional effectiveness and not be exposed first to high level training programs that cover too many topics at once. Based on the findings of this study, this approach would more than likely be ineffective. The researcher concludes that training based on "one size fits all" will not be effective for CTE instructors and individualized training based on the unique needs of CTE instructors is required. Further, training should be continuous and not just a once or twice a year occurrence; incremental improvement should be the goal with regular opportunities to share ideas among faculty holds significantly greater promise of lasting instructional effectiveness than do one-shot efforts. Secondly, CTE instructors work with a specific type of student who requires pedagogical content knowledge that is tailored to the unique needs of adult learners who are hands-on learners and require appropriate motivation.

Also, the pedagogical practices that are most beneficial for these types of learners must be infused into a lesson

Table 1. Interview results: Lesson planning.

Participant	Lesson planning
A1	"…I only had one module on lesson plans and then I had to take it to the classroom."
A3	"I don't know what I would have done without my plans…at first I practically read from them in front of the class."
B1 (administrator)	"…Some of them [new instructors] are really excited about teaching…then they realize there is a lot of preparation…lesson planning is critical…I think that training in this area could be improved for us"
B3	"…I never learned a formal process. At night I'm always on the internet just looking for what I can do the next day."
C1 (administrator)	"…I show the instructors the Madeline Hunter lesson plan model…I guess because it's the one I know…I learned it in college…"
C2	" …When I first started I was just, you know, I'll teach for a couple of days but then what am I going to do for the rest of these 10 weeks…you need help planning so that you have something for every day."
C3	"…I don't really plan it out…I speak from the heart…"

Table 2. Interview results: Engaging activities.

Participant	Engaging activities
A2 (administrator)	"…I need help with some interactive, enjoyable, learning type of things…"
A3	"…The biggest thing I learned that helped me was building rapport with students right away…after a long time I figured it out…you have to get them to want to listen to what you're saying…getting their attention"
B1 (administrator)	"…I have been an actor for 20 some years….so I believe in the edutainment concept….I'm willing and you need to be willing to act silly and entertain them all while teaching a lesson…they don't necessarily need to recognize everything I do as a lesson, even if it is...I am an actor so I know how to do this...it's something they [other instructors] need to learn..."
B3	"…I think students need, or it's easier to grasp, when I'm not just standing there like blah, blah, blah and writing on the board…I try to move around the room and keep them interested…keep them entertained...but I have trouble thinking of something new…how can I do this in my class…it would be nice to have some new good ideas"
C2	"…You have to know how to keep people's interest…training on that would be a start…"

plan template that CTE instructors can easily follow. Thirdly, professional development sessions must model the appropriate strategies and methods in order to elicit the best response. CTE instructors attend training sessions with the hope of gaining concrete strategies that they can apply in their own classrooms and the best way to ensure their deepest understanding is to model the desired behaviors; in other words, trainers should not expect instructors to do anything that they are not doing themselves in that particular training session. While the

Table 3. Interview results: Requested training topics.

Participant	Topics for training
A1	"Assessments and classroom management."
A2 (administrator)	"…We do not currently have an adult learning theory module…but that is a good idea…something we need…we are looking for that in the future"
A3	"How to build rapport with the students."
B3	"..How to get students moving around, getting involved, having them do something even if it's just physically getting up and moving around…I think it is really important to keep their attention…"
C1 (administrator)	"…leadership, group dynamics, classroom management, communication, adult learning, evaluation techniques, effective lesson plans…these are all things that we need as new teachers…it's just not happening"
C3	"…How to look at things from a student's perspective…learn how to look at things from different levels…whether they are visual, auditory, or hands-on…"

Table 4. Interview results: Training experiences and preferences.

Participant	Training experiences and preferences
A1	"...They always seem like just a bunch of Power point…I want to see how to do things…show me examples… I want to be able to replicate the ideas"
A2 (administrator)	"…Try to be very careful how you say things…discuss ideas from different angles…don't say, 'this is how you *have* to do it'…and show instructors how to do it….not just telling them…it's like they [the trainers] want us to be fun and interesting, but they are boring…"
A2 (administrator)	"…You have to think of the adult learner as somebody you really have to approach from a different angle…the faculty are adult learners *plus* there's a whole other angle to them beyond just being adult learners…they are used to being in control….I have observed them as they become very uncomfortable in the learner role… and they can behave worse than any student I've ever had…they get very resistant because they see this as okay you're adding to my workload…I've done it this way and now you're telling me I need to do my syllabus this way…and so they can really erupt."
B1 (administrator)	"…. Training sessions tend to be dry…not interactive enough…but sometimes you have to be careful with all the skits and games and things because instructors think they are being talked down to…she came in and did a presentation where you are throwing the yarn from person to person to make the web of conversation…at some point I could see where her effort to make it fun ended up rubbing them the wrong way…it was just too much…balance is really important I think…"
B2	"…I learn a lot from what other instructors do…it would be helpful to get together and talk about things…"
C2	"…They need to be more like a workshop and not an all day entertainment session…when you cover so much information you really don't remember it all…"

following recommendations are based on the data collected from the specific research sites from this study, based on the literature and the researcher's experience in the field, it is likely that the following suggestions could schools. First, CTE instructors require ongoing professional development programs. Programs should consist of a series of pedagogical training workshops that be valuable to other post-secondary career and technical focus on one specific topic per workshop. Workshops should start at the most basic level where terminology

Table 5. Interview results: CTE student characteristics categories.

Participant	CTE student characteristics		
	Hands-on learners	**Adult learning**	**Engagement and motivation**
A1		X	X
A2*		X	X
A3	X		X
B1*	X	X	X
B2		X	
B3	X	X	X
C1*		X	
C2			X
C3	X		

* Denotes that participant is an administrator.

and definitions are reviewed and then build up to more advanced levels where instructors have opportunities to put the theory into practice.

The data collected in this study provided insight into the thoughts and opinions of CTE instructors and administrators at three post-secondary technical schools. However, given that pedagogical practices are complex and in many cases institution-specific, further examination is warranted. Although the researcher's initial interview data were gathered at three sites, this study should be replicated at other post-secondary technical schools to gauge pedagogical needs on a more expansive level. Replicating this study at a state or national level provide for more trustworthy conclusions. Since the recognition of the importance of career and technical education is fairly recent, specific training programs for CTE instructors are still in the infancy stages. The researcher expects to see new pedagogical training programs that are tailored to the unique needs of CTE instructors in the near future. This growing area should be researched extensively as those programs will assist in determining the most effective content and delivery methods. In 2006, the Association for Career and Technical Education published a position paper that presented the rationale and recommendations for an expanded vision of CTE: Reinventing the American High School for the 21st Century (ACTE, 2006). This vision supports the idea that student enrollment in CTE programs will continue to increase. Increased student enrollment will result in a greater need for properly trained CTE instructors; therefore, further research on CTE faculty and their training needs is justified.

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