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Bits and Pieces

FROM THE EDITOR

Welcome, Readers, to Volume 44 Number 4 of the Journal of Industrial Teacher Education (JITE).

Han Sik Shim and Gene L. Roth set themselves a challenging task when they sought to answer the question, "…how do professors who are acknowledged to be expert teaching professors share their tacit knowledge with mentees?" (p. 7). Using a case study methodology, the authors conducted interviews with ten mentees and their mentors, 13 Presidential Teaching Professors at a mid-western University. From within the gathered data, the authors identified two overall themes, "(1) the tacit nature of the PTPs teaching expertise and (2) the nuances of articulating that expertise" (p. 8).

Not surprisingly, the authors suggest that translating tacit teaching practices into words is a most difficult endeavor, even when observed within a very finite discipline. They note that career and technical teacher educators face an even more daunting challenge in preparing the next generation of faculty.

> One could argue that the learning curve for novice CTE teacher educators is greater than other new professors, given that CTE teacher educators might not only have to meet typical teaching responsibilities, but also have to learn about supplying and maintaining technical laboratories, visiting student teachers, advising student organizations, and understanding the state's credentialing system for teacher certification. (p. 25)

A. Mark Doggett directs our attention to the question, "If given a choice, would students select videoconferencing over face-to-face instructional methods?" (p. 29) An oversubscribed class provided the author with an opportunity to utilize simultaneous face-to-face instruction and videoconferencing to a remote classroom. The results indicate that, "if given a choice, students prefer face-to-face interaction with the instructor" (p. 39). However, Doggett also provides some interesting observations that make the article well worth adding to your list of references as you weigh the pros and cons of videoconferencing as an instructional tool.

Susan J. Olson and Cathy M. Spidell conducted a follow-up to earlier studies conducted in 1991 and 2001 to investigate changes that have occurred in the credentialing of postsecondary technical faculty. "The specific objectives of this study were: (a) to describe current credentialing requirements for two-year college technical instructors; (b) to describe program requirements for postsecondary technical teacher education programs; and (c) to compare changes that have occurred since prior studies" (p. 42).

Perhaps the most interesting finding is that there are more institutions preparing postsecondary technical instructors than there are states that required a credential to teach. Personally, I wonder if the program of study emphasis within Perkins VI will have an impact on the findings of the next follow-up study.

Finally, I am pleased to be able to share with you the first book review in quite some time. Michael Kroth has provided us with an insightful review of the work of co-authors James A. Gregson and Jeff M. Allen entitled *Leadership in Career and Technical Education: Beginning the 21st Century*. I believe that Michael's review will lead you to add the book to your reading list.

Enjoy!

Sharing Tacit Knowledge Among Expert Teaching Professors and Mentees: Considerations for Career and Technical Education Teacher Educators

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Abstract

This case study provides viewpoints of knowledge sharing by expert teaching professors and their mentees. Professors who were recognized as expert teachers with an annual award at a mid-western USA university were the units of analysis of this study. Expert teaching professors had difficulty articulating much of their teaching expertise. The difficulty was rooted in three characteristics of teaching expertise. Sharing tacit knowledge was also noted as a difficult task because the nature of tacit knowledge prevented it from being articulated. Methods of sharing tacit knowledge were categorized in two ways: observation and "bringing it to surface." Recommendations for additional study include examining knowledge sharing among expert and novice professors in career and technical education teacher education programs.

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Introduction

Studies about expert teachers in higher education have produced consistent findings. The elements of expert teaching in higher education pertain to clarity of presentation (Havita, Barak, & Simhi, 2001; Kane, Sandretto, & Heath, 2004; Sherman, Armistead, Fowler, Barksdale & Reif, 1987), enthusiasm of teaching (Ekeler, 1994; Havita, Barak, & Simhi, 2001; Kane, Sandretto, & Heath, 2004; Pinsky, Monson, & Irby, 1998; Sherman et al., 1987), command of subject knowledge (Horan, 1991; Kane, Sandretto, & Heath, 2004; Sherman et al., 1987), preparation and organization (Havita, Barak, & Simhi, 2001; Kane, Sandretto, & Heath, 2004; Pinsky, Monson, & Irby, 1998; Sherman et al., 1987), stimulating the interest of students for engagement in learning (Havita, Barak, & Simhi, 2001; Horan, 1991; Sherman et al., 1987), understanding students, and creating a positive environment (Pinsky, Monson, & Irby, 1998), interpersonal relationship (Havita, Barak, & Simhi, 2001; Kane, Sandretto, & Heath, 2004), humor and approachability (Kane, Sandretto, & Heath, 2004).

The preceding studies provide a useful backdrop for the types of skills that expert teaching professors might display in classrooms. However, lacking from the literature are studies that depict how expert teaching professors do what they do. A key difference between expert teachers and novice teachers resides not with the "what they do" (their content knowledge), but with the "how they do" (their procedural knowledge). Expert teaching professors possess tacit knowledge of how they do their job, but if they are like other types of expert workers, they may struggle in their attempts to surface this knowledge and explain it to others (Polanyi, 1967).

Sternberg and Grigorenko (2001) define tacit knowledge as "knowledge which individuals use to perform effectively but which they may find hard to articulate" (p. 1). Following in the footsteps of Nonaka and Takeuchi (1995), several scholars have examined the benefits of sharing tacit knowledge within organizations and strategies for doing so. The relationship between tacit knowledge and explicit knowledge is controversial (Shim & Roth, 2006). Some researchers believe tacit knowledge may be codified, such as Berry

(1997), Hager (2000), and Nonaka and Takeuchi (1995). Some researchers assert that tacit knowledge and explicit knowledge exist on a continuum (Ambrosini & Bowman, 2001). Other scholars believe firmly that tacit knowledge cannot be codified (Cook & Brown, 1999; Tsoukas, 2002). Within the literature, a variety of perspectives and strategies may be found with regard to sharing tacit knowledge among organization members. The intent of this article is to bring to light contextual issues involving knowledge sharing among so called "expert" teaching professors and their mentees.

Problem Statement

Professors possess deep knowledge in their content areas. Expert teaching professors also possess considerable tacit knowledge about processes used to effectively teach in their respective contexts. Little is known about how expert teaching professors share tacit knowledge about teaching with mentees. Without systemic ways to access expert teaching knowledge, professors and mentees can be left with trial and error attempts at surfacing this tacit knowledge, codifying it, and sharing it. Gaining insights about how expert teaching professors share tacit knowledge with mentees may help faculty members, faculty developers, administrators and others enhance opportunities for and remove barriers to sharing knowledge about excellent teaching. The central research question for this study is how do professors who are acknowledged to be expert teaching professors share their tacit knowledge with mentees?

Limitations of the Study

Qualitative research is not intended to be used for generalizing to larger populations. This point is particularly relevant to the nature of this study and to the readership of this journal. The small number of participants of this study spanned several university departments and colleges. Participants were not limited to teacher education programs, and most certainly not limited to Career and Technical Education (CTE) teacher education programs (CTE, defined here to be an inclusive term of technology education, technical education,

and trade and industrial education). Although this study can provide insights to CTE teacher educators about the transfer of teaching knowledge between expert teaching professors and their mentees in the broad university context, readers are cautioned to recognize the unique elements of CTE teacher education contexts. For example, CTE teacher educators and their mentees may very well be more aware of educational jargon and instructional methods than professors in liberal arts and sciences, engineering, business and other non- teacher education areas of study.

Data reported herein were gleaned from a larger study that broadly examined expert teaching professors (Shim, 2006). Themes that emerged from Shim's study included aspects of teaching expertise, mentoring processes, and mentoring functions of expert teaching professors. Additionally, two major themes from Shim's larger study pertained to the nature of tacit knowledge of expert teaching professors, and the nuances of articulating it. Findings specific to these latter themes and their supportive data are reported in this article. Readers are encouraged to review Shim's work for a broader and deeper analysis of tacit knowledge of expert teaching professors.

Theoretical Framework

Symbolic interactionism and constructivism provide the theoretical framework of this study. Symbolic interactionism is a viewpoint concerning the interactions of human beings and the relationships of human beings with society and social objects (Charon, 1979). Human beings actively engage in creating the world of experience by shaping meanings that result from interaction through symbols (Denzin, 1992). Symbolic interactions help to create meaningful reality for human beings.

Consistent with symbolic interactionism is the learning theory referred to as constructivism. When learners interact with others, they actively construct knowledge that may be used functionally in a social context (Kerka, 1997). Cognitive apprenticeship is a constructivist method that has been used to help novices acquire expertise (Kerka, 1997). In traditional apprenticeship, the expert

demonstrates proper means of completing a task and helps the apprentice perform it by modeling, scaffolding, fading, and coaching (Collins, Brown, & Holum, 1991). In cognitive apprenticeship, experts model the strategies and activities required to solve problems by scaffolding, coaching, and correction (Duncan, 1996). In this study, the meaningful realities of the expert professors and their mentees were formed through symbolic interaction and their tacit knowledge about teaching was molded in context (Shim & Roth, 2006).

Methods of the Study

The method for this research was case study. Professors who were recognized as expert teachers with an annual award at a mid-western USA university were the units of analysis of this study. These award winners at this university were designated as a Presidential Teaching Professor (PTP). Only full professors with tenure and at least 6 years of service at the university could be nominated for the PTP award. Nominees were considered to be among the most able and talented teachers at the university. Thirteen of the available thirty-four PTPs participated in this study. All participants had at least twenty years of teaching experience in higher education.

The participating PTPs recommended nine mentees to be interviewed for this study. In addition, a tenth interviewee was included because he had participated in a PTP's class for an entire semester and he had analyzed and shared the teaching expertise of the PTP. Among the nine mentees, seven were professors and three were graduate assistants who had taught students at this university.

Given the qualitative approach taken in this study, several procedures were used to establish trustworthiness of data: triangulation, member checks, peer examination, and surfacing researcher biases. To triangulate data, three sources of data were used to confirm emergent themes. Two sources of data were from interviews: the PTPs who shared their knowledge with mentees or novice professors, and the mentees or novice professors who received knowledge from the PTPs. Member checks were conducted

by taking the transcripts back to interviewees and asking them for their opinions regarding the accuracy of the data. In addition, participants were invited to provide further clarification of their comments or to provide additional information. In addition to the interview sources, university documents were examined that featured interviews and comments about the PTPs. As the findings emerged, two doctoral candidates were selected to review and discuss the interpretation of the data.

Data were analyzed simultaneously with data collection by focusing on the main research question. To satisfy the descriptive account, data were "compressed and linked together in a narrative that conveys the meaning the researcher has derived from studying the phenomenon" (Merriam, 1998, p. 179).

In addition to the descriptive analysis, themes that captured some persisting pattern that occurred in the "preponderance" of the data were developed to satisfy the interpretive intent of this study. The constant comparison method was used to construct themes. Although the constant comparison method of data analysis was generated by Glaser and Strauss as the method of developing grounded theory, it has been chosen by many researchers who were not intending to create substantive theory. The constant comparison method provides compatibility with the inductive, concept-building orientation of all qualitative research (Merriam, 1998, p. 159). The basic strategy of the method was to constantly compare a particular incident from an interview with another incident in the same set of data or in another to discover recurring regularities in the data (Merriam, 1998, p. 159).

Two major themes emerged from the data concerning (1) the tacit nature of the PTPs teaching expertise and (2) the nuances of articulating tacit expertise. Data supporting these two major themes were garnered from statements from 10 of the PTPs and 4 of the mentees. Examples of excerpts that supported these two themes are provided in the next two sections.

Theme 1: The Tacit Nature of the PTPs' Teaching Expertise

Several participants spoke to the notion of the tacit nature of teaching expertise. Excerpts from the transcripts that supported this

major theme included describing teaching as a mixture of art and science, the situational nature of teaching, the context dependency of teaching actions, the lack of awareness of performance, and the innate perspective of teaching expertise.

Most PTPs answered the question, "How did you learn how to teach?" or "How did you gain your teaching expertise?" by explaining that they did not receive formal training to teach in higher education; PTPs learned through learning by doing, experience, previous jobs, or modeling. Their teaching expertise was not recognized as formal knowledge, but rather as a skill or just performing their job with their own unique style. They described the expertise that could not be articulated as a form of art. In this context, the meaning of art was that their skills were developed through intuition and experience and not from the following of a prescribed set of rules or facts. A PTP believed that teaching was a mixture of art and science. The art could not be explained or learned through the help of others.

> *It's very subjective. Teaching is a very subjective business. That's why people say it's a mixture, an art and a science. You can learn the science part, but the art is a different matter, that's something that I don't think people could explain very well or help anyone else to necessarily learn.*

Another PTP explained their expertise as situational. Situational knowledge meant that knowledge was embodied in a specific situation, thus it might not be separated from the situation. A PTP used an analogy of dancing to explain his situational expertise.

> *When I show other teachers and colleagues how I dance in a classroom, they can see the steps but it's not the same as the dance itself, which can only really exist there when I'm in the classroom with the students.*

A mentee of a PTP confirmed that the expertise of her mentor could not be detached from the context of the PTP's teaching practices.

> *We can't put a series of steps on how to learn that, I just don't think we can. You can watch videotapes of Clara teaching. It's not the same as being in the classroom with Clara and watching the interactions before class, after class, during break, all of that is important, that's where the real learning is.*

The inattentiveness to their expertise was also found, when a PTP told his experience that he was observed and briefed by his colleague. The PTP said he was not aware of what he was doing, he was just doing it.

> *My colleagues said, "Oh, well, what you're doing is you're following this whole process of student development, taking them to this stage of development to this stage of development…" I wasn't aware that I was doing that. I was just doing it. Sure enough, the questions that I was using did that, they asked different kinds of things; it had them comparing works, and it had them linking the work today with what we read yesterday and what we read the day before and pulling that old information into a revised form for today. I knew that I was doing that, but I didn't know that this was part of an educational process, so he was able to tell me things that I didn't know that I was doing, which was really very interesting.*

To a novice professor, the habitual and unexplainable expertise, it could seem like innate ability of a PTP, because it was so quick and deep. And it seemed to her that the expertise was not to be articulated in words.

> *One of the examples that comes to my mind is reading people. I think Anny is excellent at reading people, and so when she's conducting a session, she picks up on cues from the audience obviously and from individuals. The other thing that she's really good at is thinking in depth quickly, so you can watch her engage in maybe a one-on-one session with a student and the student presents a draft of something. She can respond to such*

> *a level of depth to get the person moving along in terms of her questioning, just brain-storming, whatever it takes in order to move the person forward.*

But there was one instance in this study that revealed the possibility of articulating tacit knowledge into words. A PTP was observed by a colleague who had a Ph.D. degree in education. The PTP was intrigued by his colleague's explanation of various aspects of his teaching. Some aspects of the PTP's teaching were not explainable in words to him, but his colleague explained his teaching behaviors by using educational jargon. He described the experience.

> *Right, so it is hard to explain. He was able to explain to me things that I didn't know. Because he was in education, in the field of education, he had all sorts of research to back up his observations of what I was doing that I didn't know that I was doing. I certainly didn't have the language, because every discipline, you're in education, you have a language that goes along with your field that is different from the language that goes along with my field. He had a whole language to explain things I had no idea, I knew internally that I was doing something, but I didn't know how to explain it. That's just it, because teaching is an art and it's hard to stop the art to put it into words. It was an interesting experience.*

His colleague was able to transform the PTP's tacit knowledge into explicit knowledge, even though the explanation could not deliver the specific situation where the knowledge was used. It meant that some tacit knowledge could be transformed into explicit knowledge through the use of appropriate language. Therefore, language can supply terms to transform some tacit knowledge into explicit knowledge, taking into consideration the limits of language. So, some tacit knowledge has a relatively high potential to be articulated in words given the limits, but other tacit knowledge has relatively low or no potential to be transformed into explicit knowledge.

Concluding Thoughts: The Tacit Nature of the PTPs' Teaching Expertise

The art of teaching, situational teaching, habitual teaching, and unconscious or subconscious teaching practices were tacit knowledge of PTPs' teaching expertise. These processes were difficult to be articulated in words, even though they were transformed into explicit knowledge to some degree. The PTPs had difficulty sharing their expertise with colleagues or mentees. These findings are consistent with Polanyi's (1967) seminal work that identified a form of knowledge known as the tacit dimension and suggested that "We can know more than we can tell" (p. 4). These findings are also aligned with Leonard and Sensiper (1998) explanations of the barriers that exist in sharing tacit knowledge. This study found the process of PTPs teaching to be natural, that is, seamless and flowing smoothly. PTPs have refined "natural teaching" through ample experience and incessant efforts to improve teaching. This natural teaching is aligned with Dreyfus and Dreyfus (1986) description of fluid performance as the main characteristic of expert performance. Fluid performance happens when experts perform their work without consciously thinking about situations and alternative ways.

Theme 2: The Nuances of Articulating Tacit Expertise

The second major theme that emerged from the data pertained to the nuances of articulating tacit expertise. Concepts within the transcript excerpts that supported this theme included doubting the possibility of sharing tacit knowledge, strategies for surfacing tacit knowledge, modeling and observing actions, using probing questions, describing intentions, and reflecting on actions.

Sharing tacit knowledge is difficult, because the nature of tacit knowledge and the difficulty of articulating it expose the arduous communication challenges between the possessor of the tacit knowledge and a person who wants to learn the tacit knowledge. One PTP believed that tacit knowledge could not be taught because it could not be articulated.

> *I can't teach what I can't articulate. I'm not sure what the art is really. I've seen people who have tried to emulate my teaching style, and it hasn't always worked for them. So, part of it I think is tied to the individual, and I can see it, I can recognize it I guess in other people, but I don't know that I can tell someone else how to develop that necessarily.*

However, some interviewees had their own ways to share tacit knowledge. Their sharing methods could be categorized into two ways. One way was to involve partners in real practices without transforming the tacit teaching expertise into explicit knowledge. This way was based upon an assumption that the tacit knowledge could not be easily articulated or transformed into explicit knowledge. The other way was making the tacit knowledge come to the surface in ways that allowed his/her partners to recognize the tacit knowledge. The underlying assumption of this approach was that some parts of tacit knowledge could be transformed by applying metacognitive skills, storytelling, or metaphors. Interviewees more frequently mentioned the first way than the second way. Some interviewees mentioned a mixture of the two approaches.

A way to involve partners in real practices was via observation of experts teaching. A PTP tried to explain how he could share his expertise that could not be articulated. His intent was to show his raw practices and allow his partners to see where his tacit knowledge resided.

> *Let me use an example. Do you know Mother Theresa? ...There was a question asked her, "How do you do this, you're working with the poorest of the poor?" She was one who grew up in a wealthy family, and she gave everything up to go work for all of these horribly poor people in India. Her answer always was, "Come and see. Come and see what we do." That, you can't really articulate. I can't really articulate. I can say that I go into a classroom and I get excited about it....but to see how it actually works, you have to come and see, just sit in. I have told*

people that, if you want to see it, just sit in the back of the room, or sit in one of the groups and be part of it.

A PTP also surmised that intensive modeling by the expert teacher could be a way of sharing tacit knowledge with an observer. However she did not prefer that way, because it underrepresented the notion that a teacher's personality supplied the strength to teaching.

One way it would be an intensive modeling so that you say, "I'm doing it, watch what I do and do it exactly the way I do." So, that would be one way to try to do that. But since everyone is different, my way wouldn't work for everyone else, so I wouldn't want to do it that way. I have seen other people do it, this is the way to do it, do it exactly the way that I do…But, to say to everybody, "Do it just the way that I do," wouldn't work because everybody's personality is different. Part of teaching involves using your personality. Your strengths of teaching are the strengths of your personality.

A mentee depicted a situation in which she believed that she had acquired tacit knowledge from her mentor. The mentee was convinced that she could understand the tacit knowledge because she watched her mentor's action as a holistic process without breaking down the mentor's action. The interpretation and understanding of the situation, and other situations, were left to observers, because the tacit knowledge was not separated from teaching situations of the PTPs, and that tacit knowledge could not be articulated. Thus, it took a long time for a novice to capture the tacit knowledge of an expert teacher, and various situations needed to be observed.

A mentee was certain that her observation of her mentor's real practices in various situations for a long time period helped her to grasp her mentor's tacit knowledge with regard to caring for students.

That statement doesn't show you how to care, but if you spend time with her, you observe how she implements that caring. That's what you can't often put into words exactly because it

> *varies according to student, but the value of caring and how she did that, I could view, I could feel, I could see. Do you understand what I'm saying? You could make a statement that teachers should be caring, you know she could have said that to me and it wouldn't have meant anything, but because I saw her as a teacher care for many students in many different ways, that's knowledge that I use on a daily basis now as a professor.*

Observation of PTP's practices in real situations was relatively free from the intention of PTPs, because the PTPs' teaching in the real situation was intended for the students in the classes. However, demonstration brought about a more focused intention from the experts about specific expertise that was difficult to explain, because demonstration was for the understanding of observers. A mentee of a PTP in the music department said that observation of her PTP's demonstration, even though the practice pertained to playing music and not teaching, was a way of sharing ideas that could not be expressed by words. She explained that the mixture of various motions could not be separated from each other and this mixture would be difficult to articulate in words.

> *Or, sometimes you can't explain it and he just plays it because I mean the great thing about music is you tend to express things you can't express with words, so sometimes you really can't explain something and he'll be like, let me play this part for you and you try this as well because I mean there are some motions you just can't describe sometimes, it's like a hodgepodge of all these motions put together.*

Observation did not guarantee acquiring tacit expertise. Observers would need to apply knowledge over time. A mentee mentioned that she observed her mentor's teaching for two years when they taught a course together. But, only after eight years of teaching experience did she feel she could "walk into a group and be comfortable and liven things up" in her classes. It meant that observation needed to be accompanied by time and it did not guarantee the observer's acquisition of tacit knowledge. And the

observer's command of the tacit expertise needed ample practice. The mentee explained how she gained the expertise.

> *I think just now, so after eight years, I'm starting to come to the point where I feel excited to walk into a classroom and feel confident that I can sort of bring a group through a learning experience without saying, "And now we will do this, and now we will do that." It's still not as natural for me, I don't know if I'll ever get to where she is, because it's not who I am, but I certainly learned a lot by watching how to relax and enjoy what happens and not feel the pressures of having to be the expert.*

Observation was a passive way to communicate tacit knowledge. However, "Bring it to surface" (BIS) was a more active one. BIS meant transforming tacit knowledge into a better communicable form. It transformed expert raw practices in cases where tacit knowledge was buried in situations or at a subconscious level. Interviewees of this project presented several ways of BIS. The interview method was one of them. An interviewer works with an expert, observes the practices, and asks questions during or after the expert's work.

> *One of the things that I learned as I explored that field, and I'm convinced is still very true, is that very often experts in whatever field it may be are quite unable to explain how they do their job, what it is exactly what they know, and what we learned in engineering expert systems over the years is that somebody has to be the outside observer watching that person do whatever it is that they're so good at and interrupting if necessary or at the end of a particular period of activity say, "Alright, you did this, why? Why did you do it that way instead of some other way?" In working together, an expert observer, an interviewer, and a true expert can very frequently capture what neither one of them can do alone.*

Another PTP insisted that the questions should be probing, targeted, and specific questions. To be able to ask those questions,

interviewers should have enough knowledge to identify targets for the questions and to probe deeply. When those questions provoked an expert to reflect upon his or her tacit aspects of teaching, the expert tried to bring them to the surface to his or her conscious level. The PTP used a metacognitive skill for BIS, when he was asked those questions. The metacognitive skill was "talking out loud" about the questions, which enabled him to think deeply, to make buried things become exposed, and to provoke the questioner to explore related concepts.

> *I don't think I have an example, but sometimes just talking out loud…talking about the situation, and I might not know where I'm going with the explanation, I'm using talk as a metacognitive strategy. I'm talking about something, to see if something will surface, to help the person understand something. So it's more of a talking out loud on a behavior, not sure where I'm going with it, but maybe something will surface that will help me explain it, or help the other person understand it. I guess that's a way I might try to get at something that I know, but is hard to express.*

Another way for BIS was through the use of metaphor. When something was impossible to be described in a direct way in words, some PTPs adopted something else which was the same in a particular way. The particular way was to help a communication partner to presume the nature of the something that could not be articulated in a direct way.

> *I tend to give a lot of examples. I tend to sort of go through an example or say it's like, create a metaphor, it's like this, I sort of metaphorically think or give a visual example because I think visually.*

The example of using metaphor was found in a PTP's description of teaching. When the PTP was asked to explain the art form of her delivery to me, she used a metaphor of cooking to help me understand the delivery.

> *I had one come in and wanted to see something, and I taught something and it was just flat. Sometimes you're on, and sometimes you're off. It was like I'm not sure, whether it was my timing or delivery, but it was like just bland. It was like eating a meal with no spices at all. Maybe that's what teaching is, adding some spice to the content, maybe that's it! Maybe it's not an art form, it's a cooking form. You have the content being all the ingredients, and then how you present it, that's the spice. That gets them in the kitchen. It's not the pot boiling that sound, it's the smell of the spices that lure people into the kitchen, right? Maybe that's what they remember, the delivery part of whatever.*

Storytelling was also used by a PTP, when he wanted to deliver his feeling or his understanding of beauty of music pieces, which was not directly articulated in words. The story was not abstract but specific. He presented an example of that kind of story for explaining his sad feeling about music.

> *I just heard one on the radio today that I might tell a student of mine if I have something very sad in the music. I just heard on the radio from Iraq, a woman who was the leader of a charity organization in Iraq was kidnapped, you must have heard on the radio about all the people who have been kidnapped and they get their head cut off. I heard her on the radio today, crying, begging for her life, they had that on the radio, on the TV station…It was terrible, I hated hearing it, I felt very sick and sad when I heard it. I would tell that kind of story to my student if there was a sad moment in the piece of music, for example, Mozart or one of the other composers.*

Whether it was observation or BIS, reflection on the experts' practices needed to follow. Sharing tacit knowledge seemed to require more intended, focused, and longer reflection than sharing explicit knowledge, because it was difficult to find articulated cues and explanations about tacit knowledge. Thus, time was needed for reflection on the tacit knowledge.

> *If they are still not understanding it, I don't know, maybe give them time to think about it and come back and ask questions. When you're presenting stuff to students, sometimes they don't get it right at that moment, but they do after thinking about it and reflecting on it and giving it some time to sink in or working in it in whatever you prescribed for them to practice. So, while they're in class with you, they might not be sure they understand, but once they go home and do the reading and do whatever the activity is and come back, they have gotten it. Sometimes it is that time that passes, whatever short period of time that might be that really helps people do their own work on it.*

Reflection by the novice should be accompanied with practice, because sharing tacit knowledge becomes a process of creating knowledge for novices. Through practice, they could experience the process of tacit knowledge, and reflect on their practices. Experiencing process was critical because tacit knowledge was procedural knowledge. Through the reflection and practice, novices can create their own tacit teaching expertise based upon their personality and preference, because teaching is art and the art is personal expression. A PTP explained why the process was a personal creation of tacit knowledge.

> *You cannot give them a recipe on how to do it, you can not give them detailed instructions. You can have them build their knowledge and background and then they have to work it out themselves. You give them supervision, you give them guidance, you give them suggestions. [Why can't you give those things?] Because it is a kind of art and art is a personal expression. First of all there are many theories, and students have to learn about all of those theories, but you can't really base yours on all these theories at once. You have to choose a path. The first thing is that they have to have a lot of learning so they can choose a path.*

The fact that sharing tacit knowledge was creating personal knowledge was supported by the notion that sharing tacit knowledge of art was constructing personal ideas. When a music PTP tried to

share his ideas of music (his tacit knowledge) with his mentee, the mentee constructed her own ideas of the music, even though both the PTP and the mentee experienced the same music at the same time.

> *I mean the way he plays something he could be thinking something in his mind and then when he plays I could be thinking something else in my mind all from the same piece all from the same way he played, but that's just because we think different and then I take what I want and I take the parts most relevant to me and then I work from there.*

The challenge for the PTP and the mentee is that the tacit knowledge associated with expert teaching will reside differently in each person's mind. It can be altered in the communication process – both in conveyance and reception.

Concluding Thoughts: The Nuances of Articulating Tacit Expertise

PTPs had difficulty in articulating much of their teaching expertise. The difficulty was rooted in three characteristics of teaching expertise. The first characteristic was that a considerable amount of the teaching expertise is in the form of art. This characteristic is aligned with Schon's (1983) search for an epistemology that can explain "practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict" (p. 49). In accordance with Schon, one can argue that the practice implicit in the artistic processes is the core characteristic of tacit knowledge. The uniqueness and uncertainty of problems embedded in the expert teacher's context are the places where tacit knowledge is used.

The second characteristic is that teaching is situated in a specific situation, thus it is difficult to separate from the situation. This characteristic is consistent with Zheng's (2005) assertion that sharing expertise is deeply influenced by the culture and work setting. In the case of university work settings, Shim and Roth (2006) suggested that universities need to provide professors with safe ways to

overcome cultural and physical barriers for sharing teaching expertise. Even then, it is worth noting that organizations cannot extinguish all of the barriers to knowledge sharing because many of them reside outside the boundaries of organizational action (Sharma & Grover, 2004).

The third characteristic was that teaching expertise was habitual, and thus became the target of subsidiary awareness. That is, PTPs were inattentive to their teaching expertise without being asked to explain it. This characteristic is consistent with Tsoukas (2002) interpretations of Polanyi's (1967) seminal writing. Shim (2006) provided a practical interpretation of this characteristic. Through the formation of tacit knowledge, an expert worker, for example, will focus on tools when s/he is in the process of learning the tools; will become unconscious of the tools through practice and repetition; and will eventually uncritically accept the tools. Through this process, the knower becomes unable to articulate the essence of his/her tacit knowledge.

Sharing tacit knowledge was often recognized as an impossible task because the nature of tacit knowledge prevented it from being articulated. However, methods of sharing tacit knowledge were categorized in two ways: observation and BIS. Observation was more frequently mentioned by interviewees than BIS. Sometimes, both methods were mixed to share tacit knowledge. Sharing tacit knowledge through observation was a lengthy process. Observation had merit in that it allowed observers to absorb the teaching situation holistically. This finding is aligned with assertions by Nonaka and Takeuchi (1995) that observation is a key method for sharing tacit knowledge in organizations.

However, the observation-only method transferred the responsibility of understanding tacit knowledge to the observers. Thus, observers might interpret tacit knowledge regardless of the intention of the PTPs, because the PTPs did not provide cues for the observers. BIS needed various communication and metacognitive skills for sharing, such as probing, metaphors, storytelling, and visualization. These skills are consistent with the suggestion of Nonaka and Konno (1998) that through dialogue an individual's mental models and skills are converted into common terms and

concepts. Two processes operate in concert: individuals share the mental models of others, but they also reflect and analyze their own mental models. In the case of this study, dialogue involved metacognitive tools such as probing, metaphors, storytelling and visualization.

To enhance the sharing of tacit knowledge in this study, reflection and personal practice were necessary in both observation and BIS. Through reflection and practice, sharing became more than merely mimicking the experts' tacit knowledge, it was creating novices' tacit knowledge.

Implications for Career and Technical Education Teacher Educators

A recent editorial piece by an editor of JITE noted that university classrooms can be lonely places (Burns, 2006). She noted the challenges of teaching a diverse set of students, of planning relevant class sessions, and surviving the ambiguities of a university culture. Career and technical education teacher educators probably have additional challenges that are not faced by other university professors. CTE professors are commonly teaching in laboratories that include hands-on learning with a variety of tools and equipment. Instructional methods can involve demonstration, modeling, practice, repetition, and so forth. Within these classroom and laboratory settings CTE teacher educators refine their skills as professors over time. Many of them eventually take on mentoring roles for those new to the professorial ranks.

The fact that CTE teacher educators work in unique contexts cannot be overstated in the relevance of this study to the readership of this journal. Burns (2005) explained that the Trade and Industrial (T & I) teachers that she has worked with tend to alter their simple, dualistic perspectives over time as to whether or not teaching is an art or a science. They come to recognize that the actions of teachers are context dependent. She explains "They have discovered that many of their decisions about teaching strategies, their responses to student misbehavior, or their selection of materials and assessment techniques, often must take into consideration more subjective

judgments" (p. 3). One of the authors of this study spent considerable time as a T & I teacher educator. He served as an "itinerant T & I teacher educator" traveling around a rural state helping new T & I teachers struggle through their first year of teaching. He also taught two-week "survival skills" training workshops in the summer for new T & I teachers who were pulled directly out of trades/industries and thrust into the unknown world of secondary level teaching. These new teachers relied greatly on establishing mentoring relationships with experienced teachers in their schools. Similar to these T & I teachers, novice CTE teacher educators learn over time to make subjective judgments in their roles as university professors. They learn their roles and garner knowledge about professorial work through application of theory, from observing and talking to other professors, and from trial and error.

Studies are needed that examine the unique cultures and other environmental factors of CTE teacher education programs that might hinder or help knowledge sharing among expert and novice professors. Several features of CTE programs could come into play. The graying of the CTE professoriate could be an issue with large generational factors affecting interactions among expert and novice CTE teacher educators. The small sizes of CTE programs and the merging previously segregated vocational and technical teacher education programs could also affect interactions. One could argue that the learning curve for novice CTE teacher educators is greater than other new professors, given that CTE teacher educators might not only have to meet typical teaching responsibilities, but also have to learn about supplying and maintaining technical laboratories, visiting student teachers, advising student organizations, and understanding the state's credentialing system for teacher certification. Within this milieu, the novice CTE teacher educators will need to identify expert professors and seek out ways of gleaning tacit knowledge from them.

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The Videoconferencing Classroom: What Do Students Think?

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Introduction

The advantages of video conferencing in educational institutions are well documented. Scholarly literature has indicated that videoconferencing technology reduces time and costs between remote locations, fill gaps in teaching services, increases training productivity, enables meetings that would not be possible due to prohibitive travel costs, and improves access to learning (Martin, 2005; Rose, Furner, Hall, Montgomery, Katsavras, & Clarke, 2000; Townes-Young & Ewing, 2005; West, 1999). However, there are few studies that analyze the effectiveness of videoconferencing from the student's perspective. Videoconferencing technology is often touted as a method to connect with previously inaccessible student populations, but does it adequately serve the needs of the students? If given a choice, would students select videoconferencing over face-to-face instructional methods?

Purpose of the Study

The information presented in this paper addresses student perceptions regarding videoconferencing as an instructional delivery method, but the study itself came about quite by accident. The Industrial Technology Department of a small university in the Northwest was running short of classroom space for a general education woodworking course for non-majors. This shortage was

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caused by increased student demand. Beginning woodworking is a popular course for students to fulfill one of their lower division university requirements. The course was typically delivered in a large lecture room with students divided into small groups for a separate laboratory experience. Under normal circumstances, an increase in enrollment would mean that extra sections would be created or that students would be combined into a large lecture classroom and divided into smaller laboratory sections. In this case; however, an additional instructor and/or classroom space large enough to accommodate all the students was unavailable. The institution was also experiencing severe budgetary constraints so maximizing available resources was paramount. The solution was to divide the students into two smaller classrooms and connect them using videoconferencing (VC) technology. The instructor taught approximately 40% of the students in a face-to-face classroom that was connected to a remote classroom holding the other 60% of the students. Students did not know that this would be a videoconference course before registering.

The goal of the delivery strategy was to provide a virtual environment as close as possible to face-to-face for the students in the remote classroom. Since the course has a large amount of visual and technical content, the delivery of this information using the VC format was challenging. The instructor had to adjust his teaching style so that students in the remote classroom could clearly see and hear him. The video and audio connection was two-way so students in both classrooms could see and hear each other as well as the instructor via large video screens. The instructor was able to present visual media and other printed material using an electronic switch that would alternate the screen image between the instructor and the visual material.

The department discussed the possibility of having the teleconferenced students switch rooms with the students in the face-to-face room midway through the semester, but this was rejected because of the potential for confusion among students and the additional workload to keep track of them. In addition, the department wanted the test the feasibility of delivering the course using this method in the future.

Instrument

In order to adequately assess VC as a technique for classroom instruction, a student survey was prepared using questions from Free Assessment Summary Tool (FAST), a web-based student evaluation site developed by Ravelli and Patz (2000-2004) and Mount Royal College (http://www.getfast.ca). Instructors using FAST select from a list of over 300 questions already tested for validity and reliability. According to Carini, Hayek, Kuh, & Ouimet (2001) self-reported information is considered valid when:

1. The information requested is known to the respondents;
2. Answering the questions does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways;
3. The questions refer to recent activities;
4. The respondents think the questions merit a serious and thoughtful response; and
5. Questions are phrased clearly and unambiguously.

Given these conditions and the design features of FAST, the survey questions submitted to the students contained a reasonable degree of validity. The questions selected from the FAST database were slightly modified to include the words videoconferencing technology. Questions from the FAST database included questions about student's perceptions of the technology itself and the instructor's use of the technology. Additional FAST questions were asked to distinguish student perceptions about the instructor versus the technology. The students answered a paper version of the survey while in the classroom.

The students responded to the questions shown in Table 1 using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Students were also asked to respond as to whether they had attended more than 75% of the lectures in this course. Finally, students were asked to rate the course (worst I have ever taken, poor, okay, good, excellent), and indicate which classroom they were assigned (face-to-face or remote). Students could also add other qualitative comments about the course.

Table 1.

List of Survey Questions
• I am comfortable asking questions using the videoconferencing format.
• I would have felt more engaged in a normal class setting.
• The videoconferencing technology is a barrier to my interaction with the instructor
• The purpose of using the videoconferencing technology is clear to me.
• The instructor uses videoconferencing technology appropriately.
• The instructor appears confident in using the videoconferencing technology
• The instructor uses appropriate media with the videoconferencing to enhance learning
• The use of videoconferencing technology in this course encourages me to continue discussions.
• The use of videoconferencing technology in this course encourages me to learn independently.
• The instructor encourages me to ask questions.
• The instructor establishes rapport with participants.
• The instructor is able to facilitate our communication.
• If I knew this was going to be a videoconferencing class, I would not have taken it.
• The instructor is able to use the videoconferencing technology required for this course.
• I would take another course that used this technology.
• I would recommend this course using this technology.

Method

On the first day of instruction, students were randomly assigned to either the face-to-face classroom or the remote classroom. The department administered the initial survey with the students about three weeks after the start of the semester. Rather than have students respond using the web-based format, students took the survey in the classroom to ensure a high response rate.

Prior to the initial survey, the VC system had many start-up problems such as dropped connections, unintelligible audio or fuzzy video. University technical support found that the majority of these problems were due to high communication volumes on the network during this particular time of day. The solution to this problem was to move the remote classroom to another location in the same building as the face-to-face classroom to take advantage of a shared server switch and reduced connection distance. Students took the same survey again at the end of the semester and the remote classroom students answered the questions from the perspective of their new location.

Results

Eighty-six students responded to the survey. One hundred percent of the students who were offered the survey responded. The results were compiled and statistically analyzed for the face-to-face (n = 30) and remote students (n = 56). Responses were also analyzed between the initial (first) and end-of-the semester (second) surveys. Forty-six responses were received on the first survey and 40 responses received on the second survey. Differences in the number of responses were due to absences or students who dropped the course before the fourth week.

The following provides the detailed results of the student survey. Ninety-seven percent of the students stated they attended more than 75% of the lectures. On the favorable side, over 90% of all students agreed that the instructor used the VC technology appropriately and encouraged the students to ask questions. Over 80% of all students agreed that the purpose for using the VC technology was clear to them and that the instructor was able to utilize the required VC technology. Over 80% of all students agreed that the instructor

appeared confident using the technology with the appropriate media to enhance learning and established rapport with the participants. Seventy-four percent of the students agreed that the instructor was able to facilitate communication using the technology. Sixty-four percent of the students agreed that they were comfortable asking questions using the VC format. See Table 2 for a summary of the favorable responses.

Table 2.

Percentage of Students Responding Favorably to Videoconferencing

Statement	Percent agreement
The instructor encourages me to ask questions.	94%
The instructor uses videoconferencing technology appropriately.	93%
The instructor establishes rapport with participants.	88%
The instructor is able to use the videoconferencing technology required for this course.	82%
The purpose of using the videoconferencing technology is clear to me.	80%
The instructor appears confident in using the videoconferencing technology.	80%
The instructor uses appropriate media with the videoconferencing to enhance learning.	80%
The instructor is able to facilitate our communication.	74%
I am comfortable asking questions using the videoconferencing format.	64%

Conversely, 80% of all students agreed they would have been more comfortable in a normal class setting and 57% of students

agreed that the VC technology was a barrier to their interaction with the instructor. Only half of the students agreed that the VC technology encouraged independent learning while 32% responded that they would not have taken the class if they had known it was going to be delivered using a videoconference format. Seventy percent of the students thought that the use of VC technology discouraged classroom discussions. See Table 3 for a summary of the unfavorable responses.

Table 3.

Percentage of Students Responding Unfavorably to Videoconferencing

Statement	Percent agreement
I would have felt more engaged in a normal class setting.	80%
The videoconferencing technology is a barrier to my interaction with the instructor.	57%
The use of videoconferencing technology in this course encourages me to learn independently.	50%
The use of videoconferencing technology in this course encourages me to continue discussions.	30%

Overall, 56% of all students rated the course as good or excellent, but only 33% agreed they would take another course that used VC technology. Only 20% agreed they would recommend this course using the VC technology.

Within Groups

For the face-to-face classroom, there was no significant difference in the responses between the first and second survey. For the remote classroom, there was a significant difference between the first and second survey. The perception that the use of VC

technology encourages students to learn independently eroded significantly (t(-2.585), p = .012, d = .34). Specifically, students in the remote classroom on the second survey were less inclined to agree that VC technology encouraged independent learning. In addition, students in the remote classroom significantly changed their opinion regarding the ability of the instructor to use the VC technology (t(2.756), p = .009, d = .37). Thus, by the end of the semester, these students agreed that the instructor was able to utilize the VC technology for the course. See Table 4.

Table 4.

Within Groups Statistical Analysis

	1st Survey		2nd Survey					
	M	SD	M	SD	*df*	*t*	*p*	*d*
The use of video-conferencing technology in this course encourages me to learn independently.	3.50	1.04	2.73	1.18	54	-2.58	0.012	0.34
The instructor is able to use the video-conferencing technology required for this course.	3.55	0.98	4.08	0.27	53	2.75	0.009	0.37

Between Groups

There was a significant difference in the responses between the face-to-face classroom and the remote classroom. Students in the remote classroom responded significantly different from the face-to-face classroom in both the first and second surveys that they would

have felt more engaged in a normal class setting (1st survey: $t(-2.571)$, $p = .014$, $d = .38$; 2nd survey: $t(-2.618)$, $p = .011$, $d = .35$). Students in the remote classroom responded significantly different than the face-to-face classroom in both surveys that that the VC technology was a barrier to their interaction with the instructor (1st survey: $t(-3.442)$, $p = .001$, $d = .50$; 2nd survey: $t(-3.661)$, $p = .001$, $d = .49$). As indicated by the effect size, this was the most important difference between the two classrooms. In addition, on the second survey only, students in the remote classroom responded significantly different than the face-to-face classroom that they were less comfortable asking questions using the VC format ($t(2.039)$, $p = .046$, $d = .27$) and that the instructor was less likely to encourage questions ($t(2.624)$, $p = .011$, $d = .34$). See Table 5.

Summary

Overall, the student responses pertaining to the instructor's use of the VC technology and his personal teaching skills were positive. Over three quarters of the students understood that the reason for using the VC technology was to satisfy the demand for the course and utilize existing classroom space.

It is interesting that a strong majority of students agreed they were comfortable asking questions using the VC format, but the remote classroom responses were significantly different with regard to their comfort and perceptions of interactions with the instructor at the end of the semester. This is verified by the remote students' responses that indicated that the VC technology was a barrier to their interaction with the instructor. Their normal comfort level with the learning process was disrupted by not having an instructor in the same room. The remote classrooms' perceptions of the technology also affected their perceptions of how to learn using the VC format as indicated by their changing response over time regarding the ability to learn independently. At first, it appears they blamed the

Table 5.

Between Groups Statistical Analysis

1st Survey	Face-to-Face Classroom M	SD	Remote Classroom M	SD	*df*	*t*	*p*	*d*
I would have felt more engaged in a normal class setting.	3.56	1.15	4.37	0.92	44	-2.57	0.014	0.38
The video-conferencing technology is a barrier to my interaction with the instructor.	2.63	1.08	3.73	1.01	44	-3.44	0.001	0.50
2nd Survey								
I would have felt more engaged in a normal class setting.	3.60	1.12	4.35	0.97	54	-2.61	0.011	0.35
The video-conferencing technology is a barrier to my interaction with the instructor.	2.83	1.05	3.85	1.00	54	-3.66	0.001	0.49
I am comfortable asking questions using the video-conferencing format.	3.80	1.09	3.19	1.13	54	2.03	0.046	0.27
The instructor encourages me to ask questions.	4.50	0.50	4.12	0.58	54	2.62	0.011	0.34

instructor for this lack of engagement and then gradually realized that it was their perception of the technology. According to Hogan (1992), the relationships between people and their individual and collective attitudes toward technology is an important part of socio-technical development and must addressed during this type of endeavor.

In spite of the initial technical difficulties and negative perceptions towards the technology, over half of the students thought the course itself was good. Since this course included both a lecture and a lab, their responses may have also included perceptions of the lab experiences. Two-thirds of the students seemed to prefer face-to-face formats and only a small majority would recommend this as a VC course. Yet, all the students registered for the course thinking it would have a face-to-face lecture component. If these students had known in advance regarding the VC format, course ratings might have been higher. Yet, the overall course ratings were higher than expected. Over 15% of the students rated the course as excellent.

To test the impact of VC technology on student performance, the department compared the test scores of the previous semester to the test scores of this videoconference class. No significant difference between test scores was found between the videoconference and face-to-face courses on either mid-term or final exams. Thus, it appears that the video technology did not affect the attainment of the course content, but did have an impact on student perceptions. If given a choice, students prefer face-to-face interaction with an instructor.

Conclusion

In terms of achieving the goal of offering additional seats to students while utilizing available classroom space, the VC technology did what it was supposed to do. However, its success was predicated by the availability of a VC classroom and adequate bandwidth—each of which requires a significant capital investment. For the long term, if videoconferencing of both local and remote classes were held on the same campus, it would probably be cheaper to construct additional classrooms or rent classroom space. Alternatively, for off-campus learning, this technology has good potential.

The following are personal observations and lessons learned from the experience. First, the ability of the instructor to adapt and learn new teaching techniques using this technology is critical to its success. In this case, the instructor's calm personality and good sense of humor helped develop positive student attitudes about the

technology while reducing their frustration with technical difficulties. In addition, the willingness of the instructor to work outside their comfort zone was a valuable contribution. Second, the rapid response from VC technical support staff was valuable in diagnosing and improving the delivery of the course. The support staff made many behind-the-scenes adjustments and good suggestions that were transparent to students during the process. Without support staff interest and technical follow-up, the delivery of the course using a VC format would not have been possible. Third, the patience of the students, their willingness to try something new, adapt their learning style, and maintain a positive attitude was important during the process.

In conclusion, videoconferencing as a format for courses that have large amounts of technical content or visual demonstration is worth pursuing. Videoconferencing is closest to a face-to-face experience for students in remote locations. The primary concern raised by students in this study was the perception that the VC technology was a barrier to their interaction with the instructor. If this concern can be addressed in future applications, the technology has merit. The other limitation of this format is that it requires good network connections, large video displays, and a willingness of the instructors and students to work with it and have patience through technical difficulties. It requires an investment of time and money. Savings are achieved through reduced travel time and costs, improved equity of access, and, as this study also demonstrated, short-term classroom space utilization.

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An Update: Preparation and Credentialing Requirements of Two-Year College Technical Instructors: A National Study

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Abstract

This study was conducted to see what changes have occurred in the preparation and credentialing of postsecondary technical faculty. The specific objectives of this study were: (a) to describe current credentialing requirements for two-year college technical instructors; (b) to describe program requirements for postsecondary technical teacher education programs; and (c) to compare changes that have occurred since prior studies. Since 1990 there has been a decline in the number of states that have credentialing requirements—down from 19 to 11 in 2006. The number of programs that prepare postsecondary technical faculty appears to be stable at a time of anticipated shortage of two-year technical faculty.

Introduction

Community colleges have a long history of providing programs that offer students traditional college level courses that lead to an associate's or applied degree—programs that prepare students for further study toward a bachelor's degree and that also prepare

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students for careers (Kasper, 2002). The historical role of two-year colleges, then, can be viewed in terms of educational tracks or paths: academic and career. Moreover, community or two-year colleges continue to afford students open access to higher education and to employment and careers, what can be referred to as workforce education and training. Kasper notes that "historically, community colleges have provided a gateway to opportunity for many young people who otherwise would have been denied access to higher education" (2002, p.16). An extension of high schools in its earliest incarnation, two-year occupational education has grown to increasingly provide another option beyond preparing to transfer to baccalaureate programs in colleges and universities or to enter the workforce with a "terminal" degree.

Community colleges today are comprehensive institutions providing occupational education and training from refrigeration technology to nursing through liberal arts transfer courses. They also provide adult education for their communities, short-term training programs for business and industries, and remedial education for those who want and need it. These institutions' primary mission is teaching and learning, not research (Grubb & Associates, 1999). The community college is the one educational institution simultaneously providing initial preparation for work, retraining and upgrading the skills of older workers, and second-chance training for individuals who need some combination of basic academic education and technical skills (Moore, 1997).

"Two–year colleges are a major contributor to higher education and have become the largest pipeline to postsecondary education in the United States" (H.R. Res. 2936, 1992, as cited in Zinser & Hanssen, 2006, p. 31). Community college faculty constituted 40% of all US higher education faculties (National Center for Educational Statistics (NCES), 2001). Additionally, 46% of all higher education students—a third of whom represent minority groups—are community college students. There is a unique opportunity for change in the community college sector with one-third of faculty expected to retire in the next decade (Rosser & Townsend, 2006). Most (51%) chief academic officers feel it will be "difficult recruiting fully prepared faculty members" (Berry, Hammons &

Denny, 2001, p. 133) to replace those retiring. Community college faculty are an aging, diverse population that serve the diverse needs of their student population. Gahn and Twombly's 2001 study found that community college faculty kept the same job an average of 14.5 years, with most (44%) coming from business and industry prior to teaching in community college. They further found the master's degree to be the "terminal" degree requirement for teaching in the community college overall. This is not the case, however, for those in technical programs where the bachelor's degree is sufficient (Palmer, 2000).

Community College Teaching

Relatively little is known about two-year college faculty because its members are understudied as a group (Rosser & Townsend, 2006). In fact, for an institution that sells itself as a teaching/learning institution, there has been little research conducted on teaching and learning in the community college (Levin, Kater, & Wagoner, 2006; Townsend, 2004).

"The quality of the education in the community junior college depends primarily on the quality of the staff" (O'Banion, 1997, p. v). Tsundo (1992) posits that community college teaching is one of the most difficult jobs in higher education today, with these institutions being held accountable for the product that they produce. Seymour and Hewitt (1997) report that, "poor quality teaching in subject matter expert classes [was] by far the most common complaint of all program switchers and non-switchers. Poor teaching was mentioned by almost every [science program] switcher (90.2%)" (p. 146).

Additionally, classroom-level studies point to a persistent gap between faculty members' expectations of students and the kind of work that their students are prepared to do. Indeed, community college instructors who are deeply committed to their students and to the work of teaching (Kozeracki, 2002; Outcalt, 2002), have, in a number of studies, described their students as not academically prepared (Copa, Plihal, Birky, & Upton, 1999; Kozeracki, 2002). Research also reveals that some instructional responses indicate varying levels of preparation that, while well intended, can exacerbate the problem (Grubb & Associates, 1999; London, 1978).

Technical Faculty

Community college technical and engineering faculty need to have knowledge and experience in their technical specialties, including having requisite mathematics and science knowledge and skills. Faculty also need to know how to design, deliver and evaluate curriculum and instruction, and they need to know how adults learn. Given the increasing diversity (e.g., racial, gender, socioeconomic, ability, educational readiness, motivation, and age) of the student population and the accelerating rate of technological change, there seems to be no one best teaching style. Effective teaching is dependent upon the instructor's ability to adapt a range of teaching methods to meet a variety of needs and ends (Grubb & Associates, 1999). If, "most faculty in two-year institutions arrive at their new positions not knowing how to design or facilitate learning experiences" (Copa, et al., 1999, p. 35), then how do we best prepare faculty with this knowledge and skill-base?

"Technical colleges are being faced with the increased number of teacher vacancies due to retirements, teacher's decisions to leave the teaching profession, and growth in career and technical education programs to meet employment demands" (Ruhland, 2001, Abstract section, para. 1). The increasing shortage of teachers in career and technical education fields merits a considered examination (Bartlett, 2002). According to the *Occupational Outlook Handbook* (Bureau of Labor Statistics, 2006) postsecondary career and technical education is one of the fastest growing careers. Technical job areas showing the highest growth are in database administration, personal care and home health aides, medical assistants, physician assistants, and health information. Increased student enrollments in these technical areas that require an associate degree will create a greater demand for community and technical college level faculty. Technical enrollments in community colleges align with this trend.

Nock and Shults (2001), in their research brief, list the top job preparation areas in the nation's community colleges. Allied health programs represent 46.6% of all programs; 19.6% of which are in registered nursing programs. Grubb (2005) indicates that, currently, occupational enrollments in community colleges are 29% business,

22% health occupations, 12% engineering and science technologies, and 5% computers/data processing. To keep pace with emerging technologies, community colleges continually create new programs that include information technology, biotechnology, and Web-based occupations. While there is a high demand for technical faculty in these technical areas, the pressing question remains: how well prepared are these faculty to teach?

Credentialing of Faculty

Past studies (Arizona State Board of Directors for Community Colleges, 1994; Bartlett, 2002; Delzer, 1972; Olson, et al., 2001; Olson, 1991) found few states having credentialing requirements for two-year technical faculty. A study conducted by the Certification Study Committee (Arizona State Board of Directors for Community Colleges, 1994) found the following states to have formal certification requirements for two-year college vocational faculty: Colorado, Idaho, Iowa, and Wisconsin. Additional findings indicated that the following states had standards for community college faculty: Alabama, California, Connecticut, Georgia, Hawaii, Illinois, Iowa, Maryland, Minnesota, Nevada, New Jersey, Virginia, West Virginia, Wisconsin, and Wyoming. Arizona, the state that initiated certification for community college faculty, requires its entire community college faculty to take a course on the community college prior to or early in their teaching career.

Bartlett (2002) notes that the Council for Higher Education Accreditation (CHEA) regional accrediting agencies expect faculty to have a minimum of 18 graduate semester credits in the subject they teach in programs where students are expected to transfer from a two-year college to a four-year college. This requirement principally applies to teachers of academic subjects rather than to those in technical programs with students earning applied associate degrees.

The State of Washington Vocational/Technical Council (VTC) received funding and support from the Washington State Board for Community and Technical Colleges to develop statewide standards for technical faculty (Goldstein, 2000, as cited in Wolff, 2003). They defined technical instructors as

> more than content specialists or practitioners of previous occupations. They teach in a knowledge-based economy to diverse learners with multiple needs and expectations and require a different preparation than offered in previous vocational instructor development. [These] faculty must now be computer literate, software smart, and people sensitive. (Goldstein, 2000, p. 3, as cited in Wolff, 2003, Definition section, para. 2)

Description of Study

This study was conducted as a follow-up to earlier studies (Olson, et al., 200l; Olson, 1991). The specific objectives of this study were: (a) to describe current credentialing requirements for two-year college technical instructors; (b) to describe program requirements for postsecondary technical teacher education programs; and (c) to compare changes that have occurred since the prior Olson studies (Olson, et al., 2001; Olson, 1991).

Methodology

This was a descriptive study. Data for this study were collected through e-mail communication. Representatives of appropriate state governing boards (n=50) were contacted with a request for information that would describe the current credentialing requirements for postsecondary technical instructors in each and every state. Follow-up e-mail correspondence was then sent or a telephone call made to representatives in those states that did not respond to an initial request for information (non-respondents), or where clarification was needed to determine the current status of postsecondary technical educator credentialing in the state in question. The web was used to initially locate and identify state representatives in appropriate state governing boards and to clarify or verify information. The web was also used to locate the current minimum educational requirements for two-year college technical instructors, current degree programs available that prepare two-year college technical instructors, and the current bachelor's and master's degree requirements for programs that prepare two-year college

technical instructors. This research study was conducted during the fall and spring of 2006. The research questions were as follows:

Phase 1: State Credentialing Requirements

1. How many states require credentialing of two-year college technical instructors?
2. What are the minimum educational requirements for two-year college technical instructors?
3. How have current credentialing requirements changed since the Olson, et al., (2001) and earlier (Olson, 1991) studies on credentialing?

Phase II: Postsecondary Technical Teacher Education Requirements

4. What degree programs are available to prepare two-year college technical instructors?
5. What are the coursework requirements in postsecondary technical teacher education programs?
6. How have postsecondary technical teacher education program requirements changed since the Olson, et al., (2001) and earlier (Olson, 1991) studies?

Procedures

During Phase I, all 50 state governing boards were contacted via e-mail communication and/or follow-up telephone call to request information toward answering questions 1, 2 and 3 outlined above. The web was then used to locate and identify information toward answering questions 4, 5 and 6 (current degree programs that prepare two-year college technical instructors, current bachelor's and master's degree coursework requirements for programs that prepare two-year college technical instructors). Programs were selected based upon the programs included in the Olson, et al., (2001) study that were clearly identified by titles as related to postsecondary technical teacher education programs. Secondary vocational education teacher preparation programs or secondary technology teacher preparation education programs were not included in this research study.

Findings

Phase I: State Credentialing Requirements

Data for all 50 states were located and examined at respective state education websites, with follow-up e-mails and phone calls accounting for 100% participation in providing information on credentialing requirements for postsecondary technical faculty in each of the 50 United States. Overall, fewer states have prescribed credentialing requirements since 1990, with only 22% (n=11) of the states having credentialing requirements. Of the 11 states found to have credentialing requirements in 2006, seven states (64%) require licensure of postsecondary technical college instructors with no additional minimum educational requirement (see Table 1).

Four (36%) of the 11 states require licensure of postsecondary technical instructors and also offer a bachelor's degree program in technical teacher education. Five states offer a bachelor's degree program in technical teacher education but do not confer licensure. In addition, two of the four states (Idaho & Minnesota) that require licensure and offer bachelor's degree programs in postsecondary technical teacher education also offer master's degree postsecondary technical teacher education programs. Three states (Michigan, Ohio and Utah) offer bachelor's and master's degree programs in postsecondary technical teacher education but do not confer licensure. Further, two states out of the nine included in the longitudinal (1990, 1998, & 2006) comparison of state minimum educational requirements, require a master's degree (Note: a master's degree is the minimum educational requirement in *Academic Areas* in Arizona) (see Tables 2 and 3).

A bachelor's degree is the minimum educational requirement in two states in 2006. Two states report that an associate's degree meets the minimum educational requirement for two-year college technical instructors. South Dakota signifies that "less than a Bachelor's degree" is acceptable in trade and industry or health occupations, with three years additional work experience a requirement for employment. Three states indicate that the minimum educational requirement could be a high school diploma (or equivalent), with work experience a condition of employment (range = 5-8 years).

Table 1.

1990, 1998 and 2006 Comparison of States Credentialing and Non-Credentialing

Non-Credentialing (n=39) + Dist of Columbia & Guam			1990	1998	2006
Alabama	Louisiana***	Ohio	62%	66%	78%
Alaska	Maine	Oklahoma			
Arkansas***	Maryland	Pennsylvania			
California***	Massachusetts	Rhode Island			
Connecticut	Michigan	South Carolina***			
Delaware	Mississippi***	Tennessee			
D.of Columbia	Montana	Texas			
Florida	Nebraska	Utah			
Georgia	Nevada	Vermont			
Guam	New Hampshire	Virginia***			
Hawaii***	New Jersey	West Virginia			
Illinois	New Mexico	Wyoming			
Indiana	New York				
Kansas	North Carolina				
Kentucky***					

Credentialing (n=11)	1990	1998	2006
Arizona*	38%	34%	22%
Colorado*			
Idaho*			
Iowa*			
Minnesota*			
Missouri*			
North Dakota**			
Oregon**			
South Dakota*			
Washington*			
Wisconsin*			

Notes. *Credentialing in 1990, 1998 and in 2006. **States requiring credentialing in 2006 but not in 1998. ***States requiring credentialing in 1998 but not in 2006. The District of Columbia and Guam are new populations included in the 2006 comparison. Nine states that required credentialing in 1990 and 1998 still credential in 2006. Eight states that required credentialing in 1998 no longer have formal requirements in 2006. Additionally, two states that did not credential in 1998 have credentialing requirements in 2006.

Table 2.

Comparison 1990, 1998, and 2006: Minimum Educational Requirements

Educational Requirement	1990	1998	2006
Master's Degree	NA	NA	2
Bachelor's Degree	3	5	2
Associate's Degree	4	2	2
High School Diploma	6	10	3

Table 3.

Comparison 1972, 1990, 1998, and 2006: Minimum Educational Requirements for Two-Year Instructors

Year	Education Requirements	Mean Years of Work Experience[1]	Tech. Ed. Credit
1972	HS=3 18 months training 2 years postsecondary ed. =2 AA=2 18 semesters of math and science=1	**3.67**	Most (67%) did not require any technical education. Those that did (33%) only required workshops or 12 semester hours.
1980	HS=5 AA=3 Bachelor's=1	**4.22**	Most (77.78%) required some coursework at this point with an average of 10.57 semester hours.
1998	HS=3 AA=2 Bachelor's=2	**6.75**	One state required a course on the Two-Year College. More varied course and workshop requirements depending on what was being taught.
2006	HS=3 AA=2 Bachelor's=3 Master's=1 No specified=2	**4.0**	Most (77.78%) required some coursework/ workshop credit at this point with an average of 21.29 semester hours. Again it depended on what was being taught and the purpose (terminal or transfer).

Sources: Delzer (1972); Olson (1991, 2001). *Notes:* *Courses in the community college; OCE = Occupational Competency Exams; HS = High School; PS = Postsecondary Education; A.A. = Associate Degree in Applied Science. For education level requirements the lowest level required was used. Nine states were reviewed. 1 For those states that reported required work experience.

The state of Minnesota, which required an associate's degree in both 1972 and 1990, reports that the minimum educational requirement in 2006 varies with the occupation taught, specifically listed as "license fields." Arizona's minimum educational requirement in *Occupational Areas* is five years work experience in the field to be taught, in conjunction with a high school diploma. Conversely, in *Academic Areas*, a master's degree is the minimum educational requirement—a notable distinction. The state of Idaho will subtract four years off the eight years work experience requirement with a college degree.

Phase II: Teacher Education Programs

In Phase II, using reviewed programs listed in the *Directory of Industrial and Technical Teacher Education Programs* (Schmidt & Custer, 2006-07), particular attention was paid to programs reviewed during earlier studies (Olson, et al., 2001; Olson, 1991). Programs were also reviewed to see if the programs truly served the mission of postsecondary technical teacher preparation. Twenty-three programs (13 master's programs and 10 bachelor's programs) were found that indicated their mission (full or in-part) was to prepare postsecondary technical faculty for the two-year college (public and proprietary) and often training in business and industry (another related adult population). Titles of some programs have changed between 2000 and 2006 (e.g., Vocational Education to Education and Human Resource Studies; Occupational/Workforce to Career and Technical Education) (see Table 4).

All undergraduate degree programs reviewed (n=10) require an instructional techniques course, while most (90%) require instructional technologies applications and adult learning and development theory (80%) courses. The majority of the programs (70%) also require coursework on assessment/evaluation and curriculum development. Few programs had a required practicum or a specific course requirement on training and development (30-40%). Over the past 16 years (1990-2006), there has been an increase in the number of programs requiring coursework in instructional technology applications, adult learning and development and

assessment/evaluation. However, fewer programs are requiring a practicum as a capstone course. No programs reviewed currently require coursework on the two-year college or occupational employment experience (see Table 5).

Table 4

Summary of Teacher Education Programs that Train Two-year Instructors (n=23): 2006

	Titles Used for Degree Programs
Bachelor's (B.S.); n=10	Occupational Studies; Technical Education (TCED)(n=3) Professional-Technical Teacher Education Resource Studies; Specialization: Adult Education & Training; Career and Technical Teacher Education: Vocational-Technical Ed Private or Public Sector Options; Career and Technical Education; Occupational Training & Development; Technical, Trade and Industrial Ed. (Postsecondary Option); Career, Technical Ed. and Training
Master's M.S.; M.Ed.; n=11	Community College Teaching; Teaching, Learning and Leadership: Occupational Education Studies; Technical Teacher Education; Workforce Education & Development; Technical Education; Occupational Studies; Education and Human Adult Education and Training; Instructional Technology

Notes: n=30 programs among 13 institutions listed. These are the same institutions reviewed in 2000 (Olson, et al., 2001), with 18 programs.

Table 5

Comparisons of 2006 Summary of Bachelor Degree Requirements

Course	1990 (n=16)	1998 (n=9)	2006 (n=10)	Common Title Terms	Trend
Instructional Techniques	100.0	100.0	100.0	Instructional Design, Techniques, Methods	=
Instructional Technology Applications	64.7*	88.9*	90.0	Instructional Technology, Computers, Ed. Technology	+
Adult Development & Learning	41.2	66.7	80.0	Adult Education, Learning, Principles	+
Assessment/ Evaluation	55.6	70.6	70.0	Needs Assessment, Evaluation, Assessing Students	=
Curriculum Development	94.1	100.0	70.0	Curriculum Design, Occupational Analysis, Program Development, Course Construction	_
Practicum	82.4	100.0	40.0	Student Teaching, Internship, Exit Experience	_
Training and Development	23.5	77.8	30.0	Training	_
Occupational Employment Experience	52.9	22.2	0.0	Work Experience	_
Two-Year College	17.7	0.0	0.0		_

Notes= Combines Computer Literacy and Media Methods*

Of the 13 master's programs that prepare postsecondary technical instructors, all require coursework in research, curriculum, and instructional techniques. Most programs require a foundational course in the history/philosophy of career and technical education (76.9%) and adult learners (61.54%). Coursework in evaluation of learners (20.76%) and the two-year college (15.38%) are less frequently required in the 13 master's programs reviewed (see Table 6).

Table 6

Comparisons of 2006 Summary of Masters Degree Requirements

Course	1990 (n=16)	1998 (n=9)	2006 (n=10)	Common Title Terms	Trend
Research	100.0	100.0	100.0	Research Methods, Design, Techniques, Inquiry	=
Curriculum	85.7	100.0	100.0	Program Development, Curriculum Development, Occupational Analysis, Systems Design	+
Instructional Techniques	85.7	100.0	100.0	Methods, Techniques, Fundamentals	+
Supervision/ Leadership	57.1	22.2	100.0	Administrative, Leadership, Supervision	+
Survey of Occupational Education	85.7	22.2	76.9	History, Philosophy, Foundations, Principles Vocational, Occupational, Workforce Education	+
Adult Learners	28.6	44.4	61.54	Adult Learner, Education	+
Evaluation of Learners	28.6	44.4	20.76	Evaluation, Assessment	-
Two-Year College	28.6	11.1	15.38	Two-Year College	+

Discussion and Conclusions

There continues to be confusion between secondary career-technical education and postsecondary (two-year college) technical education when it comes to the examination of credentialing requirements and teacher preparation. Research findings point to credentialing as a rarity, and, where states do have credentialing requirements, they are not always clear.

Previous scholarship also suggests that the acceptable minimal level of education needed to credential entry level faculty is creeping up on this faculty population, perhaps due to the larger pool of educators continuing their education due to articulation agreements, on-line programs, and degree completion programs. During this review, one state indicated that it now requires a master's degree as a minimal degree for credentialing—this was not the case during the last two reviews wherein no states required a master's degree. Regional accreditation requires those teaching in programs that are intended for transfer to four year institutions to have 18 graduate credits in the field in which they are teaching. Perhaps, then, the role of credentialing or of the institutions has changed. More two-year college technical programs are involved in having their students continue their education beyond the two-year degree, much like high school career technical programs and tech prep programs that have been pushing students to continue their education beyond high school.

Changes in course requirements for undergraduate programs reflect an earlier trend observed in 2001 (Olson, et al.) concerning the increasing additions of adult learning theory and instructional technologies courses in postsecondary technical teacher education programs. The large percentage of these courses represented in program curricula is reflective of studies that point to the required competency needed for postsecondary technical faculty. Additionally, in reviewing the existing postsecondary technical teacher education programs, it was not clear how or if students could transfer some or all of their terminal associate degree coursework to bachelor's degree programs. What is clear, however, is that more

programs are preparing postsecondary technical instructors than states requiring credentials.

Some important questions emerge, then, in relation to those who complete teacher education programs that de-emphasize the professional needs of two-year college faculty:

- How successful are teacher candidates in finding teaching positions?
- How long, on average, do these teachers stay in teaching positions?
- Do these teachers stay longer than those without such professional preparation?
- What advantages do states with credentialing requirements have over those states without such requirements?

Ruhland (2001) found that technical faculty that left the two-year college had career goals of completing a bachelor's or master's degree. Research findings indicated that a lack of teacher preparation was a factor for those who left the profession. Ruhland's study was conducted in Minnesota—a state with both postsecondary technical teacher education programs and credentialing requirements.

It is important to note that numerous institutions offer a certificate in community college teaching or college teaching. The majority of these programs, however, do not focus on the professional development needs of technical faculty in the two-year college (Haworth & Wilkin, 2004). Clearly, the population from which we lack needed research and evidence is this segment of educators in higher education: those who teach community college students (Outcalt, 2002).

Olson, et al., (2001) state that, "historically, states have had little involvement in the credentialing of postsecondary technical instructors" (p. 65). Moreover, Bartlett (2002) reports that the majority of educational activity (i.e., teacher preparation, licensure and certification) is found at the secondary level, not at the postsecondary level. Equally troubling is the challenging issue of how to construct a foundation in academic and occupational skills that allows students to enter a workplace with technical skills *and* that also provides the option to continue their education toward a

bachelor's degree (Zinser & Hanssen, 2006). Essentially, if postsecondary education—in collaboration with local companies and industries—sees the benefits and need for certification programs for students, why is there no sense of urgency toward ensuring the credentialing of those entrusted with their education?

With the growing cost of higher education and greater accountability expected for higher education outcomes (CHEA, 2007), perhaps these movements will guide what we expect of two-year college faculty and how they are to be prepared. The focus on higher education outcomes and implications for the field and practice lead to still more questions: what should an educated person with an associate degree know and be able to do in general? With a four year degree? And, what general knowledge and skills need an instructor have?

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BOOK REVIEW

Leadership in Career and Technical Education: Beginning the 21st Century

James A. Gregson and Jeff M. Allen, Eds.
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Reviewed by Michael Kroth
University of Idaho

Of courage undaunted, possessing a firmness & perseverance of purpose which nothing but impossibilities could divert from it's (sic) direction.

Thomas Jefferson, describing the leadership of Meriwether Lewis
(found in *Undaunted Courage* by Stephen Ambrose, 1997, p. 484)

Introduction

Here in the Northwest the explorations of Lewis and Clark are legendary. Their journey into territory unknown to those in their world, facing dangers they could not imagine, was made possible, Ambrose (1997) says, because of outstanding leadership and the ability to mold their band into what became known as the Corps of Discovery. This group trusted each other completely, and had honed itself into a hard, disciplined company able to surmount obstacles we cannot imagine.

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In 1915, Ernest Shackleton completed one of the most amazing feats that has been recorded in our history. After his ship, the Endurance, became locked in Antarctic ice and was subsequently destroyed, Shackleton led all 27 of his crew to safety over 850 miles of some of the most dangerous and harsh conditions possible. Albert Lansing's riveting book, *Endurance: Shackleton's Incredible Voyage* (1959), describes that journey and Shackleton's unending will to take his charges to safety.

In Chapter 4 of the book *Leadership in Career and Technical Education: Beginning the 21st Century,* edited by James A. Gregson and Jeff M. Allen (2005), Jerry R. McMurtry says "it is clear the field [of CTE] is in a situation nearing a crisis." He further issues a "call to action" (p. 108) to current or aspiring leaders in CTE to prescribe the future for the field. He suggests that CTE is moving toward chaos, and may need to consider new structures in order to survive.

Good editors provide an arc, or overriding theme, for a piece of work. In this case, Gregson and Allen have provided the rationale and the impetus for a wake up call. Whether there are Shackletons or Lewises who might emerge in time for CTE is another issue. GE CEO Jack Welch's famous rule "control your destiny, or someone else will" (Tichy and Sherman, 1993, p. 12), seems worth contemplation when the forces of change, as outlined in this book, swirl so vigorously.

Gregson sets the tone in the Forward as he describes why leadership is difficult in career and technical education today. Programs preparing professionals have declined at research extensive and land grant universities, he says, and as a result so has research in the field and about its leadership. Career and technical education programs in general continue to decline as public policy impetus seems to push such programs to the postsecondary level. Resources are shrinking at the same time demands are increasing. Understanding leadership in the field is sufficiently difficult, he points out, because CTE has many purposes and occurs at many different levels. Finally, he situates the challenges proposed by the

book's chapter authors not only in the world of CTE, but also that of higher education and the nation.

Strategic Assessment of CTE

There is nothing new about an institution, field, or organization being made problematic by shifting tides. Business schools have faced challenges similar to those of CTE institutions of higher education (Friga, 2003). New competitors such as private education firms, demographics that increase demand, and the advent of disruptive technologies that affect knowledge distribution are just three of the factors impacting management education as well as CTE.

Michael Porter's (1980, 1985) model of competitive analysis provides a useful tool to assess the forces which may impact an organization's competitive position. A longer article fully articulating Porter's five elements as related to CTE and an in-depth discussion of strategy as tool for leaders might give the field a clearer picture of the future. Here, however, is the basic outline of his model, and how it might be applied to CTE. (For an example of how Porter's model can be applied to higher education see Collis, 1999).

Porter (1980) defines an industry as "a group of firms producing products that are similar to each other" (p. 5). For our purposes let us consider CTE to be that group of higher educational institutions that produce secondary and post-secondary educators. Let us also assume, as Gregson points out, that the demand for CTE teachers is increasing and supply for now is limited.

The five forces Porter describes are: Threat of New Entrants, Bargaining Power of Firm's Suppliers, Bargaining Power of Firm's Customers, Threat of Substitute Products, and Intensity of Rivalry Among Competing Firms. A changing situation in any one of these areas might reorient an industry's competitive playing field. I like this model because it is a lens that can be applied to any type of sector – for-profit, not-for-profit, government organizations, or here, educational institutions. Let us use it to briefly analyze CTE's situation.

Threat of New Entrants. High barriers to entry – passing the bar examination, certain types of regulation or government policy, as

examples - may limit competition to be among just a few, relatively friendly, competitors. Low barriers lead to cutthroat competition with many players. With a high demand for teachers and low supply new entrants should find entering the field appealing. Current providers – institutes of higher education – may find other competitors, private educational institutions for example, entering into the field. If barriers to entry are lowered or made more accessible, say by modifying certification requirements or the introduction of new technology, new competitors will more easily emerge.

Bargaining Power of Suppliers. When there are few or unique suppliers – those who sell to the organization – prices are more likely to be higher. When the organization can buy from many suppliers prices are more likely to be lower. In this case, the suppliers are faculty or potential teachers. Normally, when there is more demand than supply, as we've assumed above, sellers have more bargaining power. Price – in this case salaries, benefits, or the cost of other accommodations for teachers - rises.

Bargaining Power of Buyers. Buyers are those who purchase the group's product. In this case buyers are those who pay CTE higher educational institutions to produce teachers. Buyers here might be state or federal granting institutions or the potential teachers themselves. To the extent there are substitutes, in this case for CTE or for teaching careers, the power of buyers increases because they have more choices.

Threat of Substitutes. Substitution occurs when one service or product takes the place of another when providing for the needs of a buyer. In the case of CTE, if potential teachers find more attractive opportunities than teaching or preparing for teaching they may turn to another occupation altogether. When buyers, such as these teachers or funding agencies, have alternatives their ability to command concessions rises.

Intensity of Rivalry Among Competing Firms. Competition between existing companies may occur through the introduction of new products or services, price competition, marketing strategies, or improved service to customers. Porter says that when competitors feel pressure from other rivals they may try to position themselves to

advantage, which then causes others to then try to reposition themselves. In the case of CTE, institutions of higher education may try to differentiate their offerings or make their processes – and thence the teacher's learning experience – more efficient, or turn to alternative strategies to position themselves more attractively than other competitors for students or funding.

Porter's model is not the only way to interpret changes occurring in CTE, but it points out that leaders have tools to help them understand the forces which are driving change. Leadership, in many cases, involves not only the character that Lewis, Clark, and Shackleton exhibited, but also the ability to assess the situation and to think strategically. Every chapter of *Leadership in Career and Technical Education* provides compelling evidence that CTE leaders must be strategic in order to be successful over time.

Chapter Summaries

In Chapter 1, New Approaches to Preparing Career and Technical Education Teachers, Kenneth Gray describes changes that have significance for teacher preparation programs and CTE teachers. He provides compelling evidence that there will be a significant demand for CTE teacher preparation programs. Teacher shortages he says, however, are significant and the numbers of CTE teacher preparation programs have declined. Enrollment in these programs has also declined. He describes strategies that institutions are undertaking, such as alternative licensing programs, and notes the new competitors entering the field, such as community/technical colleges, school districts, and private sector for-profits. Much of what he depicts involves rethinking CTE teacher preparation. Gray makes clear that competition for teacher preparation programs will increase, and that the current model will not survive. Specifically, he writes that "while in the past CTE teacher preparation was the sole domain of traditional degree-granting institutions, it is likely in the future these programs will no longer have such a monopoly" (p. 22). Existing programs will face the threat of an "open market" (p. 22).

William G. Camp and Courtney L. Johnston, in their Chapter 2 article titled Evolution of a Theoretical Framework for Secondary

Level Vocational Education and Career and Technical Education over the Past Century, describe efforts to develop a theoretical base for vocational education from the 1900's to the present. They then provide a proposed framework for the practice of CTE today. First they relate Prosser's Sixteen Theorems, which they call guiding principles for the design of vocational education from the early 1900's, to the theoretical work of subsequent writers and create a retrospective theoretical framework for vocational education. Concluding that there have been no significant efforts to establish a CTE theoretical framework and that, indeed, one does not exist, they propose their own, with human capital theory as the fundamental theoretical premise and constructivism as the basis for pedagogy. They situate their framework in current educational and work requirements. The leadership issue which Camp and Johnston seem to allude to but did not explicitly identify suggests a dearth of important thinkers in the field. If there have not been theoretical debates over the decades, leading to progressively deep understandings of the profession's underpinnings and at least a tentative theoretical framework either accepted or eschewed by scholars and practitioners, then the field seems certainly at risk.

Christopher J. Zirkle, Rebecca A. Parker, and N.L. McCaslin take on the Changing Environment of Career and Technical Education Leadership Development in the United States in Chapter 3. If our previous authors pointed out the need for new thinking about teacher preparation programs and the lack of existing theory in the field, Zirkle and his colleagues make the case that the numbers of existing leaders and the potential to develop new leaders is a "crisis" (p. 63). The authors here make a compelling case that there will be a dire need for new laborers in the workforce now and in the future. At the same time, educational administrators are or will be eligible to retire soon, creating a shortage they describe as a "grave concern" (p. 65). After describing the difficulties facing CTE leaders, including domestic changes and federal laws, they propose a conceptual framework for CTE leadership programs, drawing upon the Interstate School Leaders Licensure Consortium (ISLLC) standards and what they call a career and technical education knowledge base. This knowledge base consists of thirteen categories including such items

as developing a CTE vision, establishing a CTE culture, and understanding policy development issues. They go on to detail the status of CTE-related leadership programs. Finally, they make recommendations for leadership development, including the need for CTE to develop national leadership development standards.

Jerry R. McMurtry begins Chapter 4, with a "passionate call to action for vocational educators to …alert the field to an impending crisis" (p. 95). This chapter, Imagining the Future of Career and Technical Education: Reflections for Career and Technical Education Leadership from National Leadership Institute Scholars, describes leadership development efforts in the field including the work of the National Center on Vocational Education starting in the early 1990's to identify the leadership attributes of vocational educators. A Leadership Attributes Inventory was developed from this list of attributes for use in CTE leadership development programs. McMurtry says the "overall effort to create a comprehensive leadership development program for vocational education was remarkable" (p. 103). The movement, however, quickly died out until the National Leadership Institute (NLI) was created in 2001. McMurtry describes the purpose of the institute as developing leadership capabilities in CTE educators who were selected to be NLI scholars. The rest of the chapter summarizes key themes which emerged from a Delphi process which engaged 31 participants in the program. Members identified lack of a national vision as the overriding issue facing CTE and lack of new leaders to fill future needs as the second. Vision was identified as the most mentioned attribute CTE leaders will need in the future, second was a commitment to the principles of CTE. The most important skills identified as needed were networking skills, first, and organizational skills, second. McMurtry summarizes by saying that CTE is at a crisis point, not only because of the need for leaders and leadership, but also because of the momentous change that is afoot. Affirming that CTE may be moving toward chaos – much as Porter (1980) describes changes which may occur in various industry structures – he says that new CTE configurations might emerge.

Chapter 5, Leadership in Career and Technical Education: an International Perspective, by Joshua D. Hawley, gives an overview

of the status of CTE globally. New policies are developed or in the process of being developed by significant organizations such as the World Bank, the Inter-American Development Bank, and the International Labour organization. Hawley calls these the first major efforts to develop clear global vocational education and training policies in ten years. He notes the continuance of international academic scholarship and also significant new books in this arena. The data he shares is equivocal, however. For example, he reports that 64% of countries experienced increases in enrollment from 1998/1999 to 2000/2001, yet the numbers of graduates declined in 12 of 25 countries between 1998 and 2001. Hawley chalks this up as probably the result of differing ways agencies collect information. He concludes, however, that one cannot deduce that vocational education and training is increasing, nor that the level of funding has increased. He includes interesting discussions about vocational and technical school financing and goals, the role of international agencies, and the privatization of public services. Vocational-technical education will be ever more important, Hawley believes, because governments need to develop their workforces for global competition. He also wonders about the role of national state agencies when international agencies are playing increased roles in decision making.

Conclusions

Times of turbulence are always bursting with both opportunity and threat. When there is a vacuum, proactive people step in and find ways to take advantage of everyone else's hesitancy or fear, in order to rearrange the situation advantageously. This, following Jack Welch's' admonition to control one's own destiny, seems to be the state of CTE today, if one believes the authors in this book. No one, wherever they are, desires the "or someone else will" part, yet - if anything – this book signals that this is the state of CTE today. Who will lead CTE through this restructuring process? Who will become the field's thought leaders? Who will become the policy makers and administrative leaders who fill the void? Where are the Lewises and the Shackletons of today's CTE, who can provide the vision, assess

the terrain, lead the people, and negotiate the obstacles that await? The prospects for becoming a leader in CTE have never seemed brighter. The consequences of complacency never seemed so dire.

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COMMENTS

Twenty-Eighth Annual Outstanding Manuscript Award Recipients

Journal of Industrial Teacher Education

Each year the Editorial Board of the *Journal of Industrial Teacher Education* acknowledges excellence in writing through its Outstanding Manuscript Awards. The awards task force, consisting of current and former *Journal* editors and officers of NAITTE, reviewed each published refereed manuscript from Volume 43, Issues 1-3, of the *Journal*. The members first determined whether the manuscript merited recognition and then ranked the selected manuscripts. Individual rankings were combined to determine the recipient in each of the award categories. The awards task force for Volume 43 consisted of Daniel Brown, Janet Burns, Charles Gagel, Marie Hoepfl, Kara Harris, and George Rogers. The Editorial Board of the *Journal of Industrial Teacher Education* extends warm thanks to these individuals for their assistance in the awards selection process and for their continued service and commitment to NAITTE and the profession.

The Outstanding Manuscript Awards are presented to authors of refereed manuscripts based on three categories: research, conceptual, and dissertation. The Outstanding Research Manuscript is selected from published articles that were data based. The Outstanding Research Manuscript for Volume 43 was co-authored by James C. Flowers and Holly Baltzer of Ball State University, Muncie, Indiana. Their article, published in the Fall, 2006 edition, was entitled *Hiring Technical Education Faculty: Vacancies, Criteria, and Attitudes Toward Online Doctoral Degrees*. The authors provided information to university departments as they considered offering online doctoral programs in technical education. This report utilized finding from department chairs and program coordinators to characterize faculty vacancies at the bachelor's and masters levels in post-secondary levels.

The Outstanding Conceptual Manuscript Award is chosen from philosophical, historical, curricular, or expository pieces. Richard A. Walter of Pennsylvania State University authored the Outstanding Conceptual Manuscript for Volume 43 Number 4. His article entitled *Developing and Effective Workforce through Instructor Training* provided an insight into skilled instructors and that a properly trained instructor can do a much better job than an untrained instructor.

The Outstanding Dissertation Manuscript award is selected from articles that report the findings of a thesis or dissertation. The Outstanding Dissertation Manuscript for Volume 43 was co-authored by Edward J Lazaros of Ball State University and George E. Rogers of Purdue University. Their article, which appeared in issue Volume 43 Number 2, was entitled *Critical Problems Facing Technology Education: Perceptions of Indiana Teachers*.

The Outstanding Manuscript Award recipients were recognized at the NAITTE Breakfast at the Association for Career and Technical Education Conference in December 2005. The recipients were presented plaques for their achievement. Once again, the *Journal* Editorial Board and NAITTE congratulate the award recipients of Volume 43.

BITS AND PIECES

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