# PROFESSIONALS' PERCEPTIONS OF THE EFFECTIVENESS OF ONLINE VERSUS FACE-TO-FACE CONTINUING PROFESSIONAL EDUCATION COURSES

A Dissertation

by

JIE KE

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

DOCTOR OF PHILOSOPHY

August 2010

Major Subject: Educational Human Resource Development

# PROFESSIONALS' PERCEPTIONS OF THE EFFECTIVENESS OF ONLINE VERSUS FACE-TO-FACE CONTINUING PROFESSIONAL EDUCATION COURSES

A Dissertation

by

JIE KE

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

DOCTOR OF PHILOSOPHY

Approved by:

| | |
|---|---|
| Co-Chairs of Committee, | Fredrick M. Nafukho |
| | Homer Tolson |
| Committee Members, | Toby M. Egan |
| | Lorraine Eden |
| Head of Department, | Fredrick M. Nafukho |

August 2010

Major Subject: Educational Human Resource Development

# ABSTRACT

Professionals' Perceptions of the Effectiveness of Online versus Face-to-face Continuing Professional Education Courses. (August 2010)

Jie Ke, B.A., Anhui University;

M.B.A., EDHEC

Co-Chairs of Advisory Committee: Dr. Fredrick M. Nafukho
Dr. Homer Tolson

With the increasing use of the computer and the Internet in the training sector, there are constant debates about the effectiveness of e-learning versus traditional face-to-face (FTF) education since the early 1990s. However, limited empirical studies have been conducted for this purpose in the field of Continuing Professional Education (CPE), on which the flexibility in time and place of e-learning have made and will potentially make a greater impact. Even fewer such studies were situated in a non-academic context for professions other than nursing or healthcare. Moreover, the learners' voice is often absent in the debates.

This exploratory study was designed to a) obtain professionals' perceptions concerning the effectiveness of online versus FTF CPE courses from two pedagogical aspects of adult learning: professional knowledge and practice development and technology context link, and b) assess if professionals' perceptions varied as a function of their sociocultural and professional contexts.

Self-reported perception data were collected through an online survey. Professionals (n=399) from Texas Engineering Extension Service (TEEX) participated in the study. The professional units where the participants worked included Fire Service, Utilities and Public Work, Homeland Security, Safety and Health, Public Safety and Security, Technology, and Search and Rescue. Exploratory factor analysis (Principle Component Analysis), descriptive statistics, t-tests, multivariate analysis and ANOVAs were run for the purpose of data analysis.

It was found that the professionals who participated in the study (a) perceived that online CPE courses were less effective in enhancing their professional knowledge and practice development when compared to traditional FTF CPE courses; (b) perceived that online CPE courses were more effective in linking what they had learned to technology contexts that they were in; (c) perceived that online CPE courses were less effective than FTF courses in general; (d) who were female perceived online CPE courses' ability in improving their professional knowledge and practice less negatively than male participants; and (e) who were firefighters favored the online CPE courses compared to professionals from the other units in TEEX, while the professionals from Safety and Health were most negative about the effectiveness of online CPE courses. The responses to the two open-ended questions provided information on the measures recommended by surveyed professionals to improve the effectiveness of online and FTF CPE courses.

# DEDICATION

This dissertation is dedicated to my parents, Baoxuan Ke and Xiuying Dai, who supported me without any reserve and asked for no return. They are my role models, who instilled in me belief in hardworking, love for learning and courage to explore. And, to my daughter, Nini, who inspired and motivated me tremendously. I will hold your understanding, care and support forever in my heart.

# ACKNOWLEDGEMENTS

I would like to take this opportunity to thank all the people who have walked with me along the journey and helped me to finally reach the milestone of my life – the completion of this dissertation. They made the impossible – possible!

My greatest gratitude goes to the co-chairs and members of my dissertation committee: Dr. Fredrick M. Nafukho, Dr. Homer Tolson, Dr. Toby M. Egan and Dr. Lorraine Eden. More specifically, I would like to thank Dr. Nafukho for providing timely feedback and insights into the literature review. Thanks to Dr. Tolson for his valuable guidance in methodologies and data analysis. Dr. Tolson also offered answers with great patience to my endless questions and provided assurance. The unique blend of kindness, high expectations and support gave me a safe place to think and dream. Thanks to Dr. Eden for generously offering support, knowledge, and encouragement during my time at Texas A&M University. Her questions and suggestions significantly added the depth to this research. Thanks to Dr. Egan for challenging me to think more and helping me with the structure of the dissertation.

Thanks to Mr. Mark Posada for introducing me to the target audience of my research: professionals from Texas Engineering Extension Service (TEEX). Mr. Posada spent a lot of time in helping me locate contact information of participants and helping me establish the connection with the participants. His contributions to my study were extremely significant.

Thanks to the participants for their interest in my study, their enthusiasm in participating in the study voluntarily, and their openness in sharing their perceptions.

Thanks to my supervisors, Dr. Becky Petitt and Mr. Dave McIntosh, in the Office of the Vice President and Associate Provost for Diversity for providing unwavering support and trust.

Thanks to my friends for being there always to help me continue whenever the "balance of life" became challenging. Specifically, I would like to thank Prakash Nair for being "a friend in need" all the time. Mr. Nair has played a pivotal role in the completion of my dissertation by offering his timely advice and sharing his experience selflessly. His friendship and mentorship will be remembered and cherished forever.

Finally, I would like to express my appreciation to my sister, brother and husband for their patience, understanding and love.

# TABLE OF CONTENTS

CHAPTER Page

Page

# LIST OF FIGURES

# LIST OF TABLES

# CHAPTER I

# INTRODUCTION AND PROBLEM STATEMENT

## Introduction

Online education has become an integral part of education and learning in the twenty-first century as a result of the fast growth and development of information technology (Brace-Govan & Gabbott, 2004). The increasing use of the Internet in recent years has made online education the predominant delivery method in many fields, including the field of continuing professional education (CPE). In this area, the use of online instruction has encouraged many educators to leave behind the traditional face-to-face (FTF) instruction method.

The advantages of online education are: (a) easy access and flexibility for learners (Bernath & Rubin, 2001; Brace-Govan & Gabbott, 2004; Kirkpatrick & McLaughlan, 2000; Nafukho, 2007); (b) convenience for learners who have time and place constraints (Herrie, 2004; Nafukho, 2007); (c) education at decentralized locations is made possible for education providers, such as universities (Brace-Govan & Gabbott, 2004; Ponzurick, France, & Logar, 2000); (d) the cost effectiveness compared to traditional FTF education (IBISWorld, 2007; Levin, 2001).

While the web-based delivery method of education/learning has been widely accepted, questions about the "quality" of this method are still widely debated. Compared to traditional FTF education, is online education effective in promoting

---

This dissertation follows the style of *Adult Education Quarterly*.

student learning? Does it provide students with the same long-term benefits as traditional education, such as improving job performance after the students have completed their studies? The education process is not an end in itself, but rather a means to the end of student learning and performance. Therefore, it is very important for educators who are involved in online education to answer these questions about the effectiveness of their methods. For continuing professional education, where accountability to the time and money invested is greatly stressed, it is especially important to research the questions and verify if the investment is justified.

Many researchers have attempted to answer these questions by comparing online/distance and traditional education. Since these types of studies have been commonly referred to as media comparison studies (MCS), the focus of the studies has been on comparing the effectiveness of two different kinds of media on students' learning mainly between FTF instruction and technology-mediated instruction such as online education. The movement of MCS started from the early 1900s and has become popular in the education field.

The answers to whether online instruction is effective compared to traditional FTF instruction, however, have not been consistent. Ponzurick, France and Logar (2000) conducted a comparative study in graduate-level courses in marketing using a field survey and they found that distance/online education was the least effective and least satisfying delivery method for the students studied. The comparative study of a statistics course by Wang and Newlin (2000) and the one of Master's-level students by Ferguson & Tryjankowski (2009) drew a similar conclusion. In contrast, Maki and Maki (2002)

compared a web-based psychology course with the same course taught traditionally and they found the former was more effective than the latter. Other researchers who have come to similar conclusions include Zhang, Zhao, Zhou and Nunamaker (2004), Weber and Lennon (2007), Giguere (2009) and Shah (2009). Different from all the above, some researchers found no significant difference in their studies (Akdemir & Oguz, 2008; Cook et al., 2008; Hiltz, 1993; Pang, 2009; Sankaran, Sankaran, & Bui, 2000; Smith & Palm, 2007). Such conflicting results prompted Russell (1999) to review 355 education research studies, and to conclude that overall, *no significant difference* had been demonstrated between the effectiveness of classroom education and that of distance learning. Russell also set up a website (http://nosignificantdifference.org/) to track comparative studies on education media. Russell argued that it was meaningless to do comparative research on the differences between online and FTF education because there was no significant difference shown between online and FTF education. The researcher of this study partially agrees with Russell on this point because the studies from which he drew conclusions had the following flaws:

1. In measuring whether an education media is effective, one needs to check whether both learning and performance are achieved. However, learning itself is hard to measure and there is a lack of valid learning evaluation criteria. Therefore, most researchers tend to neglect the measurement of deep-level learning beyond grades or scores, which should not be ignored in any media evaluation study.
2. Test scores or grades have been used as the measure of performance in most of the studies (Kalsow, 1999; Leung, 2003). In fact, test scores/grades can be

treated only as one of the performance indicators, and grades do not necessarily reflect what students learned (Rovai & Barnum, 2003). Performance should be measured more by the degree or the extent to which learning is transferred and applied to practice.

3. The quality of research on the effectiveness of distance education, especially the validity and reliability of measurements of student performance, is questionable according to Phipps and Merisotis (1999)
4. Some researchers tend to forget that context is the key to effective learning. What most of the researchers did was to run pre- and post-tests in a formal education environment or a certain program and then tried to generalize which delivery method - online education or FTF education - was more effective without further analyzing the contexts in which the learning/education took place.

The researcher of this study posits that *contexts for learning and performance* should be considered when evaluating the effectiveness of an instruction media. Learning and performance do not occur in a vacuum, and they need context to be effectively measured. The context for learning includes the learner's age, personal learning style, learning experience, self-directedness, educational level, personalities, creativities, and so on (Merriam & Caffarella, 2001). These demographic factors, termed in this study as sociocultural contexts, are determinant factors in the satisfaction and potential success of participants in online education (Donavant, 2009; Holley, 2002; Roach, 2002; Sakurai, 2002). The context for performance includes workplace environment, organizational

culture, job title and supervisor support, which were defined in this study as professional contexts (Daley, 2000; Siegel, 2001).

Therefore, while "the issue of on-line course effectiveness remains the subject of continued debate"(Rovai & Barnum, 2003, p. 58), this researcher would agree with Russell by stating that it is meaningless to conduct studies to compare the effectiveness of online education and that of FTF education without *context*. This researcher argues further that more media comparative studies on the effectiveness of online education versus FTF education are needed in the areas where online education is widely used and accountability of the money and time invested is greatly expected. Continuing professional education (CPE) *is* such a field in which more studies are needed. In CPE, professional context is an extremely important element, which is elaborated later in Chapter II – Literature Review.

The effectiveness of online education in CPE has been studied extensively (Anderson, 1996; Anderson & Kanuka, 1997; Curran, Hoekman, Gulliver, Landells, & Hatcher, 2000; Francis, Mauriello, Phillips, Englebardt, & Grayden, 2000; Herrie, 2004; Pullen, 2005, 2006). However, few studies have been situated in professions other than medical/healthcare. A majority of the researchers who studied the effectiveness of online education have approached the issue from perspectives of either instructors or administrators (Conceicao, 2007a). As Conceicao stated, "one of the challenges for adult educators who teach online is to identify teaching strategies that fit the needs of learners…" (Conceicao, 2007b, p. 1), which poses another question to us: "How can the

needs of learners be fully addressed without being thoroughly understood?" Therefore, learners' perspectives are needed for studies on the effectiveness of online CPE courses.

Increasingly, some professions are facing the threat of obsolescence, an effect of simultaneous and rapid change in information technology and the need for new knowledge, all further accelerated by the demands and pressures of globalization. Under these circumstances, CPE courses have become more and more popular within numerous professions and among many employers as a means to update and renew their employees' skills and knowledge needed to help keep the profession/ organization current and competitive. Since a major aim of CPE courses is to improve professional knowledge, competence, performance and care in organizations (Cervero & Azzaretto, 1990), such courses have become an increasingly popular means for addressing the aforementioned professional and organizational needs.

There are commonly five stakeholders in CPE courses, namely, society or the state, the professional association, the employing organization, the professional, and the client (Van Loo & Rocco, 2006). Since one of the main stakeholders who are directly impacted by the online learning process are the professionals (the CPE participants), it makes sense to evaluate online CPE courses from the perspectives of the professionals who participate in online trainings for their professional development.

## Problem Statement

As reported in the Industry Reports (Training, 2008) by Training and American Society for Training & Development (ASTD) (2008), continuing professional education/training (CPE) has been one of the top three content areas covered in training,

about 21% of the total in the U.S. in 2008. The total training expenditure in the U.S. was $56.2 billion in 2008, of which 20% was delivered via online (Training, 2008). Although the proportion of online training dropped slightly from 2007 to 2008, online education remains as the second import delivery method to traditional FTF education for training, including continuing professional education. With the money (11 billion investments), time and effort, the effectiveness of online education, including online continuing professional education, is a topic that needs more attention and research effort. "Although a great deal of research has addressed the feasibility of online education (OE) and the use of technology within formal education settings, notoriously little research has been conducted within the professional development environment…" (Donavant, 2009, p. 227). Moreover, empirical studies on adult learning theories and principles in professional development are scarce (Donavant, 2009).

Since the learners are the most important elements of the online learning environment (Conceicao, 2007c), it is crucial to obtain their perspectives on the effectiveness of online instruction in delivering CPE courses when compared to FTF instruction. Limited studies in the field have attended to this perspective. However, there is limited research on the effectiveness of online CPE courses from the learners' perspective in non-academic settings (Donavant, 2009; Mayadas, 2001; Moore, 2002; Ortiz-Rodriguez, Telg, Irani, Roberts, & Rhodes, 2005).Very few researchers have addressed the issue from a learner's perspective (e.g. Varlejs (2003)).

## Purpose of the Study

The purpose of the study was twofold: (a) to obtain professionals' perceptions of the effectiveness of online CPE relevant to *knowledge construction*, linking knowledge to *technology context* and *professional practice development* compared to that of FTF CPE.; (b) to examine whether there are differences in professionals' perceptions as their sociocultural and professional contexts vary. In other words, the purpose of the study was to obtain the perspectives of professionals on the effectiveness of online CPE in promoting learning and improving performance compared to that of FTF CPE as well as examining the differences in perceptions of those professionals.

To reach the goals of the study, professionals employed and trained at the Texas Engineering Extension Service (TEEX) in 2008 were the target population for the study. TEEX is a comprehensive training agency which provides training to different professions. Units that provide specific trainings for TEEX are: *Fire Service, Utilities & Public Work, Homeland Security, Safety & Health, Public Safety and Security, Technology, Search & Rescue*.

Online instruction included online (self-paced and instructor-led) courses and webinars; and FTF instruction included annual conferences, schools, live seminars/workshops and in-house training. The following steps were undertaken to conduct the study:

1. The theoretical framework was based upon a thorough literature review in the fields of Adult Education, Continuing Professional Education, Online Education and Human Resource Development;

2. A large sample was used;
3. Reliability and validity estimates were calculated;
4. Descriptive and inferential statistics were used when applicable;
5. Quantitative and qualitative data were systematically collected, coded and analyzed;
6. The end users' perceptions were used to compare the effectiveness of online and FTF CPE courses.
7. The differences in perceptions among professional participants who were of different sociocultural and professional contexts were analyzed and presented.

## Research Questions

To achieve the purposes of the study, the following research questions were used to guide the study:

1. Do professionals who participated in the study perceive online CPE courses to be more effective in promoting their knowledge construction compared to the FTF CPE courses?
2. Do professionals who participated in the study perceive online CPE courses to be more effective in improving their ability to link the knowledge learned with technology context compared to the FTF CPE courses?
3. Do professionals who participated in the study perceive online CPE courses to be more effective in developing their professional practice compared to the FTF CPE course?

4. In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses?
5. Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working) differ in their perceptions on the effectiveness of online CPE courses versus FTF CPE courses?
6. What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses, to other stakeholders of CPE courses, such as course administrators and training professionals?

## Significance of the Study

As mentioned in the previous section, Russell collected hundreds of Media Comparison Studies (MCS) from the 1920's and concluded there is no significant difference in the effect of different media on learning and education (2001). If there is no significant difference, why should we care about another MCS? We care, because in the age of the Internet, we want to fully utilize the unique capabilities of Internet technology in teaching and learning to improve learning outcomes (Conger, 2005; McDonald, 2002). The significance of the research, herein, lies in its *purpose*, which is not to drop either FTF instruction or Internet instruction, but to fully understand both Internet and the traditional classroom as education media and utilize their full potential to improve learning outcomes of CPE courses in TEEX and similar professional fields. There is a great need for research of this kind (Bullen, 1999).

Second, the significance of this study is also reflected by its focus of providing useful information regarding the perceptions of TEEX trainees regarding the effectiveness of online versus FTF CPE courses. It is important to acknowledge the perceptions of CPE participants - one of the main CPE stakeholders - on the issues of CPE courses' quality and value, in order to justify the time and money invested and shed lights on the future development of online CPE.

Third, this media comparative study fills the gap in the current CPE and HRD literature by situating it in a specific working/professional context. The study was situated in the context of a professional organization (Texas Engineering Extension Service) where Internet technology has not been widely accepted and utilized in training.

Different from many MCS, the researcher studied the effectiveness of online CPE courses in a non-academic environment. Also different from most existing MCS in the field of CPE, the researcher examined the perceptions of professionals who are from professions other than medical/health. The professions covered in this study were *Fire Service, Utilities & Public Work, Homeland Security, Safety & Health, Public Safety and Security, Technology, Search & Rescue*. This design made it possible to more fully understand the impact of sociocultural and professional contexts on professionals' perceptions of CPE courses' effectiveness.

Fourth, the research is significant because it studied the issue of effectiveness of online courses versus FTF courses from perspectives other than grades or scores: (a) whether knowledge and professional practice are constructed and developed, and (b) whether the ability of linking technology context to the workplace is improved. The significance of the study, in other words, is that the researcher took both short-term and long-term impacts of learning into consideration when comparing the effectiveness of online versus FTF CPE.

Last but not least, although the purpose of the study was not to test the Professional Learning Model by Daley (2000), the researcher of this study did find discrepancies between the main constructs in the model and the constructs manifested by Principle Component Analysis. There were three steps in the model – knowledge construction, context link and professional practice development, but there were only two valid constructs as shown in the findings of the study- knowledge and professional practice development and context link. This finding is significant for the field of

continuing professional education because evidence was presented that knowledge construction and professional practice development are integrated in practice although they are separate ideas in theory.

## Assumptions

It was assumed in the study that (a) the participants were willing to take the survey and provide honest self-assessment and self-perception; (b) the courses that the surveyed participants had taken in both online and FTF formats were of similar content and degree of difficulty level.

## Delimitations

1. *Subject matters:* there was a wide range of subject matters, such as firefighting, homeland security, safety and health, technology and more, in the continuing professional education courses studied, therefore, the researcher was not able to examine the differences in perceptions attributable to different subject matters
2. *Specific courses/contents:* there were 588 CPE courses and many more customized courses provided in the organization studied. The researcher did not consider the differences among those online courses and the impact of the differences on the learning effectiveness.
3. *Geographic location of the participants*: the researcher did not consider where the participants were located as long as they had taken the online courses from the organization in which the study was conducted.

## Limitations

1. The study was conducted within the Texas Engineering Extension Service (TEEX), a training organization that provides both FTF and online professional development training for several professions. The study was, therefore, limited to the learning and practices in TEEX and the results from the study cannot be generalized beyond the organization.
2. Due to the limited literature studies known to the researcher on the effectiveness of online courses in a non-academic setting, much of the literature used to inform this study was situated in academic/higher education settings. The transferability of knowledge generated from academic settings to non-academic settings is still questionable. Therefore, some conclusions reached in the study are limited to the context.
3. The instrument used in the study was the result of combining an existing instrument and items developed from the literature studies. Although the reliability for the entire instrument was sufficient, the reliability scores of two sub-constructs within the instrument were low. The researcher ran a path analysis to identify the causal relationships among the three constructs suggested in the literature review and obtained non significant results. Therefore, the instrument should be revised if used in future studies.
4. Professional learners' learning motivations and styles were not considered in this study, which have been the integral parts of many similar research studies. Some researchers posited identifying learners' styles should help them to learn more

effectively while others argued that the relationship of learning style to e-learning, especially in the industrial settings, has not been clearly identified (Hairston, 2007). The researcher decided not to consider the impacts of learners' learning motivations and styles on perceptions in this study due to these controversies.

5. Self-reported survey data were used in this study, which was one of the limitations of the study. The reasons are: a) self-reported perceptions do not necessarily reflect actual learning and performance, and b) common method variance as a result of self-reported data may have inflated some of the relationships between the variables (Podsakoff & Organ, 1986). The researcher conducted the Harman's single factor test following the instructions of Podskoff and Organ (1986) and did not find serious problems with the data (the procedure and results of Harman's single factor test are discussed in detail in the methodology chapter).

## Operational Definitions

The findings of this study were reviewed utilizing the following operational terminologies:

*Context:* refers to sociocultural elements that influence professionals' service ability (Siegal, 2001) and "the place where professionals provide care or deliver services to clients" (Daley, 2000, p. 38). Sociocultural contexts of learners included their age, gender, ethnicity, educational background, working background; professional contexts included the existence of and communications with communities of practice/occupational community in an organization (similar to the concept of "allegiance to the profession" in Daley (2002), nature of professional work, variations in

organizational culture and political environment of a profession and/or an organization that grant different levels of independence and autonomy to the professional learners. In this study, professional contexts were working status, online training place, professional units, the number of online courses taken and the number of FTF courses taken.

*Continuing Professional Education (CPE):* a field of practice and study that is directed to the ongoing learning needs of professionals (Cervero, 2001).

*Effectiveness:* doing the right things on time and in the right manner to reach stated (specified) goals (Russ-Eft, Preskill, & Sleezer, 1997, p. 136). Educational effectiveness is reflected by how much learners have achieved in knowledge acquisition, new knowledge construction and development of skills and expertise (Donavant, 2009; Mager, 1997; Nadler & Nadler, 1994; Rachal, 2002). In this study, the perceived effectiveness of professionals was reflected by a Likert scale rating. Online instruction was perceived more effective than FTF instruction when the rating was higher than 3 on a Likert scale of 1-5; FTF instruction was perceived more effective than online instruction when the rating was less than 3 on the Likert scale; the effectiveness of online and that of FTF were perceived as the same when the rating was equal to 3 on the same scale. Therefore, 3 was set in the study as the hypothesized middle point of the measured scale (M), reflecting the central tendency point.

*Evaluation:* procedures to systematically define criteria, collect relevant information, analyze its meaning and make informed decisions (Barnow, 1986, p. 63).

*Human Resource Development (HRD)*: a process for developing and unleashing human expertise for the purpose of improving performance (Swanson & Holton, 2009, p. 99).

*Knowledge construction:* the process of creating knowledge and changing it when faced with practice experiences (Daley, 2000).

*Learning promotion:* is an action that facilitates learning in a way that more knowledge, competence and expertise are gained.

*Learning/Professional learning:* is the process of acquiring new knowledge and expertise in people in the field of HRD (Swanson & Holton, 2001, p. 208); in the field of continuing professional education, however, learning happens in three modes that frequently overlap: instruction, inquiry and performance (Houle, 1980; Mott, 2000). "In the instruction mode, learning is typically passive and consists of the dissemination of predetermined knowledge and skills. Learning in the inquiry mode tends to be exploratory and cooperative, resulting in a synthesis or creation of new techniques or concepts. Learning by performance is more active and involves practice in the actual work setting" (Mott, 2000, p. 27).

*Online education:* is often called online learning, eLearning or web-based learning/education, which is learning or education conducted and completed through computers and the Internet. Donavant (2009) defined online education as instructional material transmitted and delivered via personal computers to learners at locations remote from that of the instructor, including postings, discussion board, online materials, synchronous or asynchronous chat, and other methods allowing self-paced, interactive, and individualized learning (p.233).

*Performance improvement:* is an action through which an individual's knowledge, competence and expertise are applied to his/her workplace and positively impact the productivity/outcome of his/her job.

*Performance:* accomplishing units of mission-related outcomes or outputs (Holton as cited in Swanson and Holton, 2001, p.137), in this study, performance referred to the job performance at the individual level, defined as representative of the effectiveness of the consequences of an individual's intended behavior, or actions, what some recognize as competence or "the capacity to think about performance and also to perform" (Barrie & Pace as cited in Swanson and Holton, p.237).

*Perspective:* one's point of view towards a phenomenon or event that has his/her values, beliefs and attitudes embedded.

*Professional practice development:* the enhancement of thought, information processing, problem solving, decision making, reasoning and judgment skills, and the ability to attain expertise by taking a more intuitive approach to the topic (Daley, 2000).

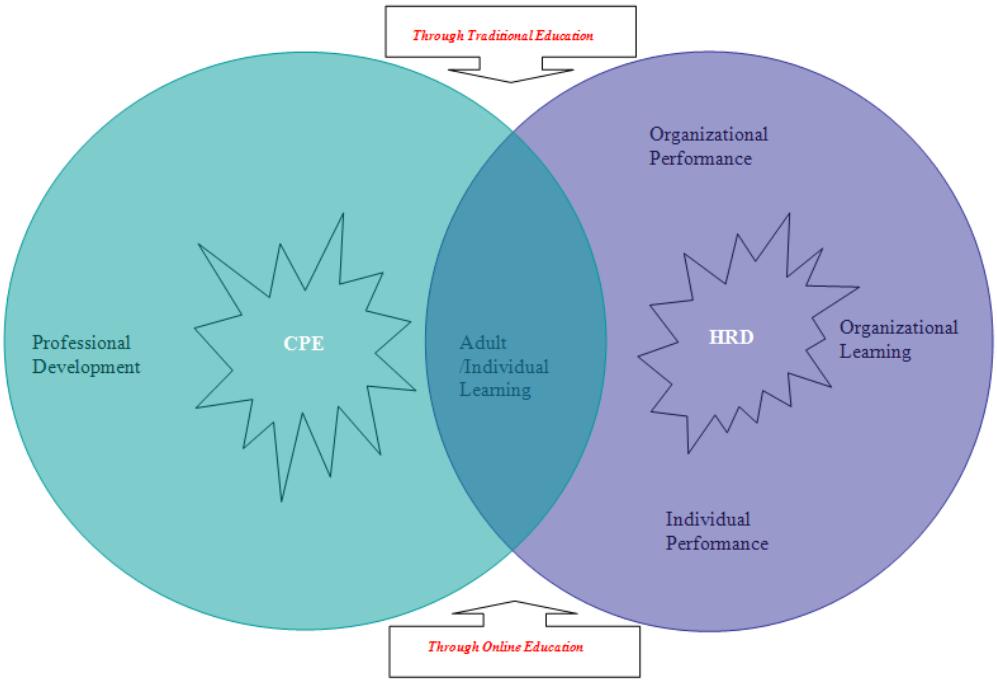
# CHAPTER II

# LITERATURE REVIEW

In this chapter, the related literature is presented to achieve the purpose of the study. A concept map (Figure 1) was drawn to present the organization/structure of the literature review.

**Figure 1**

**Concept Map of Literature Review**



As shown in the concept map (Figure 1), the fields related to the study are Continuing Professional Education (CPE) and Human Resource Development (HRD). Further, the study falls in the overlapped area between the field of CPE and the field of HRD-adult/individual learning. Therefore, this chapter of literature review was first organized around the three areas of interest: CPE, HRD and adult learning/learning in CPE. Online learning, as an alternative method of delivery, is briefed as well as its advantages and disadvantages. Next, the effectiveness of e-learning and its importance were highlighted, followed by the discussions of existing effectiveness studies of online CPE. Finally, the theoretical framework was presented and summarized. However, before presenting the literature, the researcher introduces the method used in the literature review or the literature review procedures developed.

## Review Procedure

The search for the literature was completed through two steps: general search and in-depth search. The general search was undertaken to locate literature that could inform the study, mostly from the three focused areas: CPE, HRD and adult education/learning. The resources for the general search were (a) computerized bibliographic databases (i.e., ERIC, PsycInfo, EBSCOhost Academic Search Complete, Dissertation Abstracts, and ProQuest ABI/INFORM Global), (b) education, human resource and educational technology journals, and (c) conference proceedings. During the literature search process, the keywords used included ‘‘effectiveness’’, ‘‘online’’, “web-based”, “face-to-face”, “traditional”, “e-learning”, “training”, “professional development” and the combinations of the above keywords. The selection process for the literature review was guided by the

following criteria: (a) studies or literature had to be able to inform the study by addressing the features of CPE, HRD, adult education/learning and e-learning, and or (b) studies or literature had to address primary issues of CPE regarding enhancing learning and/or improving performance. The result of the general search provided background information for the study.

Due to the narrowness of the topic, not many related empirical studies were found from the general search. The researcher then turned to an in-depth search, which was focused on locating empirical studies on the effectiveness of online CPE by reading every abstract or the full paper. The resources for the in-depth search were the selected journals (Appendix A) in the selected areas of study. The five fields, *CPE, Training and HRD*, *Education and Educational Research*, *Online Education/Training/E-learning*, and *Human Resource Management* and *Organizational Behavior*, were selected because they are directly and indirectly related to the study. For each study area, five journals per field were selected to scholarly represent the field based on Social Science Citation Index and recommendations by well-known scholars in the fields. Then, the time frame for the search was set from 1990 to present because media comparison studies became popular since the early 1990's (Volery & Lord, 2000). The criteria to select the studies were: (a) studies had to be empirical and contain data from assessment or evaluation of online courses alone or compared with FTF courses although evaluation did not necessarily have to be the focus of the study; (b) studies had to have/indicate a criterion or a set of criteria used to measure effectiveness in learning or performance or both; (c) research studies of online CPE courses aimed at demonstrating a course's effectiveness were also

included. Evaluation and research differ only in the reasons for which they are conducted (Upcraft & Schuh, 1996). For instance, "the function of instructional research is to determine how and why certain practices have potential for promoting learning, while the purpose of educational evaluation extends that function to judge particular interventions as successful or unsuccessful"(Ke & Hoadley, 2009, p. 490). The publications were filtered using the above inclusion criteria. A total of 18 studies met the inclusion criteria, which is detailed in Appendix B.

## Continuing Professional Education (CPE) and Human Resource Development (HRD)

The definition, process and functionality of CPE and HRD, the recent convergence of the two fields, why a CPE issue is also an HRD issue and how HRD informs CPE in practices are presented in the following paragraphs.

### Continuing Professional Education (CPE)

CPE is defined as "a field of practice and study that is directed to the ongoing learning needs of professionals" (Sleezer et al., 2004, p. 21). The purpose of CPE "is to certify and improve professional knowledge and practice" (Sleezer et al., 2004, p. 21). Also, from a functionalist's point of view, CPE is "to help professionals provide higher quality service to clients by improving their knowledge, competence, or performance" (Cervero, 1989, p. 518). Along with these purposes, an important role of CPE is to certify professional knowledge.

Three main stakeholders of CPE are CPE providers, participants and sponsors. CPE bears several characteristics: (a) it serves learning needs of professionals, (b) CPE's

improvement process relies solely on *learning*, and (c) the focuses of CPE are on *professionals*, *professions* and *society*.

Cervero (2001) has identified the trends that have greatly influenced the landsc*ape of CPE over the past twenty years:*

> (1) the amount of continuing education offered at the workplace dwarfs that offered by any other type of provider, and probably all other providers combined; (2) an increasing number of courses are being offered in distance education formats by universities, professional associations and for-profit providers ; (3) there are increasingly more collaborative arrangements among providers, especially between universities and workplace ; (4) the corporatization of continuing education has increased dramatically; and (5) continuing education is being used more frequently to regulate professional practice (p.16).

Recent expansion of CPE has pushed its focus from learning to job performance. As Cervero (1989) has stated, a role of CPE is "to help professionals provide higher quality service to clients by improving their knowledge, competence, or performance" (p. 518). Because of this functionality, CPE has gained more and more popularity among many professions since 1980s.

**Human Resource Development (HRD)**

Swanson and Holton (2009) defined HRD as: "a process for developing and unleashing human expertise for the purpose of improving performance" (p.99). The HRD professional strives to promote both *learning* and *performance* at different levels: individual, team and organization (Swanson & Holton, 2001).

As pointed out in Barrie and Pace (Barrie & Pace, 1998), HRD may be constituted in at least one of two paradigms: one is the learning paradigm which may be seen as part of the general field of personnel practice or human resource management; and the other one is the performance paradigm which may be constructed as an arena of discourse in the extensive field of adult education. The learning paradigm dominated HRD practice in the U.S. for a long time before it was challenged by proponents of the performance paradigm. According to Watkin's definition of the learning paradigm, "HRD is the field of study and practice responsible for the fostering of a long-term work-related learning capacity at the individual, group, and organizational level of organizations" (Watkins, 1995, p. 2) and the purpose of the learning paradigm is "to enhance individual's capacity to learn, to help groups overcome barriers to learning, and to help organizations create a culture which promotes conscious learning" (Watkins, 1995, p. 2). Swanson and Holton (2001) stated that the two characteristic approaches within this paradigm are *adult learning* and *traditional instructional design.*

The performance paradigm of HRD "holds that the purpose of HRD is to advance the mission of the performance system that sponsors the HRD efforts by improving the capabilities of individuals working in the system and improving the systems in which they perform their work" (Swanson & Holton, 2001, p.137). Like the learning paradigm, the performance paradigm also has two approaches: performance improvement on an *individual* level and performance improvement at *multiple levels* in the organization. Human performance technology, represented by Gilbert (1995), Stolovich and Keeps (1999), is of the first approach. Process performance improvement

by Holton (1999 ), Rummler and Brache (1995 ), and performance consulting by Robinson and Robinson (1989) are of the second approach (Swanson & Holton, 2001). The three views of the performance paradigm are: (a) performance as a natural outcome of human activity (b) performance as necessary for economic activity (c) performance as an instrument of organizational oppression. This study adopts the first view, which recognizes performance as a natural outcome of human activity.

There have been heated debates about the learning versus performance paradigms of HRD since 1995, followed by advocates of reconciling the two paradigms (Swanson & Holton, 2001). The two paradigms are complementary and mutually reinforcing to each other instead of competing with each other. The reasons are: (a) performance and learning show two different levels of outcomes that are complementary, not competing; (b) there is substantial overlap between the two paradigms such as belief in learning and development's significant role in individual growth and organizational performance improvement (Swanson & Holton, 2001), which form the common grounds between the two paradigms. Kuchinke (1995) echoed this notion by a call for connecting these two paradigms: "organizational learning must be managed for performance at the individual, group, process, and organizational levels; learning is omnipresent, yet it must be aimed at improving performance and increasing expertise" (p.309). Nevertheless, Barrie and Pace (1998) argued that the learning paradigm is conceptually richer and more comprehensive than the performance paradigm while recognizing the common ground between these two paradigms.

**Convergence of CPE and HRD**

CPE and HRD have been two separate fields since their debut, but recent developments in the fields have urged them to converge in many aspects due to the similarities they share:

1) Both CPE and HRD disciplines are applied in nature.
2) Adult learning theory is central to both fields.
3) Both fields call for integration of theory, research and practice.
4) For both professions, "the acquisition of job and professional skills is a learning process that is internal to the individual and that is applied externally in a workplace or community setting" (Sleezer et al., 2004, p. 30). In other words, the interplay of context and learning is shared by both (Roth, 2004). Therefore, for a HRD professional, studying CPE issues will help to inform, further understand and improve HRD practice.

In summary, *CPE* is a field of study that helps professionals provide higher quality service to clients through continuous learning enhancement and performance improvement. Over the past twenty years, CPE has been offered more and more in the format of distance education while its focus gradually shifted from learning to job performance.

*HRD* is a human development process for the purpose of promoting learning and performance at multiple levels, which includes learning at the individual level. Recent convergence of the two fields was built upon the shared notion – interplay of learning at the individual level and performance in context/at the workplace. Furthermore,

individuals engaged in CPE are mostly adults; adult learning theories naturally become the dominant theories in guiding practices in CPE. However, one cannot equate learning in CPE to adult learning because adults in CPE are professionals who possess profession-specific knowledge and are required to provide quality service to their clients with the knowledge.

Similar to the convergence of learning and performance paradigms, the convergence of CPE and HRD does not mean that these two fields have become one inseparable discipline. Differences between these two do exist and one rules over the other in most of the circumstances. For this study, the researcher agreed with Barrie and Pace (1998) in asserting that the learning paradigm is conceptually richer and more comprehensive than the performance paradigm; therefore, adult learning theories in the literature were reviewed to inform this study, in which both learning and performance were examined.

## Adult Learning and Professional Learning in CPE

Learners in continuing professional education (CPE) are adult professionals; therefore, learning in CPE is greatly influenced by adult learning theories both theoretically and practically. Needless to say, it is of great importance to review adult learning theories that are related to learning in CPE, mainly including those of Andragogy, self-directed learning and context-based learning/situated learning.

**Andragogy and Self-directed Learning**

Merriam (2001) pointed out that Andragogy and self-directed learning are pillars of adult learning theory and provided comprehensive reviews of the two adult learning theories. Termed by Knowles (1970) in 1968, "Andragogy" is "the art and science of helping adults learn" (p.43). The five assumptions of Andragogy "describe the adult learner as someone who

> (1) has an independent self-concept and who can direct his or her own learning, (2) has accumulated a reservoir of life experiences that is a rich resource for learning, (3) has learning needs closely related to changing social roles, (4) is problem-centered and interested in immediate application of knowledge, and (5) is motivated to learn by internal rather than external factors (Merriam & Caffarella, 2001, p. 5).

Also introduced by Knowles, self-directed learning theory was completed by Tough (1967) and Houle (1961). Self-directed learning posits that learning happens everyday in life and occurs without an instructor or a classroom. The main goals of self-directed learning are (a) to develop the learner to be self-directed, (b) to foster transformational learning, which is defined by Mezirow (Mezirow & Associates, 2000) as critical reflections by learners to understand "the historical, cultural, and biographical reasons for one's needs, wants and interests…"(Merriam & Caffarella, 2001, p. 9), (c) to promote emancipatory learning and social action.

Both Andragogy and self-directed learning theories have been criticized for their lack of *context* consideration. Critics pointed out that nobody can be as autonomous, free,

and growth-oriented as Andragogy learning theory has claimed to be and every learner has been shaped by his/her cultural and social background. Interestingly, self-directed learning has similar critics, as result of which, later models of self-directed learning became less linear and more interactive. In other words, these models started to take into account the interactions among learners, the context of learning and the nature of the learning itself.

**Context-based/Situated Learning**

To answer the critics toward Andragogy and self-directed learning on the lack of context consideration, another school of scholars, represented by Vgostsky (1978, 1999), Dewey (1933), Lindemann (1926), Lave and Wenger (1991), have stressed the important role of contexts in learning. "Learning in context is paying attention to the interaction and intersection among people, tools, and context within a learning situation" (Merriam & Caffarella, 2001, p. 44). "These interactions and activities are mediated through the *use of tools*, either technical (machines, computers, calculators) or psychological (language, counting, writing, and strategies for learning), provided by the culture. These tools ensure that linguistically created meanings have shared social meanings" (Merriam & Caffarella, 2001, p. 45).

The basic idea of situated learning is that learning is social in nature and learning is realized by interacting through tools with people and context (Lave & Wenger, 1991; Vygostky, 1978, 1999). *Cognitive apprenticeships* and *communities of practice* are two important concepts in situated learning. *Cognitive apprenticeships*, proposed by Rogoff, mean that "learning involved development in personal, interpersonal, and community

processes" (Merriam & Caffarella, 2001, p. 47). *Communities of practice* are self-organized and selected groups of people who share their subcultures with a culture such as a common sense of purpose and a desire to learn and know what each other knows (Brown & Duguid, 1996; Brown & Gray, 1995; Merriam & Caffarella, 2001; Wenger, 1998). In other words, adult learning is about how to develop their personal, interpersonal and community processes in their subcultures.

**Professional Learning in CPE**

With the principles of Andragogy, self-directed learning and context-based/situated learning illustrated above, one can better understand how professionals learn in CPE and what are the factors influencing the success of professional learning in CPE.

Some scholars of situated-learning have specifically addressed learning in CPE using the context-based/situated learning theory. LeGrand Brandt, Farmer and Buckmaster (1993) described cognitive apprenticeship in continuing professional education in five sequential phases: *modeling, approximating, fading, self-directed learning,* and *generalizing*. Merriam and Caffarella (2001) have summarized the five phases as follows:

> Modeling occurs in two parts: behavioral modeling allows learners to observe performance of an activity by experienced members of a community, while cognitive modeling allows experienced members to share "tricks of the trade" with newer members. Approximating allows learners to try out the activity while articulating their thoughts about what they did and how it is different from the

> expert's performance. In this phase, to minimize risk while at the same time allowing learners to approximate the real experience, role models provide scaffolding, which takes the form of physical aids, modeling tasks, and coaching. In the fading process, scaffolding and other support gradually decrease as learners' abilities increase. Self-directed learning takes place as learners practice doing the real thing, adapting what is necessary from models and working on their own, receiving assistance only at their request. Finally, students generalize what they have learned through discussions and relate what they have learned to subsequent practice situations (p.47).

In conclusion, whether the five sequential phases are successfully completed is the key to success of any CPE course. Daley (2001), on the other hand, conducted a qualitative research on CPE of four professions and described the learning experiences of nurses, social workers, adult educators and lawyers as information and experience exchange within their own communities of practice. She found that each studied profession framed their meaning-making process through an understanding of the nature of their professional work, meaning that professionals' work context shaped their meaning-making process in learning. Daley (2002) further stressed the vital role of "the context in which professionals practice in framing what professionals learn and how they use the information they gain from a CPE program" (p.79). Daley (2002) also summarized four kinds of context that frame learning in professional practice as follows:

1. *Allegiance to the profession* – Professionals often choose to align themselves with the tenets of their professional work and form their own "occupational

community", which "is unique in that it features shared characteristics that make the people in it more similar to other members of the occupational community than to people in the rest of the organization in which they work" (p.80).

2. *Nature of professional work* – "How professionals view what they do day to day affects what they choose to learn and how they go about learning it", also, "professionals often view the needs of their client as paramount in their learning" (p.82). Therefore, it is important to create a healthy environment that can positively influence professionals' view on learning.
3. *Variations in organizational culture* – Professionals often view their profession as a subculture of the organization. Cultures in an organization can be integrated, differentiated, or fragmented, which will have impact on how professionals view their roles. At the same time, the politics of the organizational culture shapes learning and the use of information in professional practice.
4. *Level of independent and autonomy* – "the level of autonomy and independence the professional enjoys, or the extent to which his or her practice is housed within a traditional or bureaucratic organizational system" (p.83) will shape his or her learning. Fortunately, online CPE has a higher level of autonomy and independence.

Complex as it is, the learning and context cannot be summarized exclusively as the above. Siegel (2001) found a missing element in the framework proposed by Daley (2002): the learner's sociocultural context. In line with Siegel (2001), the researcher of this study would like to propose the following categories of contexts that influence

professional learning in continuing professional education. There are two categories of contexts: (a) *sociocultural contexts of learners*, (b) *professional contexts*. Sociocultural contexts of learners include their *age*, *gender*, *ethnicity*, *educational background*, *working background*; professional contexts include the existence of and communications with communities of practice/occupational community in an organization (similar to "allegiance to the profession", one of the main concepts in the framework of Daley (2002), nature of professional work, variations in organizational culture and political environment of a profession and/or an organization that grant different levels of independence and autonomy to the professional learners. In this study, professional contexts were further defined as *working status*, *online training place*, *professional units*, *the number of online courses* taken and *the number of FTF courses* taken.

**How Professionals Learn and Perform**

Mott (2000) presented how professionals learn by summarizing Houle's theories and some other learning models for professionals. There are three modes of learning in continuing professional education at any level: (a) *instruction mode*: learning through passively accepting predetermined knowledge and skills; (b) *inquiry mode*: more exploratory and cooperative learning that results in a synthesis or creation of new techniques or concepts; (c) *performance mode*: more active learning that involves practice in the actual work setting. Following Houle's theory of professional learning, the Mental Schema Model, Skill Acquisition Model, Schon's Reflective Practitioner Model and some other professional learning and development models were also introduced by Mott (2000).

Shuell, Ausubel, Novak and Hanesian are the main contributors to the Mental Schema Model, which stresses the importance of meaningful learning. Meaningful learning is an active and constructive learning process, of which the goal is to acquire new meaning from meaningful material. Meaningful learning is more advantageous to professional learners because it is more likely to transfer to new contexts.

Dreyfus and Dreyfus (1986) built the foundation for the Skill Acquisition Model, suggesting that professionals learn and develop their skills in the context of practice. Later scholars, such as Daley (2000) and Mott (2000), modified the model by proposing that new knowledge and skills can be created from the experience in the context.

Schon used the Reflective Practitioner Model to argue that more tacit knowledge and skills could be learned from learning in context. "Reflection is a social process embedded in practice… learning reflection-in-action is a developmental process in which practitioners first learn a system of rules and procedures, recognize their appropriate application within particular situations, and then develop and verify new forms of knowing in actual practice situations" (Mott, 2000, p. 28).

Some other professional learning and development models were also briefed in Mott (2000). For instance, Mott proposed that a vested interest will have great positive effects on expert knowledge creation. All the above-mentioned models emphasize Houle's inquiry and performance modes of learning, which is context-based adult learning.

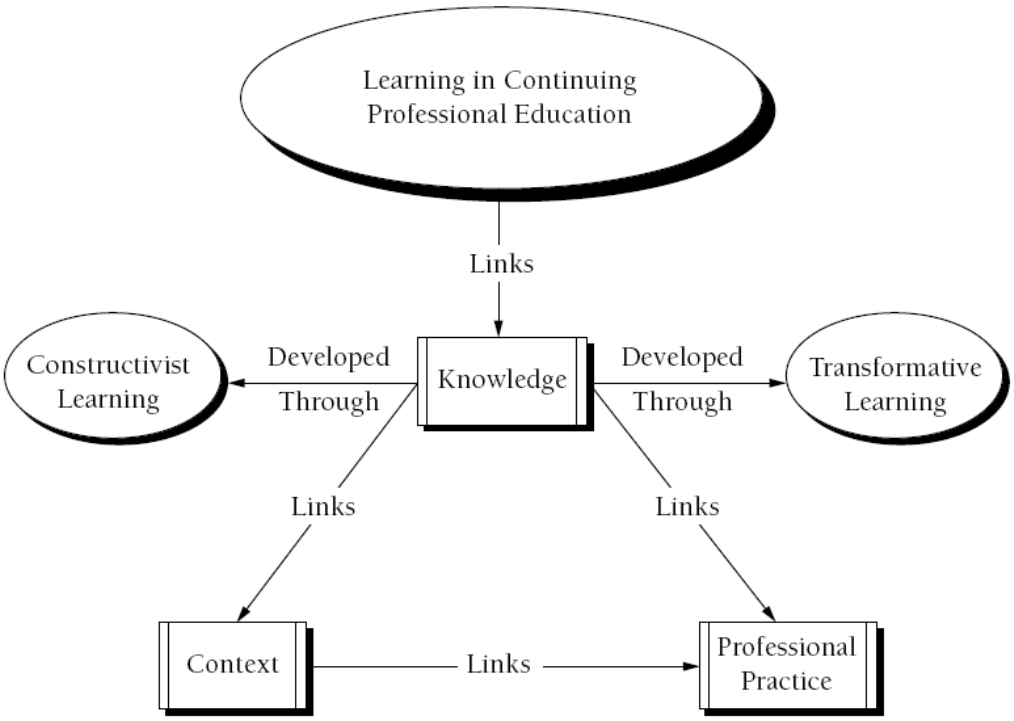
In conclusion, professionals learn by acquiring new knowledge, reflecting on knowledge learned and practice in the professional context; professionals perform by

applying their "*know how*" and *tacit knowledge* to the workplace and *developing skills* from experience and practice.

**The Model of Professional Learning**

The theoretical framework of this study was based on multiple theories and studies, of which the main one is Daley's theory of professional learning (Figure 2) since the framework was used to incorporate both concepts of professional learning and professional practice. The model of professional learning is based on Cervero's (1988) model for learning in the profession. Cervero's model incorporated cognitive psychology, reflective practice and studies of expertise and advocated a critical model that integrates the development of two forms of knowledge-technical and practical (Daley, 2000). Daley (2000) expanded Cervero's theory by including a constructive view and transformative learning, and argued that professional learning should be an integrated learning system that links knowledge, context and professional practice.

**Figure 2**
**Model of Professional Learning in CPE**




As shown in Figure 2, there are three crucial steps in professional learning. The three crucial steps are elaborated as follows (Daley, 2000):

*Step One. Knowledge construction for professional practice.*

The term "knowledge construction" was first coined by constructivists such as Dewey, Montessori, Piaget, Papert and others. According to the constructivist learning theory, "learners constructed their knowledge based upon interactions with environments" (Hairston, 2007, p. 35).

"Knowledge is viewed as a social construction of information that occurs through a process of constructivist and transformative learning" (Daley, 2000a, p. 35). Constructivist learning theory and situated cognition help us understand how knowledge is created by *linking* new information and past experience and professional knowledge (situated cognition). Transformative learning "expands our understanding of constructing knowledge by defining learning as *a critically reflective process* wherein the learner ultimately assesses previous understanding to determine whether those assumptions still hold in the learner's present situation"(p.37).

*Step Two. Linking knowledge with context*.

Daley (2000) used Bolman and Deal's framework to illustrate the impact that context has on knowledge creation. Bolman and Deal (1997) viewed organizations through four different frames: "*structural, human resources, political, and symbolic"* (p.38):

1) *The structural frame* uses sociological concepts and emphasizes formal roles, defined relationships, and structures that fit the organizational environment and technology.
2) *The human resources frame* posits that organizations consist of individuals with needs and feelings that must be taken into account so that the individuals can learn, grow, and change.
3) *The political frame* is used to analyze conflict as part of organizational processes. Within this view, the organization is composed of separate groups competing for power and resources.

4) *The symbolic frame* is used to conceptualize organizations as tribes with cultures propelled by rituals, ceremonies, stories, heroes, and myths.

*Step Three. Developing professional practice*.

This step in the model includes two perspectives on how professionals develop within their practice arena: (a) the enhancement of *thought and information processing skills*: information processing, problem solving, decision making, and clinical reasoning and judgment. Houle (1980) stated that "professionals are deeply versed in advanced and subtle bodies of knowledge, which they apply with dedication in solving complex practical problems" (p. 1). Therefore, professional practice cannot be improved until problem-solving skills are acquired.

The learning model informs us that an effective delivery media in CPE courses should be able to facilitate all of the three steps in professional learning: constructing knowledge, linking knowledge with context and developing professional practice.

In the following section, the researcher elaborates more regarding online learning/education as an alternative delivery method to traditional FTF instruction for CPE. The importance of studying effectiveness of online CPE and the existing empirical studies on this topic are also discussed. As a conclusion of this chapter, the theoretical framework of this study is presented based upon the rehash and summaries of important points within previous sections.

## Online Education and Its Advantages and Disadvantages

Online education is often called online learning, eLearning or web-based learning/education, which is learning or education conducted and completed through computer and the Internet. Therefore, these terms are used interchangeably in this study.

As a part of distance education, the use of the computer to deliver education can be traced back to the 1970s when cable and satellite television became popular (Seibold, 2007). Literature concerning online education has flourished since the early 1990s because of the increased use of the online education method (Volery & Lord, 2000). Online education has been widely accepted because it has many advantages:

1. Easy access and flexibility for learners (Bernath & Rubin, 2001; Brace-Govan & Gabbott, 2004; Kirkpatrick & McLaughlan, 2000; Nafukho, Thompson, & Brooks, 2004). This is extremely important for adult professional learners who always have busy schedules (Donavant, 2009).
2. Convenience provided to learners who have time and place constraints (Donavant, 2009; Eastmond, 1998; Herrie, 2004).
3. Education at decentralized locations made possible, helping education providers to grow and develop (Brace-Govan & Gabbott, 2004; Ponzurick, France, & Logar, 2000).
4. The cost effectiveness compared to traditional FTF education (IBISWorld, 2007; Levin, 2001).

Despite the above-mentioned advantages, online education has been criticized for its lack of “interaction between student and instructor and student and student” (Seibold,

2007, p. 12). The inability to provide the practical hands-on aspect is another weakness of online education (Donavant, 2009).

Because of the above-mentioned advantages of online education, the past decade has witnessed the proliferation of online education programs provided to adult learners. "Educating workers in an efficient and effective way becomes critical for knowledge management in industry and makes the corporate knowledge management market the most promising for e-learning"(Hairston, 2007, p. 27). However, questions and doubts remain: Compared to the traditional FTF instruction, is online instruction effective in promoting individual learning? Is online instruction effective in improving job performance when the further impact of learning is concerned? What are the factors that can make online education as effective as FTF instruction, if not better?

To answer these questions in the field of adult learning, specifically in the sphere of continuing professional education, one needs to review what situated learning is and what is professional learning in context as it has been shown in the previous section. "Learning in context is paying attention to the interaction and intersection among people, tools, and context within a learning situation" (Merriam & Caffarella, 2001, p. 44). "These interactions and activities are mediated through the *use of tools*, either technical (machines, computers, calculators) or psychological (language, counting, writing, and strategies for learning), provided by the culture. These tools ensure that linguistically created meanings have shared social meanings" (Merriam & Caffarella, 2001, p. 45). In online continuing professional education, the computer and the Internet have served as tools to facilitate the interactions between the adult learners and the contexts of learning

as well as tools that interact with the adult learners and the context of learning. To make the computer and the Internet better tools for online adult education, the study benefited from the set of guiding principles for effective online teaching offered by Graham, Caglitay, Lim, Craner and Duffy (2001) and tailored them into four principles for the online CPE: (a) encourage learner-instructor *contact*, (b) encourage *cooperation /interaction* among professional peers, (c) encourage *active learning*, (d) enable prompt *feedback.*

## Effectiveness of E-learning and Its Importance

As mentioned above, the question of effectiveness or whether e-learning has driven business results becomes a central issue with the growing trend of e-learning in the industry setting (Bersin, 2002; Hairston, 2007). The effectiveness of e-learning is to promote learning and improve workplace performance through computer, technology and other related technologies. Although more and more organizations and learners have embraced the concept of e-learning for professional development, e-learning itself cannot be effective without efforts from multiple stakeholders during the process, such as examining students' learning experiences, assuring the effectiveness of instructional methods, and making sure technology does not get in the way (Hairston, 2007). In the case of online continuing professional education, "the most effective means are practitioners' dialogue, reflection-in-action and theory building, in which knowledge is generated from new examples, understandings, and actions… and added to already existing repertoires" (Mott, 2000, p. 30).

Pyper and Belanger (2004) emphasized the importance of effective teaching and learning in distance education. They viewed the principles of effectiveness by the Council for Adult and Experiential Learning (CAEL) as holistic principles. CAEL principles are supported by Slogan C's five pillars of quality (Pyper & Belanger, 2004)., which are learning effectiveness, cost effectiveness, access, faculty satisfaction and student satisfaction. CAEL principles are (p.23-24):

1) Outreach – overcoming barriers of time, place, and tradition in order to create lifelong access to education opportunities.

2) Life and Career Planning – addressing life and career goals before or at the onset of enrollment.

3) Financing – the use of an array of payment options.

4) Assessment of Learning Outcomes – definition and assessment of the knowledge, skills and competencies acquired by adult learners both from the curriculum and from life/work experience.

5) Teaching-Learning Process – use of multiple methods of instruction.

6) Student Support Systems – comprehensive academic and student support systems.

7) Technology – uses information technology to provide relevant and timely information and to enhance the learning experience.

8) Strategic Partnerships – strategic relationships, partnerships, and collaborations with employers and other organizations in order to develop and improve educational opportunities for adult learners.

Since learners in continuing professional education are adult professionals who are learning in an environment of a profession, Andragogy, self-directed learning and context-based/situated learning can well support learning in CPE both theoretically and practically. Adult professional learners have experiences with their professional work; they are comparatively autonomous and self-directed in learning. Effective CPE courses need to strengthen their capability to be self-directed, reflect critically and be applied in social actions.

## Effectiveness Studies on E-learning

Based on the search criteria in the previous section, the researcher searched 35 journals (Appendix A). Only 18 articles of 12 journals met the inclusion criteria (Appendix B). Of the 18 articles, fourteen were from CPE, HRD and HRM journals. These articles were the effectiveness of e-learning/web-based learning alone or compared with traditional FTF courses. Of the 18 articles found, ten were situated in academic settings while the rest were in non-academic settings. Seven studies were about online continuing professional education (CPE) or development (CPD) courses, of which five studies were in the profession of nursing or healthcare. From the result, one can see that more studies on online CPE/CPD courses for professions other than nursing or healthcare are needed.

The following questions were addressed for each study that met the inclusion criteria:

1. What was the purpose of the study?
2. Where was the study located?

3. What was the profession studied if the research focused on the effectiveness of continuing professional education or continuing professional development courses?
4. Who were the sampled population?
5. What were the criteria of being effective?
6. What were the conclusions of the study?

From the search result, one may also see that while comparative studies became popular from the early 1990s, empirical effectiveness studies of e-learning only started to appear in academic journals from the late 1990s. As a matter of fact, more studies on such a topic were published during the past two years than ever before.

As shown in Appendix B, the researchers of the reviewed effectiveness studies used similar criteria for evaluating effectiveness of online training which were grouped into four main categories: (a) *knowledge and skill acquisition* (Chan, Tsai, & Huang, 2006; Donavant, 2009; Harrington & Walker, 2002, 2009; Jelfs, Richardson, & Price, 2009; Santos & Stuart, 2003; Villar & Alegre, 2007; Waddill, 2006; Zahner, Tipple, Rather, & Schendzielos, 2009); (b) *technology system and support* (Andrusyszyn, Iwasiw, & Goldenberg, 1999; Hung & Cho, 2008; Villar & Alegre, 2007; Webster & Hackley, 1997); (c) *practice and performance* (Donavant, 2009a; Harrington & Walker, 2002, 2009; Pullen, 2006; Roberts, Brannan, & White, 2005; Santos & Stuart, 2003; Waddill, 2006); (d) learners' attitudes, efficacy and/or satisfaction towards online learning (Andrusyszyn et al., 1999; Donavant, 2009; Harrington & Walker, 2002, 2009;

Hung & Cho, 2008; Luthans, Avey, & Patera, 2008; Pullen, 2006; Webster & Hackley, 1997).

**Knowledge and Skill Acquisition**

In most of the reviewed effectiveness studies, researchers set knowledge and skill acquisition as the effectiveness criteria. Zahner, Tipple, Rather and Schendzielos (2009) clearly pointed out that online continuing education should increase the knowledge of preceptors in order to be effective. The researcher in the study used pre- and post-surveys to assess knowledge and self-efficacy gained in an online continuing education course and concluded that online continuing education is a feasible strategy to support preceptor learning. This conclusion was consistent with the findings from Harrington and Walker (2002), who used control and experiment groups to study the effectiveness of both online and traditional training for long-term care givers in improving their knowledge score. Similarly, Waddill (2006) used Kirkpatrick's Four Levels of Evaluation as the evaluation tool to determine the effectiveness of online action learning courses for management-level participants and confirmed that the online delivery method was effective and yielded changes in participants' knowledge.

**Technology System and Support**

How technology is provided and supported decides whether the online learning interventions will be successful. Webster and Hackley (1997) set technology as one of the four categories that influenced distance learning outcomes. They examined 29 of the 30 technology-mediated distance learning courses taught during two semesters by instructors at six North American Universities. Both quantitative and qualitative data

were collected. It was revealed in the findings that students' comfort with technology, the quality of technology and teachers' control over technology helped students to learn in an online environment.

Ten graduate students and three faculty members in a computer conferenced (CC) graduate course in nursing were invited to give their perceptions on the effectiveness of the CC course in terms of five categories in Andrusyszyn, et al. (1999). One of the categories was environment technical support. It was found that both students and faculty were pleased with the innovative way of learning and satisfied with the technology provided. Another study conducted by Villar and Alegre (2007) reached a similar conclusion: 162 faculty members who participated in online staff development courses reported that the reliability of the online system was key to the success of computer-aided courses.

**Practice and Performance**

In almost all the studies in which knowledge gain was used as the criterion for evaluating the effectiveness of online training, practice and/or performance improvement was used as the criterion for the same purpose (Harrington & Walker, 2009; Pullen, 2006; Roberts et al., 2005). In Roberts, et al. (2005), an online nurse refresher course was evaluated based on three categories, one of which was the success and weakness of the course itself. To rate the success and weakness of the course, 12 participants were asked to rate the course based on four aspects, including content knowledge (theory and lecture) and professional practice skills (critical thinking discussion and clinical

experience). Most of the respondents had a positive perception on online refresher course in terms of the aspects of practice and performance.

Pullen (2006) examined the impact of web-based learning on more than 300 healthcare professionals and assessed the pedagogical and instructional design (e-pedagogy) effectiveness of online continuing professional courses. Ratings on professionals' learning achievement and self-reported change in practice performance reflected the effectiveness of online CPE courses.

Harrington and Walker (2009) reached a similar conclusion in a qualitative study. They evaluated the effectiveness of a computer-based fire safety training program by using pre- and post- tests for treatment and control groups. As revealed in the findings, the treatment group that took computer-based fire safety training significantly increased knowledge and practice scores compared to the control group.

In the above-mentioned studies and studies in which professional practice was adopted as a criterion of effectiveness, what was noticeable was the emphasis on critical thinking, decision-making and other higher-order learning skills in the effectiveness category of professional learning and performance (Billings & Kowaiski, 2005; McAlpine, Lockerbie, Ramsay, & Beaman, 2002; Roberts et al., 2005). It was shown in these empirical studies that online courses were able to increase professionals' critical thinking, decision-making and other higher-order learning skills, but the conclusions were not made against comparable traditional courses.

**Learners' Attitudes, Efficacy and/or Satisfaction**

A large amount of literature as devoted to studying learners' attitude, efficacy and/or satisfaction towards online learning when examining the effectiveness of online learning/education (Anderson, 2005; Bingham, 2002; Hairston, 2007; Holley, 2002; Hui, Hu, Clark, Tam, & Milton, 2008; Morgan, 2007; Reisetter, LaPointe, & Korcuska, 2007; Solimeno, Mebane, Tomai, & Francescato, 2008). Positive attitudes and satisfaction towards technology and e-learning in general are positively related to the effectiveness of online learning/education. It was found in many CPE effectiveness studies that learners in general held positive attitudes towards and were satisfied with online learning/education (Andrusyszyn et al., 1999; Harrington & Walker, 2002, 2009; Luthans et al., 2008; Webster & Hackley, 1997).

Efficacy is a state that one believes that he/she is able to perform a specific task (Bandura, 1995). Luthans (2008) used a pretest, posttest experimental design to test the ability of web-based training intervention to develop working adults' self-efficacy , and concluded that such an intervention that focused on improving adult learners' self-efficacy could result in positive capital psychology (including increased self-efficacy) in the workplace.

Among the empirical effectiveness studies identified, Donavant (2009) was the most relevant to this study. In the rest of this section, the study conducted by Donavant (2009) is presented in detail. The purpose of Donavant's study was to examine the efficacy of online education (OE) for professional development, compare OE to traditional delivery methods, determine whether the potential performance of adult

learners was related to various demographic factors, and evaluate the adult learners' perceptions of OE. A three-stage research project was conducted for the purpose. During the first phase of the study, a quasiexperimental examination of pre- and posttest professional development scores was used to determine whether learning occurred pursuant to various delivery methods and whether there was a difference between the effectiveness of online education (OE) and traditional instruction (TI). Historical pre- and posttest scores of professional development courses conducted by the Florida Regional Community Policing Institute from January and June 2005 were analyzed accordingly.

During the second and third phases of the study, Donavant examined the potential for online learning success (OLS) by adults and whether the potential OLS of adult learners is related to determinant factors identified by previous OE efficacy studies, including gender, race, age of the adult learner, number of years of police service, number of formal education received, and previous exposure to OE, the willingness of adults within a police professional development environment to participate in OE, and other factors pertinent to the use of OE for professional development. A 45-item self-report assessment of online learning success was used to determine the potential for successful learning by police officers participating in professional development training via OE, and whether the potential performance of adult learners were related to various demographic factors. A total of 180 police officers participated in the second phase, and the majority of them were male (161, 85.6%) and White (165, 87.8%).

An open-ended questionnaire was used in the third phase to determine contributing factors significant to the learning experiences of the respondents, including the willingness of adults within a police professional development environment to participate in OE, and evaluated learners' perceptions regarding the use of OD for professional development, and the practicality of its application as an appropriate delivery method. A total of 150 police officers participated in the third phase and the majority of them were male (127, 84.7%) and White (131, 87.3%).

It was found in the study that learning was significantly improved through professional development courses for the police officers, but there was no significant difference between the effectiveness of OE and TI. Despite the non-significance between the effectiveness of the delivery methods, a statistically significant relationship between potential online learning success and a formal education level was revealed from the results of the study. In addition, participants did feel that OE was an appropriate delivery method for professional development although a majority of them preferred TI.

Finally, Donavant (2009) called for a careful evaluation of the appropriate use of OE by administrators and trainers instead of rushing to embrace OE as a panacea to rising costs and other impediments to requisite training in order to develop the areas in which the online delivery of professional development education provides the greatest benefits. For future studies on the effectiveness of online professional training, Donavant (2009) suggested taking social elements and other factors into consideration.

In summary, Donavant (2009) compared the effectiveness of online and traditional CPE in a non-academic setting from the learners' perspective, which is

similar to what was conducted in the present study. For this reason, the definition of educational effectiveness by Donavant (2009) was used to define effectiveness in this study: "educational effectiveness generally is determined by learner achievement and results in the acquisition and development of new knowledge and skills" (p.229).

## Theoretical Framework of the Study

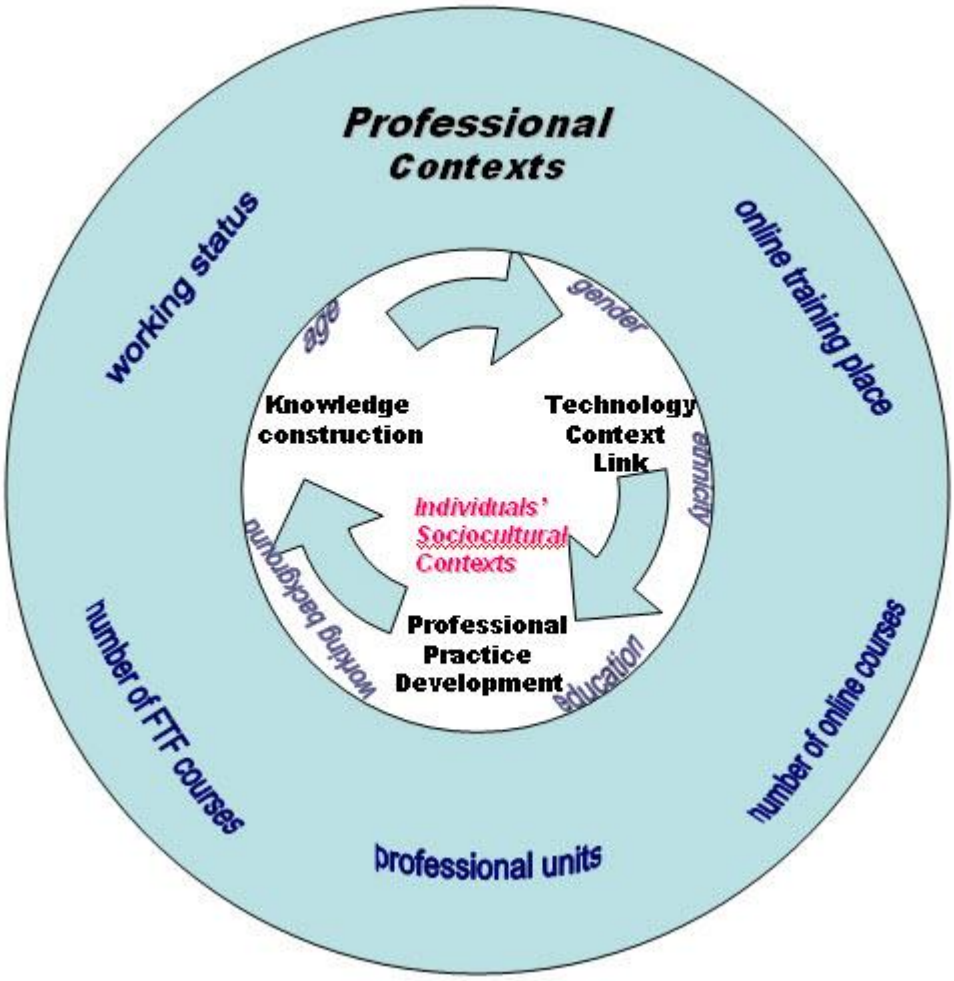
From the above review of existing effectiveness studies of online learning/training, the common criteria in the studies included: (a) knowledge and skill acquisition (b) technology system and support (c) practice and performance (d) learners' attitudes, efficacy and/or satisfaction towards online learning. These criteria matched the three steps in the professional learning model proposed by Daley (2000): (a) *knowledge construction for professional practice*, (b) l*inking knowledge with context*, and (c) *developing professional practice*. As stated in Donavant (2009), empirical research on adult learning principles and adult educational techniques in professional development was almost nonexistent and was greatly needed. The professional learning model and the three learning steps by Daley (2000) were based on a review of adult learning literature and principles. Therefore, this study was designed to examine the effectiveness of online learning from the three aspects with some moderations.

Since more effectiveness studies that incorporate personal, social and professional elements are needed (Donavant, 2009), the researcher took into consideration factors that were identified by previous effectiveness researchers as relevant to the effectiveness of online learning (Davis, 1993; Ghani & Deshpande, 1994; Legris, Ingham, & Collerette, 2003; Ong, Lai, & Wang, 2004). The factors were

categorized into two contexts: (a) *sociocultural factors:* age, gender, ethnicity, education levels, years of working experience; and (b) *professional factors:* working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working. Donavant (2009) found that there was a statistically significant relationship between potential online learning success and a formal educational level and inferred that employing adults with higher levels of postsecondary education would bring the greatest return on organizations' training investment. Based upon the above information, a theoretical framework for this study was proposed and is depicted in Figure 3. As shown in Figure 3, both professional contexts and individuals' sociocultural contexts need to be considered when examining the effectiveness of online courses. Professional contexts include working status, professional units, number of FTF courses, number of online courses and online training place; and, individuals' sociocultural contexts include age, gender, ethnicity, education and working background. The three crucial steps that influence the effectiveness of online learning are knowledge construction, technology context link and professional practice development. The three steps work cyclically.

**Figure 3**

**Theoretical Framework of the Study**



**Knowledge Construction for Professional Practice**

In Bersin (2002), one of the five questions used to determine whether e-learning was effective was: "Are they (e-learners) learning the material?" In Kirkpatrick's evaluation model (Kirkpatrick, 1994); the second level of learning to be examined was what was learned. Therefore, knowledge construction is a very important stage in the process of learning and performing for professionals.

**Linking Knowledge with Context**

In Bolman and Deal, 1997 (1997), four frames of organization - structural, human resources, political and symbolic, were used to illustrate the context that impacts knowledge creation and organizational learning (As cited in Daley, 2000). For this study, the structural frame, especially technology, was the context under close scrutiny. Kalsow (1999) collected data from three human development courses at Drake University to determine whether there was a difference in student performance when the modes of delivery were different and to analyze student perceptions of using Web-based learning as all or part of their course experience. Kalsow (1999) found the effectiveness of online courses depended on many technical issues such as software, learners' technical skills and the server.

Linking knowledge with technology context is important since "the introduction and use of collective technologies and the way we individually and collectively think about technology in relation to our work have the ability to change the organization and its work practices if the technology is adopted" (Hairston, 2007, p. 52). The ability of online learners to relate technology to the context in which it is being used is influenced

by their pre-existing attitudes and perceptions concerning the use of technology (Svensson, 2003).

The interdependency between learning/knowledge and the technology context in online education is best illustrated and can be further strengthened by Roger's innovative diffusion theory. "The term diffusion refers to the stage in which the technology spreads to general use and application" (Hairston, 2007, p. 53). It was argued that top administrators control the process of technology adoption and diffusion, which will impact the relationship between knowledge and technology context in organization (Carr, 1999; Rogers, 1995). The subjective evaluation of near-peers will influence the individuals' decision to adopt technology while the diffusion can only be successful when collective adoption is achieved.

**Developing Professional Practice**

Effective adult learning must include performing tasks in the workplace through simulation (Cranton, 1989; Hairston, 2007). In order to successfully perform tasks in the workplace, professionals need to think critically, analyze available information and make logical judgments (Block & Dobell, 1997). In other words, learning is not effective unless judgment and analytical skills are developed;

In addition, effective adult learning is also reflected by enhancement of *expertise* through an artistic-intuitive approach, which is to attain expertise by taking a more intuitive approach to the topic. In the Skill Acquisition Model of Dreyfus and Dreyfus (1986), increased perception and intuition within practical situations is an indication of effective learning from experience. Intuitive knowledge is an important kind of

professional practice to develop since professionals rely on it to solve problems in practice.

Daley (2000) suggested the directions among those crucial steps in professional learning. However, since the model was based purely on a literature review (no empirical studies have been conducted based on the model), the directional relationships among the three steps suggested by the model should not be considered as reliable and stable relationships. Therefore, in this study, the three steps of professional learning were examined only as three independent aspects that reflect how effective professionals learned, leaving the examination of the relationships among the three steps for future studies.

## Summary

In the literature review, online education and its advantages and disadvantages have been introduced. With the advantages of easy access and convenience, online education has become the most popular method in delivering CPE courses in many professions. Yet, it is unknown whether it delivers the courses to professionals effectively in terms of enhancing learning and promoting performance in the workplace. To reiterate, the purposes of the study were to: (a) obtain the perceptions of CPE participants on the effectiveness of online education relevant to *knowledge construction, technology context linkage* and *professional practice development*; (b) examine whether there are differences in professionals' perceptions as their sociocultural and professional contexts vary. The researcher attempted to close the information gap in the field of HRD and CPE by providing empirical data with regard to the effectiveness of online education

from the perspective of CPE participants. A theoretical framework of effective learning in online CPE courses that was built upon Daley's (2000) professional learning model and other related literature was used for this study

# CHAPTER III

# METHODOLOGY

The primary purpose of this study was to obtain TEEX professionals' perceptions of the effectiveness of online CPE courses versus face-to-face (FTF) courses in terms of its impact on promoting learning (knowledge construction) and improving performance (linking knowledge learned to technology context and developing professional practice). To achieve the goal, a self-administered online survey was used to obtain TEEX professionals' perceptions. Research design, site and sample selection, instrumentation, validity and reliability of the instrument, dependent and independent variables, human subject protection, data collection procedures, research hypotheses, data analysis and the results of a pilot study are presented in this chapter.

## Research Design

The researcher used an online self-perception survey and a proportional stratified random sampling technique to collect data on participants' perception on the effectiveness of online CPE courses versus FTF CPE courses. A self-perception survey, titled "Self-perceptions towards Effectiveness of E-learning versus Traditional Learning" (Appendix C), was chosen as the instrument to collect data for this study because self-reporting of perceptions has been the most direct and common way to obtain perceptions (Anderson & Kanuka, 1997; Corrallo, 1994). Another important reason that a self-report survey was chosen was that it serves the interest of CPE

participants best (Dillman, 2007). As explained in the literature review, Andragogy and constructivist learning theories are the foundations of adult learning. The theorists posit that learning is personal, individual and purposeful. As a result, examining whether online CPE courses are effective can be best achieved by obtaining adult learners' perceptions. Many researchers have questioned the validity of self-reports of cognitive outcomes. Corrallo (1994) researched related literature and confirmed that self-reported cognitive gains are indicative of results obtained through more direct forms of assessment.

*Mail and Internet surveys: The tailored design method* by Dillman (2007) was used as a guide to design and implement the survey study. In Dillman (2007), four errors that a researcher should try to avoid in a survey study are: (a) *coverage error*: a study does not have a complete sampling frame; (b) *sampling error*: error made by sampling only some; (c) *non-response error*: people do not respond; (d) *measurement error*: instrument is not well constructed. Coverage error was easily avoided in this study because the whole population in TEEX was sampled. The detailed measures to avoid sampling error, non-response error and measurement error are covered later in this chapter in order to facilitate the flow.

**Site and Sample Selection**

Professionals employed and trained at the Texas Engineering Extension Service (TEEX) in 2008 were the target population for the study. TEEX is a comprehensive training agency which provides training to different professions. Units that provide

specific trainings in TEEX are: *Fire Service, Utilities & Public Work, Homeland Security, Safety & Health, Public Safety and Security, Technology, Search & Rescue*.

The number of professionals to be surveyed in TEEX was 1,382. Two hundred professionals were randomly pulled for the pilot study, leaving the number of professionals for the final study at 1,182. According to a sampling chart (Krejcie & Morgan, 1970), 291 people would need to be surveyed to represent the population at the margin of error of .05. The number of respondents needed to represent each professional unit (i.e. the total number needed to represent the population times the percentage of the unit) is shown in Table 1.

**Table 1**

**Sampling Plan of the Study**

| Professional Unit/ Division | Number | Division Percentage (%) | Number of people needed to represent the division |
|---|---|---|---|
| Fire Service | 508 | 43 | 125 |
| Utilities & Public Work | 87 | 8 | 21 |
| Homeland Security | 297 | 25 | 73 |
| Safety & Health | 103 | 9 | 25 |
| Public Safety and Security | 39 | 3 | 10 |
| Technology | 48 | 4 | 12 |
| Search & Rescue | 100 | 8 | 25 |
| Total | 1182 | 100 | 291 |

The time frame used for the study was based on courses taken three years before taking the survey, which exceeded the three-month window suggested in Kirkpatrick (1994). According to Kirkpatrick (1994), the real effect of a training course is reflected after at least three months. In order to compare the effectiveness of online and FTF CPE courses, participants had to have taken both online and FTF courses within the three-year window.

Therefore, to be eligible for the study, participants had to have had both online and FTF CPE courses from September, 2005 through September, 2008. A proportionate randomized sampling technique was used to minimize the threats to internal validity.

The number of individual respondants to the survey is presented in Table 2. The total number of invitations sent was 840, and 399 invited TEEX professionals started the survey, making the initial response rate 48%. After eliminating unqualified responses, there were 320 qualified and completed responses. The unqualified responses included: (a) responses from those who did not meet the criteria to take the survey – who had not taken both online and FTF professional development training courses during the past three years; (b) responses from those who declined to proceed to the survey after reading the information sheet; (c) responses that had over 10% missing data. The population of TEEX professionals to be surveyed was 1,182, the number of respondents needed to represent the total population should be approximately 291 (Krejcie & Morgan, 1970); and the approximate sample size for good estimates of reliability is 300 (Mertler & Vannatta, 2002, p. 258). Therefore, the number of 320 respondants met the above-

**Table 2**

**Survey Respondents**

| Professional Unit | Total Emails Sent | Total Qualified & Completed Surveys | Percentage of Number of Responses |
|---|---|---|---|
| Fire Service | 354 | 123 | 38% |
| Utilities & Public Work | 54 | 25 | 8% |
| Homeland Security | 214 | 89 | 28% |
| Safety & Health | 78 | 31 | 10% |
| Public Safety and Security | 24 | 13 | 4% |
| Technology | 30 | 15 | 5% |
| Search & Rescue | 86 | 24 | 8% |
| Total | 840 | 320 | 100% |

mentioned criteria and is a sufficient number for utilizing inferential statistics for the study. The final response rate was 38% after the elimination of unqualified responses. The response rate is acceptable because it exceeds 32.52%, the average response rate from the study of online surveys in the industry (Hamilton, 2003) and 34.6%, the average response rate of online surveys from the meta-analysis study by Cook, Heath and Thompson (2000). As also shown in Tables 2 & 3, the number of responses in all TEEX units except “Fire Service” and “Search & Rescue” had reached the expected number needed to represent the group. Because the number of responses in the two units

was only one or two less than what was needed in each unit, the researcher deemed the obtained responses suitable for further analysis.

**Table 3**

**Survey Response Rates**

| Professional Unit | Total Qualified & Completed Survey | Response Rate in Each Unit | Total Email Sent | Total Response Rate |
|---|---|---|---|---|
| Fire Service | 123 | 35% | 354 | |
| Utilities & Public Work | 25 | 46% | 54 | |
| Homeland Security | 89 | 42% | 214 | |
| Safety & Health | 31 | 40% | 78 | |
| Public Safety and Security | 13 | 54% | 24 | |
| Technology | 15 | 50% | 30 | |
| Search & Rescue | 24 | 28% | 86 | |
| Total | 320 | | 840 | 38% |

**Proportional Stratified Random Sampling Plan**

To avoid sampling error and validate further analysis of perception differences among different professional units, a proportional stratified random sampling plan was used to identify the number of responses needed to represent each professional unit

(Shown in Table 1). The proportion rate used was the proportion of each unit within the organization based on the number of professionals.

In the pilot study, 90% of the respondents who started the survey were eligible because they had taken both online and FTF CPE courses during the past three years. The response rate for the pilot study was 40%. To get the number of emails that needed to be sent, the researcher divided the number of responses needed to represent the unit by the product of 90% and 40%. For example, to get the total number of emails that needed to be sent for the Fire Service Unit, 125 was divided by the product of 90% and 40%, of which the final number was rounded to be 354. From that, the researcher was able to get the number of emails that needed to be sent for each unit and the whole organization. The numbers were then randomly drawn from the pool of 1,182, the target population of the final study.

**Instrumentation**

Since learning is central to the learners, this study used a self-perception survey to obtain the perception of the learners. The survey instrument by Anderson and Kanuka (1997), based on the work of Rogers (1995), was modified to suit the needs of this study.

The researcher revised the original survey instrument based on the literature and the writing principles in Patten (2001) and Dillman (2007). The three goals that guided the writing of the survey questions were: (a) the question should be worded in the way that a potential respondent would interpret in the same way; (b) the question should be worded and structured in the way that a potential respondent would be able to

understand accurately; (c) potential respondents should be motivated and willing to answer (Dillman, 2007). The ultimate goal of writing a good survey is to avoid non-response error and maximize the response rate. Flesch-Kincaid grade level was used to assess and improve the readability of the instrument (Johnson-Glenberg, 2007). The readability level of the final instrument was 12, which means 12th Grade and is equivalent to the senior high school education level. Flesch-Kincaid grade level is explained in detail in the pilot study section later.

The first part of the modified survey instrument consisted of a 17-item questionnaire using a 5-point Likert scale (Likert Scale, 1-5 where 1 is Strongly Disagree and 5 is Strongly Agree), 9 demographic questions and 2 optional open-ended questions (As shown in Appendix C. Survey Instrument). Among the 17 5-point Likert scale questions, the last question was used to ascertain the general perception of the effectiveness of CPE courses, and the first 16 questions were used to assess three conceptual constructs, namely, *Knowledge Construction, Technology Context Link* and *Professional Practice Development* based upon the professional learning model of Daley (2000a) and the theoretical framework proposed in Chapter II.

The construct of *Knowledge Construction,* consisting of 6 items (questions 1-6), was used to measure the process of creating knowledge and changing it when faced with practice experiences (Daley, 2000). The concept of knowledge construction is similar to learning at instruction mode defined by Houle (1980) except that this concept has also borrowed the concept of reflective learning from Schon's learning model. Knowledge is

constructed not only through passively acquiring existing knowledge, but also through reflecting upon prior knowledge and in action/practice. An example of the questions asked in this construct was "The online courses reinforced my pre-training professional knowledge and expertise more than FTF courses".

The construct of *Technology Context Link,* consisting of 5 items (questions 7-11), was used to measure the ability of the delivery method to improve a professionals' ability of linking the knowledge learned with the technology context. Technology is an integral part of e-learning and plays a significant role in the learning process. According to Hairston (2007), Bates and Escamilla de Los Santos (1997), and Block and Dobell (1997), technology has the ability to facilitate collaborative learning and stimulate learners to think more critically, better analyze information and make more logical arguments. The growth of technology and the Internet has provided potentially effective communication structures and vast information resources for e-learners. Consequently, one cannot study the effectiveness of e-learning without mentioning the technology context in which e-learners are situated. An example of the questions asked in this construct was "Activities and interactive tools used in online courses have helped me transfer learning from the training sessions to the workplace more than those used in FTF courses".

The construct of *Professional Practice Development,* consisting of 5 items (questions 12-16), were used to assess whether professionals' professional practice was developed through the medium. Professional practice is developed through the

development and enhancement of information processing skills (problem solving, decision making, clinical reasoning and judgment skills) and professional expertise. An example of the questions asked in this construct was “My expertise in the professional area has been updated and enhanced more effectively by online courses than traditional FTF courses.

The second part of the survey instrument was used to collect professionals’ sociocultural and professional backgrounds, including, age, gender, ethnicity, working experience, education background, working status and experience with online and FTF CPE courses. In the last part of the instrument, two open-ended questions for recommendations were asked to further understand what is perceived as effective CPE courses, online or FTF.

## Reliability of the Instrument

The reliability of an instrument is assessed in order to determine if the instrument is consistent with whatever is being measured. Since the article by Anderson and Kanuka (1997) did not mention the reliability of the original survey instrument, the reliability of the adapted instrument was checked by obtaining Cronbach’s Coefficient Alpha in both the pilot study and the final study.

The commonly used measurement for reliability is Crobach’s alpha. A reliability alpha of .60 is viewed as an acceptable cut-off in the social sciences (Gronlund, 1981). Since the last item of the questionnaire was used to assess professionals’ overall

perceptions, it was not included in the calculation of the reliability coefficient for the three constructs, but was included in the estimate of the overall reliability.

The overall reliability coefficient and those of the three constructs from the survey instrument from the pilot study data and from the final study data are shown respectively in Tables 4 and 5. Although there were fewer respondents in the pilot study than what is normally recommended for a reliability estimate, the reliabilities from the two data sets were similar, which speaks to the stability of the instrument.

**Table 4**

**Reliability of Survey Instrument and Constructs form the Pilot Study Data**

| Instrument/Variable | Number of Responses | Number of Items | Cronbach's Alpha |
|---|---|---|---|
| Questionnaire | 64 | 16 | .90 |
| Knowledge Construction | 64 | 5 | .66 |
| Technology Context Link | 64 | 5 | .68 |
| Professional Practice Development | 64 | 5 | .89 |

**Table 5**

**Reliability of Survey Instrument and Constructs from the Final Study Data**

| Instrument/Variable | Number of Responses | Number of Items | Cronbach's Alpha |
|---|---|---|---|
| Questionnaire | 320 | 17 | .89 |
| Knowledge Construction | 320 | 6 | .67 |
| Technology Context Link | 320 | 5 | .65 |
| Professional Practice Development | 320 | 5 | .85 |

An alpha of .89 was obtained for the total instrument, including all 17 items that comprised variables of three designed constructs (knowledge construction, context link and professional practice) and one general perception question. The reliability coefficients for the subscales of Knowledge Construction and Context Link were .67 and .65 respectively. The reliabilities scores were all acceptable because they were all higher than .60, which is viewed as an acceptable cut-off in the social sciences (Gronlund, 1981). The reliability coefficients for those two constructs were lower than that of the *Professional Practice* construct probably because the constructs with lower reliability were constructed through combining the existing instrument of Anderson and Kanuka (1997) with information taken from the literature review while the construct

with higher reliability was purely based on the information provided by literature. Considering the fact that it is partly a newly constructed survey and the instrument is testing perceptions, the reliability for the two constructs were deemed to be acceptable. The Professional Practice construct was developed from items purely based upon literature, and yielded an alpha score of .85.

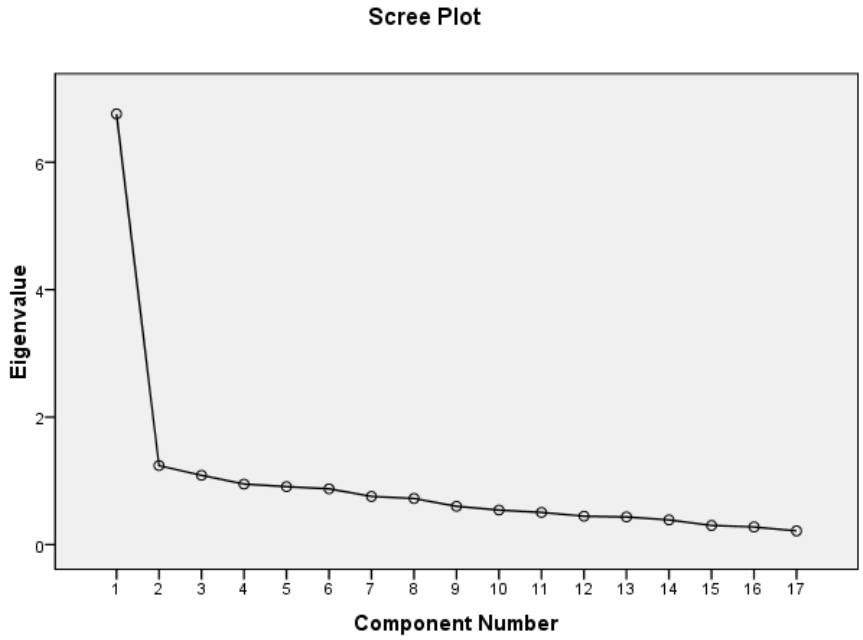
## Construct Validity of the Instrument

The validity of an instrument is examined in order to check whether the instrument is accurate in its function. The form of instrument validity examined in this study was construct validity.

The researcher first checked the number of constructs by using minimum Eigenvalue of 1 suggested by Mertler and Vannatta (2002) and a scree plot. According to Mertler and Vannatta (2002), a scree plot is a reliable criterion for checking the number of constructs when the number of individuals is >250 and communalities are >.30 (Appendix D) , which is the case for this research. As shown in Figure 4, three constructs were shown in the Scree Plot.

**Figure 4**

**Scree Plot of Variable Components**




While it was indicated in the literature review that constructs related to knowledge construction, technology context link and professional practice development may exist, the evidence provided was too weak to support the use of a confirmatory factor analysis. Therefore, an EFA approach, using principal component analysis (PCA), was conducted to explore whether the three distinct constructs (knowledge construction, technology context link and professional practice development) emerged from the data

collected in the study as designed. Factor Analysis (FA) procedures were not used because the underlying processes that could have produced correlations among variables were not the concerns of the study (Tabachnick & Fidell, 2001).

The purpose of exploratory factor analysis "is to describe and summarize data by grouping together variables that are correlated" (Mertler & Vannatta, 2002, p. 257). Principal component analysis (PCA) is usually used for exploratory factor analysis when only an empirical summary of the data set is wanted (Tabachnick & Fidell, 2001).

Prior to a principal component analysis (PCA), communalities of all variables were examined. As shown in Appendix D, since all communalities are above 0.3, the principal component analysis was deemed an appropriate exploratory method (Tabachnick & Fidell, 2001). Furthermore, as indicated by the Kaiser–Meyer–Olkin measure of sampling adequacy (0.916) and Bartlett's test of sphericity ($p<.001$), the sample size and correlations (Appendix E) were acceptable for factor analysis.

Since self-reported data were used in this study, common method variance may have inflated some of the relationships between the variables (Podsakoff & Organ, 1986). To ensure that common method variance was not a serious concern of this study, the researcher conducted Harmen's single-factor test following the instructions of Podsakoff and Organ (1986) (Table 6). Exploratory factor analysis was run and all items were loaded. The first unrotated factor accounted for 37.596 percent of the total variance in this study (Table 6), and as expected, three factors emerged with eigenvalues greater than 1.0. According to Podsakoff and Organ (1986), "if a substantial amount of common

method variance is present, either a single factor will emerge from the factor analysis, or one "general" factor will account for the majority of the variance" (p. 536). It is indicated in the result of Herman's single factor analysis that common method variance was not a serious concern in this study because less than 40 percent of the total variance was explained by the first factor, and three factors emerged as expected in the original design.

As suggested in Pallant (2005), both orthogonal (Varimax) and oblique (Direct Oblimin)(Appendix F) rotation methods were used. Since both methods produced similar factor combinations, only the results from the Varimax rotation (using Kaiser normalization) are shown in Table 6. The use of only Varimax rotation is supported by Field (2005) and Kay and Knaack (2008) who stated that the interpretation of the data could be simplified in Varimax rotation. In the rotation, any factor loadings under .40 was suppressed and not presented (Tabachnick & Fidell, 2001).

**Table 6**

**Factor Information and Varimax Rotated Factor Loadings**

| Factor | Eigenvalue | PCT of VAR | CUM PCT |
|---|---|---|---|
| 1 | 6.015 | 37.596 | 37.596 |
| 2 | 1.227 | 7.666 | 45.262 |
| 3 | 1.072 | 6.701 | 51.963 |
| **Scale item** | **Factor 1** | **Factor 2** | **Factor 3** |
| 1.KC1- Information Provided | .458 | | |
| 2.KC2- Peer Communication | .529 | | |
| 3.KC3- Content Reflection | | | .561 |
| 4.KC4- New Knowledge | .726 | | |
| 5 KC5- Pre-training Knowledge | .666 | | |
| 6.KC6- Real-life Scenarios | | | .576 |
| 7.TCT1- Emerging Technologies | | .688 | |
| 8.TCT2- Technical Skills | .404 | .477 | |
| 9.TCT3- Valued Platform | | .797 | |
| 10. TCT4- Activities and Tools | .721 | | |
| 11. TCT5- Workplace Preference | | | .698 |
| 12. PP1- Problem-solving Skills | .654 | | |
| 13. PP2- Decision-making Skills | .763 | | |
| 14. PP3- Reasoning and Judgment | .768 | | |
| 15. PP4- Intuition Utilization | .680 | | |
| 16. PP5- Expertise Reinforcement | .558 | .443 | |

*Note.* KC refers to Knowledge Construction; TCT refers to Technology Context Link; PP refers to Professional Practice Development

As shown in Table 6, three factors, which explained 51.963 percent of the variance, were extracted through the principal components analysis. Meyers, Gamst and Guarino (2006) suggest that variables with explained variance of 50% and above are considered acceptable for further interpretation. The results confirmed that there are three constructs in the instrument but the constructs are not as distinct as proposed. The resulting rotation confirmed that there were three constructs as originally proposed but items *did not* load in each construct as was expected: (a) two Knowledge Construction items (Item 1- information provided and Item 2- peer communication had high loadings with Professional Practice construct items; (b) one of the Technology Context Link construct items (Item 8 – technical skills) loaded equally low on both Factor 1 and Factor 2. After carefully reviewing the item in the instrument, the researcher decided to interpret the item as a part of Factor 2 because it loaded higher there; (c) one of the Professional Practice construct items (Item 16 – expertise reinforced) loaded equally low on both Factor 1 and Factor 2. After carefully reviewing the item in the instrument, the research decided to make the item part of Factor 1 because it loaded higher there.

Based on the structure obtained via PCA, the originally proposed constructs were redefined as follows: (a) All but five items loaded on Factor 1, so it became the major construct of the study after rotation, which included ten items: item 1 (information provided); item 2 (peer communication); item 4 (acquiring new knowledge), item 5 (pre-training knowledge), item 10 (activities and tools), items 12-16 (problem-solving skills, decision-making skills, reasoning and judgment, intuition utilization, and expertise

reinforcement). Based on the content of the items and underlying literature, Factor 1 was close to the third construct in the original design of the instrument with some additions. The researcher decided to name the first construct P*rofessional Knowledge and Practice* to reflect the changes made to the construct; (b) Factor 2 was close to the second construct in the original design with some additions, including item 7(emerging technologies), item 8 (technical skills) and item 9 (valued platform). This factor was still named T*echnology Context Link*; (c) item 3 (content reflection), item 6 (real-life scenarios) and item 11 (workplace preference) loaded on Factor 3. Because two of the three items in this factor were from Knowledge Construction in the original design (interesting content and content reflection for constructing knowledge), the researcher decided to keep the name of *Knowledge Construction* for the third factor.

After the items were regrouped into three new constructs based on the factor analysis of the data, the reliability coefficients of the new constructs were also checked. The reliabilities of the constructs are presented in Table 7. As shown in Table 7, the reliability of the first new factor, Professional Knowledge and Practice, was .89. The reliability coefficients of the second and third new constructs, Technology Context Link and Knowledge Construction, were .63 and .38 respectively. The low reliability scores of the two constructs might be the results of the following factors: (a) the instrument was used to collect data on people's perceptions, which might vary greatly; (b) the number of items loaded in the last two constructs were small- only three in each; (c) the instrument was constructed by mixing the existing instrument of Anderson and Kanuka (1997) and

literature relevant to the research. However, the overall alpha score of .89 for the instrument still indicates a high level of reliability. Because the reliability indicator for the construct of Knowledge Construction was unacceptably low, the researcher decided to delete it from further analysis.

**Table 7**

**Reliability of Survey Instrument and New Constructs in the Final Study (N=320)**

| Instrument/Variable | | Number of Responses | Number of Items | Cronbach's Alpha | Cronbach's Alpha for construct if item deleted |
|---|---|---|---|---|---|
| **Questionnaire** | | **320** | **17** | **.892** | **N/A** |
| *Professional Knowledge and Practice* | | *320* | *10* | *.888* | *N/A* |
| Construct Factor Items | Information Provided | 320 | | | 0.887 |
| | Peer Communication | 320 | | | 0.890* |
| | New Knowledge | 320 | | | 0.871 |
| | Pre-training Knowledge | 320 | | | 0.877 |
| | Activities and Tools | 320 | | | 0.873 |
| | Problem-solving Skills | 320 | | | 0.873 |
| | Decision-making Skills | 320 | | | 0.873 |
| | Reasoning and Judgment | 320 | | | 0.876 |
| | Intuition Utilization | 320 | | | 0.874 |
| | Expertise Reinforcement | 320 | | | 0.877 |

**Table 7** Continued

| Instrument/Variable | | Number of Responses | Number of Items | Cronbach's Alpha | Cronbach's Alpha for construct if item deleted |
|---|---|---|---|---|---|
| *Technology Context Link* | | *320* | *3* | *.633* | *N/A* |
| Construct | Emerging Technologies | 320 | | | 0.474 |
| Factor | Technical Skills | 320 | | | 0.639* |
| Items | Valued Platform | 320 | | | 0.500 |
| *Knowledge Construction* | | *320* | *3* | *.347* | *N/A* |
| Construct | Content Reflection | 320 | | | 0.334 |
| Factor | Real-life Scenarios | 320 | | | 0.213 |
| Items | Workplace Preference | 320 | | | 0.225 |

*Note*. * Cronbach's Alpha increased only slightly if the item was deleted.

Based on the results from the PCA and regrouped structures, the researcher decided to change the order of the original research questions to the following:

1. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Professional Knowledge and Practice development compared to the FTF CPE course?

2. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Technology Context Link compared to the FTF CPE courses?
3. In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses?
4. Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working) differ in their perceptions on the effectiveness of online CPE courses versus FTF CPE courses?
5. What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses, to other stakeholders of CPE courses, such as course administrators and training professionals?

## Dependent and Independent Variables

The dependent variables in the study were professionals' perceptions of the effectiveness of online CPE courses compared to face-to-face (FTF) CPE course in two aspects: Professional Knowledge and Practice and Technology Context Link.

The independent variables in the study were professionals' sociocultural and professional context factors, which included age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online

courses taken and number of FTF courses taken, and units/divisions in which professionals were working.

The interval of the independent variable levels were set up as small as possible to prevent loss of information. However, to meet a recommended minimum cell size for statistical analysis (n for each cell should be greater than 30), each independent variable except gender and online training places were operationally re-categorized. The categories of all independent variables are detailed in the following paragraphs:

**Age Category**

The original age groups (10 groups) were re-categorized into four groups according to the theory of social generations (Strauss & Howe, 1991).

1) 20-34 – Generation Y (Millenials):

Generation Y, or "Millennials" born from 1981 to 2000 (19 years) is the largest generation in American history, approximately 75 million (Lancaster & Stillman, 2010).

2) 35-44 – Generation X

Generation X born from 1966 to1980 (15 years) is the generation that was connected to the pop culture of the 1980s and 1990s in which they grew up.

3) 45-54 – Generation Jones

Generation Jones born from 1954 to 1965 (12 years) is the generation of actual children in the 1960s, which came of age in the late 1970s and early 1980s.

4) 55 and above - Boom Generation

The Baby Boomers (Boom Generation) born from 1942 to 1953 (12 years) is the generation born just after World War II, a time that included a 14-year increase in birthrate worldwide.

**Gender**

The original grouping of two was kept for further analysis: male and female.

**Ethnicity**

Based on the characteristics of the data collected (majority of the total respondents were white/non-Hispanics), the ethnicity groupings were re-categorized from the original seven groups into two groups for further analysis: (a) White (Non-Hispanic and Non-Black); (b) Minority group, which included American Indian or Alaska Native, Hispanic or Latino, Black, Non-Hispanic, Asian or Pacific Islander, Mixed Origin and Others.

**Education Level**

According to Gibson and Graff (1992), those who have already had at least two years of college experience are most likely to be successful in online courses. Considering the level of education in the data, a four-group categorization was used for further analysis: (a) High School + Technical School; (b) Up to 2 years college; (c) 2-4 years college (Bachelor's Degree); (d) 4 and above years of college (Master's and Doctoral Degree).

**Working Experience**

As defined in the literature, experts are those who have worked in the field for at least 5 years, and those who have a working experience of 5-15 years. The latter group often becomes the backbone of organizations because of both their working experience and their age. Therefore, the working experience data was categorized into 3 groups: (a) 1-5 years (from novice to expert); (b) 6-15 years (expert and backbone); (c) 16 years and above (expert).

**Working Status**

The original four working status groups (Full-time, Part-time, Full-time to Part-time and Part-time to Full-time) were re-categorized into two groups: (a) Full-time; (b) Part-time.

**Online Training Places**

The original groups under this category were retained for the analyses: (a) TEEX; (b) Outside TEEX; (c) Both.

**Number of Online Courses**

As shown in the literature (Francis et al., 2000), people who take just one online course will have a very different view towards online courses from those who have never taken any online course simply because of fear; and afterwards, the experience will not be much different. Therefore, the number of online courses was regrouped into five for further analyses: (a) 0~2 courses; (b) 3~5 courses; (c) 6~10 courses; (d) 11~15 courses; (e) 16 courses and above.

### Number of FTF Courses

The same rationale for re-grouping the previous category, Number of Online Courses, applied to this category. The number of FTF courses was, therefore, regrouped into four for further analyses: (a) 0~2 courses; (b) 3~5 courses; (c) 6~10 courses; (d) 11 courses and above.

### Units/Divisions

The units were re-grouped from the original seven into four based on the similarity of the professions/units with regard to their functionality in TEEX: (a) Fire Service; (b) Public Work; (c) Emergence Response; and (d) Safety & Health.

## Human Subject Protection

To protect human subjects, the approval to conduct this study was obtained from Texas A&M University Institutional Review Board (IRB). The information sheet approved by IRB is attached as Appendix G. All the initial invitation letters sent to potential participants of the study and the online survey included the information sheet approved by Texas A&M University Institutional Review Board. Strict confidentiality has been kept throughout the study. Only the researcher could access both coded and uncoded data for the purpose of analyzing data. Data files will be discarded two years after the study is completed.

## Data Collection Procedure

Following the guidelines set forth by IRB, the researcher obtained the permission letter from the authors of the instrument that was adapted for the use in the study. The

researcher also obtained the permission from the administrators at TEEX to conduct this study within the organization. A pre-notice letter was sent from the administrators to potential participants before starting both the pilot and final studies, explaining who the researcher of the study was and what the study was about.

A self-administered survey was set up on www.monkeysurvey.com, and invitations were sent to TEEX professionals directly from Surveymonkey. The first two pages of the survey contained the operational definition of continuing professional education (CPE) and a question that asked potential participants whether they had had both online CPE and FTF CPE courses during the past three years. If potential participants clicked "Yes", they were taken to the next page of the survey; otherwise, they were not eligible for the survey and were led out of the survey page. For those eligible participants, the researcher explained the details of the research study on the next two pages and provided the approved information sheet. The information sheet stressed that participation in the study was completely voluntary and participants could exit the survey any time during the process of filling out the survey. The potential participants would need to click "I Agree" in order to proceed, otherwise, they would exit the survey. The rest of the survey was the 17-item questionnaires and two open-ended questions.

The researcher obtained 1,182 TEEX trainers' emails from a TEEX training administrator and used SPSS to randomly select the emails/samples that the survey

invitation would be sent to. A stratified proportional random sampling technique was used to lower the threats to internal validity.

An email that invited potential respondents to the online survey was sent out directly from Surveymonkey in order to track respondents and non-respondents. A sample invitation email and copy of three follow-up emails are attached as Appendices H, I, J and K. The final study was conducted between October, 2008 and the end of December, 2008.

One of the four major errors that researchers conducting surveys should try to avoid is non-response error (Dillman, 2007). To maximize the response rate and avoid non-response error, the researcher followed the guidance of the social exchange theory in Dillman (2007) and took the following measures in the process of designing and conducting the survey:

1) *Made the survey instrument concise*. The questionnaire was very short, which only took participants 5-10 minutes to complete.
2) *Improved the readability of the instrument.* A readability test had been run for the instrument. Flesch-Kincaid grade level was used in the readability test. Flesch–Kincaid Grade Level is designed to indicate comprehension difficulty when reading a passage of contemporary academic English (Johnson-Glenberg, 2007). The "Flesch–Kincaid Grade Level Formula" translates the 0–100 score to a U.S. grade level and the number of the level shown in the readability test means the number of years of education generally required to understand this text. Based

upon the readability result and minimum education level in the pilot study (senior high school), the researcher revised the instrument and made the readability level of the final instrument 12, which means 12th Grade and is equivalent to the senior high school education level. The better participants understand the survey, the more motivations participants have to complete the survey and the better the results will be.

3) *Established rapport.* The researcher initially contacted the respondents through a TEEX administrator. The pre-notice email sent through the administrator confirmed the formality of the survey and established the trust between the researcher and the respondents. The researcher also asked internal liaisons to spread the word and encourage more people to participate. An invitation email was followed by three more reminder (contact) emails, which is one of the important techniques to increase the response rate. Three follow-up emails, which were worded differently and followed the guidelines spelled out by Dillman (2007), were sent to increase the response rate.
4) *Offered exchange of service*. In the invitation emails, the researcher encouraged the message recipient to participate and offered the sharing of study findings as an exchange for participants' efforts to complete the survey.

The response rate for the study was 48% (n=399), which is acceptable because the number of responses was sufficient enough to represent the population. Confirmed by the correspondence from TEEX liaisons, the response rate of 48% is satisfactory and

what one could possibly get due to the nature of the professional work in TEEX: many TEEX professionals are always on the go, therefore, emails are not accessible to them or they simply did not have time to complete the survey at the time they opened their emails. However, the response rate could be improved by using an alternate survey method, such as telephone survey, and sending survey invitations to alternate email addresses. This assumption was also backed up by the fact that a third of professionals working in the organization were part-time, who seldom check their TEEX email account according to the information provided by correspondence from TEEX liaisons. These are some concerns for similar studies in the future.

## Pilot Study

A pilot study was conducted with a mix of part-time and full-time TEEX professionals, from July 31, 2008 to Sept. 8, 2008. One invitation email and four reminders were sent during that period.

Total e-mails sent were 185 and 95 people responded after one invitation and four reminder emails, but 21 of the respondents had not taken both online and FTF courses. Therefore, only 74 people were eligible to participate in the pilot study. One refused to proceed at the page of information sheet. Nine out of 73 responded partially. In the end, there were 64 total qualified respondents for the pilot test. The response rate was 40% with only qualified respondents.

The purposes of conducting the pilot study were two fold: (a) to check readability of the instrument by using Flesch-Kincaid grade level; (b) to check face validity and

logistics of the survey instrument. For those purposes, a readability test, a reliability test and an exploratory factor analysis were performed. The readability test of Flesch–Kincaid Grade Level was used to check the readability of the survey instrument. Flesch–Kincaid Grade Level means the number of years of education generally required to understand the text. As shown in the demographic data, the lowest education level reported in the pilot study was senior high school, Grade 12. The researcher then simplified the syntax of the questions and divided one question into two in order to accommodate the reading ability of potential participants of the study. The readability score of the revised instrument for the final study was 12, which accommodated the lowest projected education level.

As shown in the reliability test for the pilot study (Table 4), Cronbach's alpha for the first five items was .66; that of the second five items was 0.68; that of the last five items was 0.89 and that of all items was 0.90. The reliability coefficients ranged from acceptable to high.

## Data Screening and Coding for the Final Study

Data were entered into and coded in SPSS 16.0. Participants having over 10% missing information were eliminated, leaving 320 entries that were eligible for final analyses. One question in each construct and three in total were reverse coded to avoid response error. The three reverse-ordered items (Questions #6, 9 and 11) were then coded back for final analysis. Each perception entry was rated on a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

## Data Analysis

An exploratory factor analysis was used to examine how many constructs were included in the survey instrument. Principle component analysis (PCA) was the method used to conduct the exploratory factor analysis. The PCA results were used to indicate that the instrument had three constructs as originally designed, but the items with high loadings in each construct were different from the original design. Therefore, three constructs were redefined for further analyses. The details have been covered in the previous section about the construct validity. The three constructs extracted through PCA were the constructs used in the data analyses to answer the research questions.

The researcher used SPSS 16.0 to analyze the data in this study. Dependent variable, and professionals' perceptions was measured at the interval level. Therefore, descriptive data such as frequencies, means and standard deviations were calculated. Additionally, to answer Research Questions 1-4, one sample t-tests were run to examine whether the means of professionals' perceptions were significantly different from 3 (the middle point of 5-point Likert scale, which indicates the effectiveness of online courses is not equal to that of traditional classroom courses). A Bonferroni adjustment was used to reduce the probability of a Type I error when significant differences were detected.

To test whether professionals' perceptions were statistically different, multivariate analyses of variance (MANOVA) were run. There are three assumptions underlying MANOVA testing: "(1) independence of observations, (2) multivariate normality of the group population dependent variables, and (3) homogeneity of group

population variance-covariance matrices" (Grice, 2007, p. 214). Therefore, assumptions were tested before hypothesis testing following the steps in Pallant (2005). When statistical significance was detected by MANOVA results, the null hypothesis was rejected. Post Hoc tests (ANOVAs) were run with a Bonferroni adjustment. Since there were three dependent variables, 0.025 (0.05 divided by 2) was the final alpha value that was used to detect whether there were significant differences in perceptions among different groups examined. Box's M Test was used to check if assumptions of MANOVA were violated and Wilks' Lambda was used as the global test to examine for significance.

The responses to the open-ended questions are qualitative data. The researcher used content analysis to identify themes that emerged from those questions and to provide recommendations. The data analysis procedures are shown in Table 8.

**Table 8**

**Data Analysis Procedures**

| Research Questions | Variables and Level of Measurement | Statistical Tools to Analyze Data |
|---|---|---|
| #1. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Professional Knowledge and Practice development compared to the face-to-face (FTF) CPE courses? | Perception is the dependent variable and measured at interval level; method of instruction is the independent variable and is measured at nominal level. | Descriptive statistics (frequencies, means and SD); one sample t-test to compare the means with the mid-point of the 5-point Likert Scale. |

**Table 8** Continued

| Research Questions | Variables and Level of Measurement | Statistical Tools to Analyze Data |
|---|---|---|
| #2. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Technology Context Link compared to the FTF CPE courses? | Perception is the dependent variable and measured at interval level; method of instruction is the independent variable and is measured at nominal level. | Descriptive statistics (frequencies, means and SD); one sample t-test to compare the means with the mid-point of the 5-point Likert Scale. |
| #3. In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses? | Perception is the dependent variable and measured at interval level; method of instruction is the independent variable and is measured at nominal level. | Descriptive statistics (frequencies, means and SD); one sample t-test to compare the means with the mid-point of the 5-point Likert Scale. |
| #4. Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working) differ in their perceptions? | Perception is the dependent variable and measured at interval level; sociocultural and professional context factors are the independent variables and are measured at nominal level. | Descriptive statistics; MANOVA; Post-doc tests were run and Bonferroni adjustment was used when significance is identified. |
| #5 What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses to other stakeholders of CPE courses, such as course administrators and training professionals? | Recommendations are qualitative, narrative data. Descriptive data, no variables. | Content analysis of two open-ended questions. |

## Research Hypotheses

The following research hypotheses were derived from Research Questions 1-4:

**$H_1$:** Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in terms of Professional Knowledge and Practice development.

**$H_2$:** Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in terms of Technology Context Link.

**$H_3$:** Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in terms of Knowledge Construction promotion.

**$H_{4a}$:** Professionals of different age groups perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4b}$:** Male professionals and female professionals perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4c}$:** Professionals of different ethnicity groups perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4d}$:** Professionals with different education levels perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4e}$:** Professionals with different years of working experience perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4f:}$** Professionals of different working status perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4g:}$** Professionals who took online training at different places perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4h:}$** Professionals who had taken different numbers of online CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4i:}$** Professionals who had taken different numbers of FTF CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

**$H_{4j:}$** Professionals who were from different professional contexts perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.

## Summary

In this chapter, the researcher has presented research design, the site, population and sample of the study, followed by instrumentation, its construct validity and reliability. Detailed data collection and analysis procedures were also covered. The researcher presents the results of the study in Chapter IV.

# CHAPTER IV

# PRESENTATION OF THE RESULTS

The original purpose of the study was twofold: (a) to examine online CPE in terms of its effectiveness in promoting learning (knowledge construction) and improving performance (linking learning to technology context and promote professional practice development) compared to FTF CPE from the perspectives of TEEX professionals who had participated in both online and FTF CPE courses; (b) to examine whether there were differences in professionals' perceptions as a function of their sociocultural and professional contexts varied. In Chapter IV, the collected data were analyzed through the statistical methods specified in Chapter III. As a result, the research questions were answered. The chapter is organized into three parts: (a) descriptive data about respondents' demographics and questionnaire items; (b) answers to the research questions and tested hypotheses; (c) the summary of findings.

## Descriptive Data

The respondents' sociocultural contexts information is presented in Table 9. The information includes the professionals' age, gender, ethnicity and education background and working background. There were 399 respondents who participated in the study and 80% of the response entries (n=320, which was 38% of 840 emails sent) were valid for data analysis.

**Table 9**

**Sociocultural Contexts of Participants, N=320**

| Sociocultural Contexts | Frequency | Percent |
|---|---|---|
| ***Age of Participants*** | | |
| 20-24 | 7 | 2.2 |
| 25-29 | 11 | 3.4 |
| 30-34 | 12 | 3.8 |
| 35-39 | 30 | 9.4 |
| 40-44 | 32 | 10 |
| 45-49 | 63 | 19.7 |
| 50-54 | 59 | 18.4 |
| 55-59 | 54 | 16.9 |
| Above 60 | 52 | 16.2 |
| Total | 320 | 100 |
| ***Gender*** | | |
| Male | 206 | 64.4 |
| Female | 114 | 35.6 |
| Total | 320 | 100 |
| ***Ethnicity*** | | |
| White, Non-Hispanic | 273 | 85.3 |
| American Indian or Alaska Native | 1 | 0.3 |
| Hispanic or Latino | 21 | 6.6 |
| Black, Non-Hispanic | 15 | 4.7 |
| Asian or Pacific Islander | 2 | 0.6 |
| Mixed Origin | 6 | 1.9 |
| Others | 2 | 0.6 |
| Total | 320 | 100 |

**Table 9** Continued

| Sociocultural Contexts | Frequency | Percent |
|---|---|---|
| ***Education Background*** | | |
| High school | 33 | 10.3 |
| Technical School | 17 | 5.3 |
| Up to 2 years of college | 78 | 24.4 |
| Bachelor's degree | 81 | 25.3 |
| Master's degree | 101 | 31.6 |
| Doctoral degree | 10 | 3.1 |
| Total | 320 | 100 |
| ***Working Background*** | | |
| Less than 1 year | 10 | 3.1 |
| 1-5 years | 48 | 15 |
| 6-10 years | 46 | 14.4 |
| 11-15 years | 28 | 8.8 |
| Over 16 | 188 | 58.8 |
| Total | 320 | 100 |

As shown in Table 9, the most frequently reported age range was 45-49 years (19.7%; n=63), followed by the group of 50-54 years (18.4%; n=59). Sixty four percent (n = 206) of the total respondents were men. The most reported ethnicity was White/non-Hispanics, 85.3% (n = 273). The majority of respondents had earned post-secondary degree, either master's degrees, 31.6% (n= 101) or bachelor's degrees, 25.3% (n=81), and only 3.1% (n=10) of the respondents were reported having doctoral degrees. Over

half of the respondents, 58.8%, (n=188) had a working experience of over 16 years, and only 18% of the respondents had less than 5 years.

The professional contexts information of the respondents is shown in Table 10. The information includes working status, online training place and professional unit in which they worked.

**Table 10**

**Professional/ Background Information of Participants, N=320**

| Professional Background | Frequency | Percent |
|---|---|---|
| ***Working Status*** | | |
| Full-time to Part-time | 10 | 3.1 |
| Part-time to Full-time | 16 | 5 |
| Full-time and Part-time | 1 | 0.3 |
| Full-time | 193 | 60.3 |
| Part-time | 100 | 31.2 |
| Total | 320 | 100 |
| ***Online Training Place*** | | |
| TEEX | 84 | 26.2 |
| Outside TEEX | 47 | 14.7 |
| Both | 189 | 59.1 |
| Total | 320 | 100 |

**Table 10** Continued

| Professional Background | Frequency | Percent |
|---|---|---|
| ***Professional Unit*** | | |
| Fire Service | 123 | 38.4 |
| Utilities & Public Work | 25 | 7.8 |
| Homeland Security | 89 | 27.8 |
| Safety & Health | 31 | 9.7 |
| Public Safety and Security | 13 | 4.1 |
| Technology | 15 | 4.7 |
| Search & Rescue | 24 | 7.5 |
| Total | 320 | 100 |
| ***Number of Online CPE Courses*** | | |
| 0~2 Courses | 34 | 10.8 |
| 3~5 Courses | 103 | 32.7 |
| 6~10 Courses | 114 | 36.2 |
| 11~15 Courses | 31 | 9.8 |
| Over 16 Online Courses | 33 | 10.5 |
| Total | 315 | 100 |
| ***Number of FTF CPE Courses*** | | |
| 0~2 Courses | 70 | 21.9 |
| 3~5 Courses | 117 | 36.6 |
| 6~10 Courses | 84 | 26.2 |
| 11~15 Courses | 49 | 15.3 |
| Total | 320 | 100 |

As shown in Table 10, among the 320 respondents, 60.3% of them (n= 193) were full-time employees of TEEX; 31.2% of them (n= 100) were part-time employees of

TEEX, and the rest of the respondents had either changed their working status from full-time to part-time, part-time to full-time or both.

More than half of the respondents (59.1%; n=189) reported that they took their online courses both from TEEX and outside TEEX. Of the respondents who provided information on the number of online courses taken from 2005 to 2008, the most reported range was 6~10 (36.2%; n=114), followed by the range of 3~5 (32.7%; n=103). Only 10.5% of them (n=33) had taken more than 16 online courses.

Of the respondents who provided information on the number of FTF courses taken from 2005 to 2008, the most reported range was 3~5 (36.6%; n=117), followed by the range of 6~10 (26.2%; n=84). Only 15.3% of them (n=49) had taken more than 11 FTF and online CPE courses.

Descriptive data about the survey constructs and questionnaire items are summarized in the following tables, which are presented and discussed in the next section.

## Research Questions

Originally, there were six research questions in this study. But after running the factor analysis, the researcher found only two reliable constructs instead of three. As two constructs- knowledge construction and professional practice development were combined into one construct: professional knowledge and practice development, two of the original research questions were compiled into one: Do professionals who participated in the study perceive online CPE courses to be more effective in terms of

Professional Knowledge and Practice development compared to the FTF CPE course? Therefore, only five research questions were posed and answered.

In this section, the results of the study based on each research question are presented. Descriptive data in the following tables were used to answer research questions one to three.

***Research Question One:*** *Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Professional Knowledge and Practice development compared to the FTF CPE course?*

$\boldsymbol{H_1}$*: Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in terms of Professional Knowledge and Practice development.*

Table 11 is a summary of the first construct and its associated items indicated in PCA- Professional Knowledge and Practice. In Table 11, the mean of the construction of Professional Knowledge and Practice (including ten items) was 24.54 (less than the hypothesized middle point; M=30) with a standard deviation of 6.38 (SD=6.38), and significantly different from the hypothesized middle point (M=30) as shown in the one-sample t-test. As indicated in the result, professionals who participated in the study disagreed that online CPE courses were more effective in promoting professional knowledge and practice than FTF courses.

**Table 11**

**Summary of Perceptions for the Construct of Professional Knowledge and Practice and Construct Items (N=320)**

| Survey Construct / Construct Items | | *Min.* | *Max.* | *Mean* | Result | *Hypo. Mean* | *SD* | *t* | *p* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Information Provided | 1 | 5 | 2.45 | D | 3 | 0.81 | -12.16*** | <.001 |
| 2 | Peer Communication | 1 | 5 | 1.98 | SD | 3 | 0.84 | -21.87*** | <.001 |
| 4 | New Knowledge | 1 | 5 | 2.42 | D | 3 | 0.88 | -11.71*** | <.001 |
| 5 | Pre-training Knowledge | 1 | 5 | 2.55 | D | 3 | 0.9 | -8.93*** | <.001 |
| 10 | Activities and Tools | 1 | 5 | 2.53 | D | 3 | 0.86 | -9.71*** | <.001 |
| 12 | Problem-solving Skills | 1 | 5 | 2.61 | D | 3 | 0.95 | -7.30*** | <.001 |
| 13 | Decision-making Skills | 1 | 5 | 2.41 | D | 3 | 0.89 | -11.88*** | <.001 |
| 14 | Reasoning and Judgment | 1 | 5 | 2.44 | D | 3 | 0.93 | -10.88*** | <.001 |
| 15 | Intuition Utilization | 1 | 5 | 2.59 | D | 3 | 0.98 | -7.51*** | <.001 |
| 16 | Expertise Reinforcement | 1 | 5 | 2.56 | D | 3 | 0.98 | -8.04*** | <.001 |
| ***Professional Knowledge and Practice Perception Rating*** | | ***10*** | ***50*** | ***24.54*** | ***D*** | ***30*** | ***6.38*** | ***-15.32****** | **<.001** |

*Note.* * $p<.05$; ** $p<.01$; *** $p<.001$; SD- Strongly Disagree (1); D- Disagree (2); N= Neutral/ Undecided (3); A- Agree (4); SA- Strongly Agree (5)

As shown in Table 11, the mean score of professionals' perception on the effectiveness of CPE courses with regard to developing their Professional Knowledge and Practice was significantly different from and less than the hypothesized mean (M=30). The null hypothesis was, therefore, rejected. Professionals who participated in the study perceived that online CPE courses were less effective than FTF CPE course in developing their Professional Knowledge and Practice.

***Research Question Two****: Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Technology Context Link compared to the FTF CPE courses?*

***$H_2$****: Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in terms of Technology Context Link.*

Table 12 is a summary of the second construct and its associated items indicated in PCA- Technology Context Link. In Table 12, the mean of the construct of Technology Context Link (including three items) was 10.51 (greater than the hypothesized middle point; M=9) with a standard deviation of 2.06. As shown in the one-sample t-test, the mean score of professionals' perception about the effectiveness of Technology Context Link was significantly different from the hypothesized middle point. The null hypothesis was, therefore, rejected. Professionals who participated in the study perceived that online CPE courses were more effective than FTF CPE course in improving their ability to link the knowledge learned with technology context.

**Table 12**

**Summary of Perceptions for the Construct of Technology Context Link and Construct Items (N=320)**

| Survey Construct/ Construct Items | | *Min.* | *Max.* | *Mean* | Result | *M* | *SD* | *t* | *p* |
|---|---|---|---|---|---|---|---|---|---|
| 7 | Emerging Technologies | 1 | 5 | 3.76 | A | 3 | 0.90 | 15.11*** | <.001 |
| 8 | Technical Skills | 1 | 5 | 2.98 | N | 3 | 1.01 | -.33 | .740 |
| 9 | Valued Platform | 1 | 5 | 3.77 | A | 3 | 0.78 | 17.69*** | <.001 |
| ***Technology Context Link Perception Rating*** | | ***3*** | ***15*** | ***10.51*** | ***A*** | ***9*** | ***2.06*** | ***13.16****** | ***<.001*** |

*Note.* * $p<.05$; ** $p<.01$; *** $p<.001$; SD- Strongly Disagree (1); D- Disagree (2); N= Neutral/ Undecided (3); A- Agree (4); SA- Strongly Agree (5)

The mean for the construct item of learning technical skills, was 2.98 (little less than 3) and was not significantly different from the hypothesized middle point (M=3). As indicated in the results, professionals perceived that online CPE courses were equally effective as FTF CPE courses in learning technical skills. The means for the construct items of emerging technologies and valued platform, were 3.76 and 3.77 (little more than 3) and were significantly different from the hypothesized middle point (M=3). As

indicated in the results, professionals perceived that online delivered courses were more effective as emerging technologies and valued platform.

***Research Question Three****: In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses?*

***$H_3$****: Professionals who participated in the study perceived that the effectiveness of online CPE courses was different from that of FTF CPE course in general.*

Table 13 is the summary of the last question in the questionnaire which was used to obtain the general perception of the professionals about the effectiveness of CPE courses. In Table 13, the mean of the overall perception was 2.29 with a standard deviation of 0.91, and was judged to be significantly different from the hypothesized middle point (M=3) as shown in the one-sample t-test. As indicated in the results, professionals who participated in the study perceived that online CPE courses were less effective than FTF courses in general.

**Table 13**

**Summary of the General Perception (N=320)**

| Survey Constructs/ Construct Items | | *Min.* | *Max.* | *Mean* | Result | *M* | *SD* | *t* | *p* |
|---|---|---|---|---|---|---|---|---|---|
| 17 | ***General Perception*** | ***1*** | ***5*** | ***2.29*** | ***D*** | ***3*** | ***0.91*** | ***-13.83****** | **<.001** |

*Note.* * $p<.05$; ** $p<.01$; *** $p<.001$; SD- Strongly Disagree (1); D- Disagree (2); N= Neutral/ Undecided (3); A- Agree (4); SA- Strongly Agree (5)

***Research Question Four****: Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working) differ in their perceptions on the effectiveness of online CPE courses versus FTF CPE courses?*

Ten research hypotheses were derived from this question and three dependent variables are examined. Therefore, the researcher addressed this question through the statistical procedure of Multivariate Analysis of Variance (MANOVA). A .05 alpha level was used in all tests of the hypotheses. The ten hypotheses are addressed in the next section of Hypotheses Testing.

## Hypotheses Testing

The following section was used to present the results of the MANOVA hypothesis testing of 10 sub-hypotheses that were derived from Research Question four. The purpose of MANOVA is to examine mean differences on linear combinations of multiple quantitative variables. Before conducting hypothesis testing through MANOVA, preliminary assumption testing was conducted.

### Preliminary Assumption Testing

Since the sample size was greater than 300 and each cell had a sample size of at least 30, the assumptions of MANOVA were not violated based on the sample size (Pallant, 2005; Tabachnick & Fidell, 2001). However, the researcher decided to calculate Mahalanobis Distance to further check multivariate normality. Two cases were detected as outliers. Since their $D^2$value was much higher than the critical value of 16.27 for the three dependent variables, the researcher decided to remove the two cases from further analysis. Furthermore, correlations between dependent variables (Professional Knowledge and Practice, Technology Context Link and Knowledge Construction, in this study) were checked to ensure the independence of observations. According to Pallant (2005), correlations that are less than .80 will not cause concerns. The results from correlation testing showed the independence of the three redefined dependent variables in the study (Appendix). Finally, linearity was also checked, the result of which indicated the presence of a straight-line relationship between each pair of the three redefined dependent variables in the study. After all the above-mentioned assumption

testing, the researcher then proceeded to hypotheses testing. MANOVAs were performed to investigate if there were mean differences in perceptions based on sociocultural and professional contexts. A summary of the MANOVA results is presented in Table 14.

**Findings/Results**

***$H_{4a}$:*** *Professionals of different age groups perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate age differences in perceptions. Box's M test was non significant (p = .426), indicating equality of variances- covariances for the two DVs across the different age groups. There were no significant differences in perceptions among the four different age groups on any of the criterion tests, F (9, 759) = 1.006, p = .434; Wilks' Lambda= .972; partial eta squared=.010; observed power=.412. Therefore, the null hypothesis was supported. Reported perceptions on the effectiveness of online versus FTF CPE courses for professionals of different age groups did not differ.

**Table 14**

**Summary of MANOVA Results for Perceptions of Two Constructs**

| | Professional Knowledge and Practice Development | | Context Link | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variables | *M* | *SD* | *M* | *SD* | *Λ* | *F* | *p* | *Effect Size** | *Observed Power* |
| Age | 24.509 | 6.370 | 10.517 | 2.037 | 0.972 | 1.006 | 0.434 | 0.010 | 0.412 |
| Gender | 24.509 | 6.370 | 10.517 | 2.037 | 0.957 | 4.721** | 0.003 | 0.043 | 0.896 |
| Ethnicity | 24.510 | 6.324 | 10.510 | 2.023 | 0.981 | 2.027 | 0.110 | 0.019 | 0.519 |
| Education Level | 24.509 | 6.370 | 10.517 | 2.037 | 0.909 | 3.387*** | 0.001 | 0.031 | 0.957 |
| Working Experience | 24.509 | 6.370 | 10.516 | 2.037 | 0.967 | 1.785 | 0.100 | 0.017 | 0.674 |
| Working Status | 24.521 | 6.377 | 10.527 | 2.031 | 0.993 | 0.746 | 0.525 | 0.007 | 0.209 |
| Online Training | 24.510 | 6.324 | 10.516 | 2.037 | 0.969 | 1.649 | 0.131 | 0.016 | 0.633 |
| Places | | | | | | | | | |
| Online Courses | 24.527 | 6.342 | 10.527 | 2.035 | 0.958 | 1.110 | 0.348 | 0.014 | 0.582 |
| FTF Courses | 24.509 | 6.370 | 10.516 | 2.037 | 0.958 | 1.512 | 0.139 | 0.014 | 0.725 |
| Units/Divisions | 24.509 | 6.370 | 10.516 | 2.037 | 0.929 | 2.578** | 0.006 | 0.024 | 0.875 |

Note: ***p*<.01; ****p*<.001; * *all the effect size figures are small*

108

***$H_{4b}$:*** *Male professionals and female professionals perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate gender differences in perceptions. Box's M test was non significant (p = .184), indicating equality of variances- covariances for the two DVs between male and female groups. There were significant differences in perceptions between male and female professionals, F (3, 314) = 4.721, p = .003; Wilks' Lambda= .957; partial eta squared=.043; observed power=.896. Therefore, the null hypothesis was rejected at .05. However, to avoid Type 1 error (i.e. finding a significant result when there isn't really one) for the post hoc, a Bonferroni adjustment was used. Using a Bonferroni adjusted alpha level of .025, the researcher found significant difference in both perceptions on the effectiveness of promoting Knowledge Construction (p=.002) and perceptions on the effectiveness of improving Professional Knowledge and Practice (p=.002). As shown in the mean ratings of the two groups' (female and male) perceptions on the two constructs, female professionals tended to have a more positive perception about the ability of online CPE courses to construct knowledge and improve professional practice than their male peers. Therefore, the null hypothesis was rejected. In other words, male professionals' reported perceptions on the effectiveness were different from those of the female professionals.

***$H_{4c}$:*** *Professionals of different ethnicity groups perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate ethnicity differences in perceptions. Box's M test was non significant (p = .802), indicating equality of variances- covariances of the two DVs across the two different ethnicity groups. There were no significant differences in perceptions between White/Non-Hispanics and Minority groups on any of the criterion tests, F(3, 312) = 2.027, p = .110; Wilks' Lambda= .981; partial eta squared=.019; observed power=.519. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness were not different for the four ethnicity groups.

***$H_{4d}$:*** *Professionals with different education levels perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions among the groups with different education levels. Box's M test was non significant (p = .143), indicating equality of variances- covariances of the two DVs across the four different groups with different education levels. There was a statistically significant difference in perceptions among the groups of professionals with different education levels: $F$ (9, 759) = 3.387, $p$= 0.001; Wilks' Lambda= .909; partial eta squared = .031; observed power=.957. However, to avoid type 1 error, a Bonferroni adjusted alpha value of 0.025 was used to decide whether there were significant differences in perceptions when the dependent variables (perceptions on the effectiveness of promoting Knowledge Construction, linking the Technology Context and developing Professional Practice) were considered separately. There was no significance detected at alpha level of .025. Therefore, the null hypothesis was supported.

Reported professionals' perceptions on the effectiveness were not different as their education levels varied.

***$H_{4e}$:*** *Professionals with different years of working experience perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions among the groups with different years of working experience. Box's M test was non significant (p = .057), however, one of the *p* value was less than .05, indicating that the assumption of equality of variances of the variable (working experience) might have been violated. As suggested by Tabachnick and Fidell (2001), the alpha level used to detect difference was adjusted from .05 to .025. There were no significant differences in perceptions among the three different groups with different years of working experience on any of the criterion tests, F(6, 626) = 1.785, p = .100; Wilks' Lambda= .967; partial eta squared=.017; observed power=.674. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness were not different as their years of working experience varied.

***$H_{4f}$:*** *Professionals of different working status perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions between the part-time and full-time professionals. Box's M test was non significant (p = .268), indicating equality of variances- covariances of the two DVs between the groups of full-time and part-time professionals. There were no significant differences in perceptions among the three different groups with different

working status on any of the criterion tests, F(3, 313) = .746, p = .525; Wilks' Lambda= .993; partial eta squared=.007; observed power=.209. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness were not different as their working status varied.

***$H_{4g}$:*** *Professionals who take online training at different places perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions among the three groups of professionals who took online training at three different places. Box's M test was non significant (p = .055), indicating equality of variances- covariances of the two DVs across the three groups. There were no significant differences in perceptions among the three different groups of professionals who took online training at different places on any of the criterion tests, F (6, 626) = 1.649, p = .131; Wilks' Lambda= .969; partial eta squared=.016; observed power=.633. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness were not different even though they took online trainings at different places.

***$H_{4h}$:*** *Professionals who had taken different numbers of online CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions among the groups of professionals who took different numbers of online courses during the past three years. Box's M test was non significant (p = .792), indicating equality of variances- covariances of the two DVs when

different numbers of online classes had been taken. There were no significant differences in perceptions among the five different groups on any of the criterion tests, F (12, 810) = 1.110, p = .348; Wilks' Lambda= .958; partial eta squared=.014; observed power=.582. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness did not vary as the number of online courses they have taken varied.

***$H_{4i}$:*** *Professionals who had taken different numbers of FTF CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions among the groups of professionals who took different numbers of FTF courses during the past three years. Box's M test was non significant (p = .458), indicating equality of variances- covariances of the two DVs when different numbers of FTF classes had been taken. There were no significant differences in perceptions among the four different groups on any of the criterion tests, F(9, 759) = 1.512, p = .139; Wilks' Lambda= .958; partial eta squared=.014; observed power=.610. Therefore, the null hypothesis was supported. Reported professionals' perceptions on the effectiveness did not vary as the number of FTF courses they have taken varied.

***$H_{4j}$:*** *Professionals who were from different professional contexts perceive the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

A one-way between-groups multivariate analysis of variance was performed to investigate differences in perceptions when the units that professionals worked differed. Box's M test was non significant (p = .930), indicating equality of variances- covariances of the two DVs across the different units. There were significant differences in

perceptions among the professionals who worked in different units, F (9, 759) = 2.578, p = .006; Wilks' Lambda= .929; partial eta squared=.024; observed power=.875. Therefore, the null hypothesis was rejected. However, to avoid Type 1 error in running ANOVAs (i.e. finding a significant result when there isn't really one), a Bonferroni adjustment was used. Using a Bonferroni adjusted alpha level of .025, the researcher found significant difference in all the perceptions: the effectiveness of improving Professional Knowledge and Practice Development (p=.001), and the effectiveness of Technology Context Link (p=.001). As shown in Table 14, the mean ratings of the four professions, professionals' perceptions on the two constructs differed. Firefighters were the least negative about the effectiveness of online courses, followed by professionals from Public Work, Emergency Response and Safety & Health. Therefore, the null hypothesis was rejected. In other words, the perceptions of professionals on the effectiveness of CPE courses, online versus FTF who were from different professional units differed.

***Research Question Five:*** *What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses to other stakeholders of CPE courses, such as course administrators and training professionals?*

The last research question regarding the recommendations for improving the effectiveness of online and FTF CPE courses was answered by analyzing the last two optional open-ended questions using content analysis. Themes were generated, categorized and are summarized in Table 15 and Figure 5.

**Table 15**

**Recommendations for Improving Online and FTF CPE Courses**

| Recommendations for Improving the Effectiveness of Online CPE Courses | |
|---|---|
| Top Five Themes | Details |
| Interaction | Increasing interaction is critical |
| Content | Be relevant<br>Be specific to the position<br>Meet the needs of different learners<br>Reinforce learning feedback<br>Use case studies or scenarios<br>Show relevant marketplace/industry applications |
| Blended Learning Approach | Online is great for review (continuing education), but should be in conjunction with FTF education<br>Keep the online courses to the minimal during the first stages while starting career |
| Implementation | Adopt adult learning principles<br>Assign group workshops and exercises<br>Ask different questions<br>Keep interactive feedbacks |

**Table 15** Continued

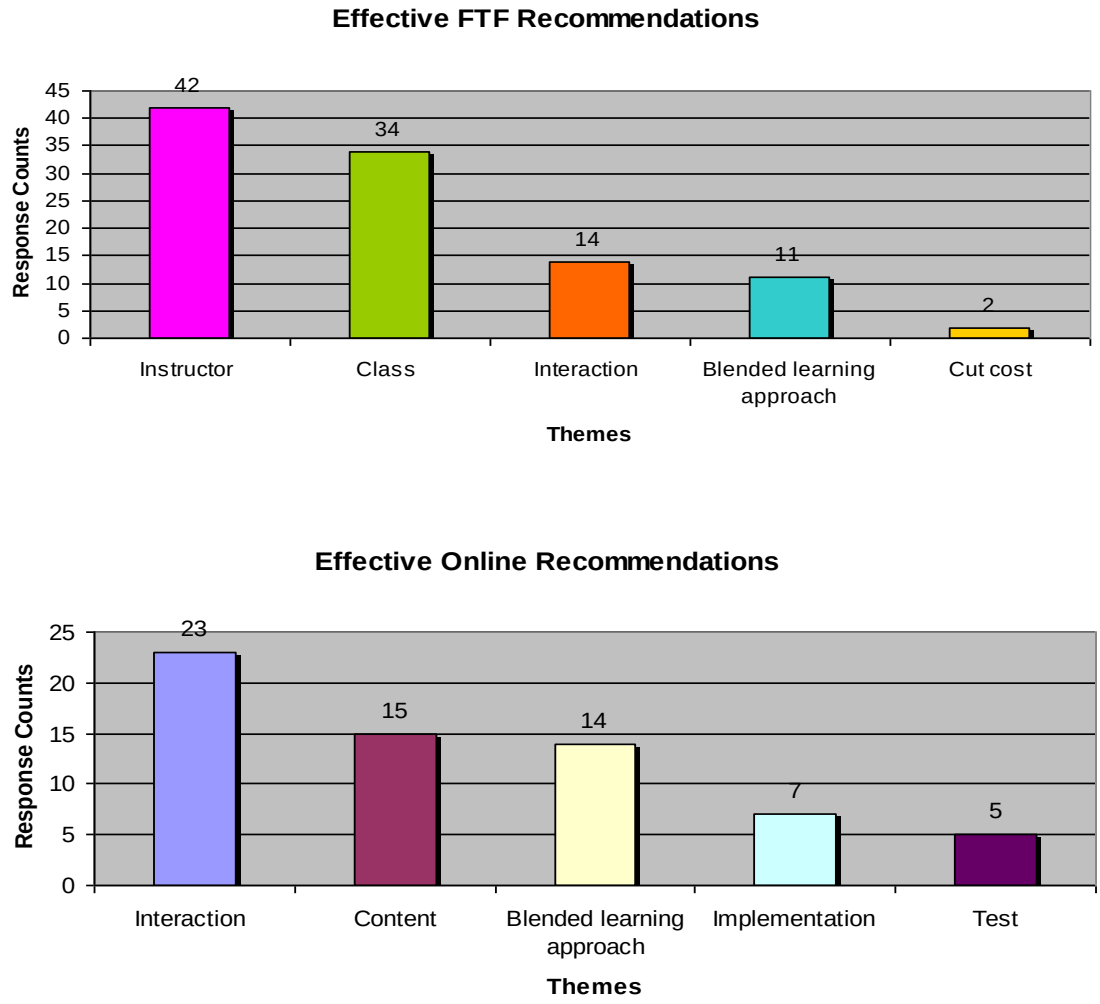
| **Recommendations for Improving the Effectiveness of Online CPE Courses** | |
|---|---|
| Top Five Themes | Details |
| Test | Should not be too easy to be guessed out<br>Should be provided both at the beginning and the end of each module or step<br>More practice quizzes should be provided for module exam |
| **Recommendations for Improving the Effectiveness of FTF CPE Courses** | |
| Top Five Themes | Details |
| Role of instructor | Instructor is the critical to the success of FTF classes. A good instructor should be prepared, know your audience, use adult learning theories and models, vary the speaker and subject to cover new materials, bring experience to the table and get more feedback. |
| Physical class | Pre-course needs assessments<br>Curriculum<br>Size: limit up to 25<br>Clear agenda<br>Group activities and more team work<br>Anonymous evaluation |
| Interaction | It is important to keep interactions (a) between instructors and students; (b) among peer students |

**Table 15** Continued

| Recommendations for Improving the Effectiveness of FTF CPE Courses | |
|---|---|
| Top Five Themes | Details |
| Blended Learning Approach | FTF classes are better suited for classes requiring hands on training<br>Pre-training can be non-hands on training<br>Multiple modules<br>FTF for basic information and online for enhancement<br>Use on-line courses as a follow-up to, or in combination with, FTF education |
| Cost, Technology and Test | Cut the cost<br>Use better technology<br>Improve the quality of tests |

**Figure 5**

**Top Five Recommendations for FTF and Online CPE Courses**



Two common themes emerged in recommendations for both online and FTF CPE courses: (a) increasing interactions in the courses; and (b) adopting blended/hybrid teaching methods, which is the call for the convergence of traditional and online delivery methods. What made the difference between the recommendations to improve online courses and those to improve FTF courses was that the instructor is the critical element to the success of FTF courses while the content presented through the Internet is the key to the success of online courses. In other words, good instructors are the key to the success of online CPE courses while well organized and presented content is crucial to the success of FTF CPE courses. Based on the content analysis of the recommendations, the online courses' effectiveness depends on the effectiveness of procedures and support from management.

## Summary

There were 399 TEEX professionals who participated in the study, of which 80.2% (n=320) responses were eligible for the data analysis. In Chapter IV, descriptive data of the professionals' background information were presented and MANOVAs were run to detect differences in perceptions as socioculturaland professional contexts varied. As the result of the data analysis, the five research questions were answered and research hypotheses were tested.

Most of the respondents, 71.2% (n=288) were aged 45 years and above; 64.4% (n=206) of the total respondents were men. The most reported ethnicity was White/non-Hispanics, 85.3% (n=273). There were 31.6% (n=101) of all the respondents who had earned Master's degree.

Professionals who participated in this study perceived that online CPE courses, when compared with FTF courses, were less effective in developing their Professional Knowledge and Practice skills and expertise, but more effective in improving their ability of linking knowledge learned with Technology Context.

The perceptions of individual professionals with different sociocultural and professional contexts were not significantly different except that there were gender and profession differences in perceptions. The effectiveness of online CPE courses in enhancing Professional Knowledge and Practice were approved more by female professionals than their male colleagues; Firefighters favored the online CPE courses the most among the four groups of professionals while professionals from Safety & Health were the most negative about the effectiveness of online CPE courses,

Finally, the researcher analyzed the content of the last two open-ended questions to answer the last research questions. As revealed in the content analysis, professionals responded to the open-ended questions called for more interactions in the courses and more uses of blended delivery methods to improve the effectiveness of CPE courses. Finally, the researcher analyzed the two open-ended questions to answer the last research questions.

# CHAPTER V

# SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

## Introduction

In this chapter, the study is summarized, followed by a summary of these findings and discussions of the findings, conclusions and implications for HRD professionals. Finally, recommendations for future study are presented.

As disclosed in Chapter II of this study, about 11 billion dollars was invested in online continuing professional education in the U.S. in 2008 (Training, 2008). Preparing learners for success in e-learning has become, therefore, a growing priority for training organizations (Watkins, 2005), and the effectiveness of online learning naturally becomes the focus of attention for practitioners and researchers. Since the early 1900's, there have been numerous studies on comparing the effectiveness of technology-mediated learning including e-learning with that of traditional FTF learning, which are usually called Media Comparison Studies (MCS). The answers to whether online instruction is effective compared to traditional FTF instruction, however, have not been consistent. Ponzurick, France and Logar (2000) conducted a comparative study in graduate-level courses in marketing using a field survey and they found that distance/online education was the least effective and least satisfying delivery method for the students studied. The comparative study of a statistics course by Wang and Newlin (2000) drew a similar conclusion. In contrast, Maki and Maki (2002) compared a web-based psychology course with the same course taught traditionally and they found the

former is more effective than the latter. Other researchers who came to similar conclusions include Zhang, Zhao, Zhou and Nunamaker (2004) and Weber and Lennon (2007). Different from all the above, some researchers found no significant difference in their studies (Hiltz, 1993; Sankaran et al., 2000). Such conflicting results prompted Russell (1999) to review 355 education research studies, and to conclude that overall, *no significant difference* had been demonstrated between the effectiveness of classroom education and that of distance learning. As cited in Hairston (2007), Dellana, Collins and West (2000) attributed the conflicting results to variable analytic rigor.

The researcher of this study argues that researchers who conduct MCS need to look beyond the grades, examine whether the learners have really learned and whether they have performed with knowledge learned. The researcher also argues that MCS should be situated in the context, especially those in the field of CPE since contexts are the integral elements to CPE. Based on Daley (2002) and Siegel (2001), the researcher proposed the following two categories of contexts that influence professional learning in continuing professional education: (a) *sociocultural contexts* of learners, (b) *professional contexts*. Sociocultural contexts of learners include their age, gender, ethnicity, educational background, working background; professional contexts include the existence of and communications with communities of practice/occupational community in an organization (similar to allegiance to the profession in Daley (2002), nature of professional work, variations in organizational culture and political environment of a profession and/or an organization that grant different levels of independence and autonomy to the professional learners. In this study, professional contexts are working

status, online training place, professional units, the number of online courses taken and the number of FTF courses taken.

The purpose of this study was two fold: (a) to obtain professionals' perceptions on the effectiveness of online CPE in promoting learning and improving performance compared to that of FTF CPE; and (b) to examine whether professionals' perceptions varied as a function of professionals' sociocultural and professional contexts.

With limited literature on the effectiveness of online training in non-academic settings, this study was informed by theories and studies in the academic setting from the field of adult education, continuing professional education and distance education/e-learning. The theoretical framework of this study was built upon Daley's (2000) professional learning model, and related theories and the literature reviewed in the field of adult education, continuing professional education and distance/online education. The effectiveness of online CPE courses is understood as a successful effort that results in promoting professionals' *knowledge construction*, improving professionals' ability to link knowledge learned to *technology context* and developing professionals' *professional practice*. The researcher also attempted to examine the differences in perceptions as professionals' sociocultural and professional contexts varied.

A proportional stratified random sampling plan was used and an online self-perception survey using an adapted questionnaire instrument from Anderson and Kanuka (1997) was used to collect data. A pilot study was conducted to test the readability, the reliability and validity of the survey instrument since the instrument was adapted from an instrument of which reliability had not been confirmed. The number of participants

for the pilot study was 95, but only 64 responses were qualified and completed for the pilot analysis. Cronbach's alpha for the instrument as a whole and for the three constructs (Knowledge Construction, Technology Context Link and Professional Practice) were 0.90, 0.66, 0.68 and 0.89 respectively. The researcher improved the instrument based on the reliability test and a readability test of the pilot study so that the reading level was commensurate with the education level of the surveyed participants.

In the final study for the research, 399 professionals participated, and 320 responses were qualified and completed. The 320 professionals had taken both online and FTF CPE courses from September 2005 to September 2008. Exploratory factor analysis, Principle Component Analysis, descriptive statistics, t-tests, multivariate analysis and ANOVAs were run for the purpose of data analysis. The number of constructs shown in the results of PCA was the same as that in the original design; however, the construct items loaded differently under each construct. Due to the low reliability score of one construct, Knowledge Construction, that specific construct was dropped from further analysis. Consequently, the original three constructs were redefined into two and construct items under each construct were regrouped based on the results of PCA. Professional Knowledge and Practice became the main factor with ten construct items loading high in this factor, and Technology Context Link second. The Cronbach's alphas for the instrument and the two newly defined constructs, Professional Knowledge and Practice and Technology Context Link, were then re-examined, and resulted in 0.89, 0.89 and 0.63 respectively.

The original research questions and hypotheses were also changed accordingly as follows:

1. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Professional Knowledge and Practice development compared to the FTF CPE courses?

***$H_1$:*** *Professionals who participated in the study perceived that online CPE courses were not equally effective as FTF CPE courses in terms of Professional Knowledge and Practice Development.*

2. Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Technology Context Link compared to the FTF CPE courses?

***$H_2$:*** *Professionals who participated in the study perceived that online CPE courses were not equally effective as FTF CPE courses in terms of Technology Context Link.*

3. In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses?

***$H_3$:*** *Professionals who participated in the study perceived that online CPE courses were not equally effective as FTF CPE course in general.*

4. Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals

were working) differ in their perceptions on the effectiveness of online CPE courses versus FTF CPE courses?

***$H_{4a}$:*** *Professionals of different age groups perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4b}$:*** *Male professionals and female professionals perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4c}$:*** *Professionals of different ethnicity groups perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4d}$:*** *Professionals with different education levels perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4e}$:*** *Professionals with different years of working experience perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4f}$:*** *Professionals of different working status perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4g}$:*** *Professionals who took online training at different places perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4h}$:*** *Professionals who had taken different numbers of online CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4i}$:*** *Professionals who had taken different numbers of FTF CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

***$H_{4j}$:*** *Professionals who had taken different numbers of FTF CPE courses perceived the effectiveness of online CPE courses versus that of FTF CPE courses differently.*

5. What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses, to other stakeholders of CPE courses, such as course administrators and training professionals?

Descriptive statistics were used to analyze the demographic data for age, gender, ethnicity, ethnicity, education level, working experience, working status, online training places, number of online courses and number of FTF courses. Descriptive statistics were also used to analyze the perception data. Frequencies, percentages, means and standard deviations were the descriptive data presented. One sample t-tests were run to compare professionals' perceptions about the effectiveness of online CPE courses versus FTF CPE courses. To test for significant differences in professionals' perceptions as a function of the sociocultural and professional context, multivariate analyses (MANOVA), ANOVAs and Bonferonni Adjustments were used.

## Summary of Findings

TEEX professionals who responded to the survey were predominantly 45 years old and above (71.2%; n=228), male (64.4%; n=206), white or Caucasian (non-Hispanic origin) (85.3%; n=273), and had an education level of 2 years of college and above (84.4%; n=270). Most of the reported professionals had over 16 years of working experience in their professional field (58.8%; n=188), and were full-time employees of the surveyed organization (60.3%; n=193). They were mostly from two professional units: Fire Service (38.4%; n=34) and Homeland Security (27.8%; n=89). During the past three years from the surveyed date, the majority of the reported professionals had

taken online CPE courses from both TEEX and outside TEEX (59.1%; n=189); and took 6~10 online CPE courses (36.2%; n=114) and 3~5 FTF CPE courses (36.6%; n=117).

***Research Question One:*** *Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Professional Knowledge and Practice Development compared to the FTF CPE courses?*

The first research question was about professionals' perception on the effectiveness of Professional Knowledge and Practice. As indicated from the descriptive statistics, the mean of the construct of Professional Knowledge and Practice (including ten items) was 24.54 (less than the hypothesized middle point; M=30) with a standard deviation of 6.38. As also shown in the one sample t-test, the mean was significantly different from the item hypothesized middle point (*n=320; p<0.001*). It was inferred from the operational definition that professionals who participated in the study disagreed that online CPE courses were more effective in promoting Professional Knowledge and Practice than FTF courses.

***Research Question Two****: Do professionals who participated in the study perceive online CPE courses to be more effective in terms of Technology Context Link compared to the FTF CPE courses?*

The second research question was about professionals' perception on the effectiveness of Technology Context Link. As indicated from descriptive statistics, the mean of the construct of Technology Context Link (including three items) was 10.51 (greater than the hypothesized middle point; M=9) with a standard deviation of 2.06. As also indicated from the one-sample t-test, the mean score of professionals' perception

about the effectiveness of Technology Context Link were significantly different from the hypothesized middle point (M=9) (*n=320; p<0.001*), indicating that professionals who participated in the study perceived that online CPE courses were more effective in promoting their ability to link the knowledge learned with technology context.

***Research Question Three****: In general, do professionals who participated in the study perceive online CPE courses to be more effective compared to the FTF CPE courses?*

The third research question was about professionals' perception on the effectiveness of online CPE courses versus that of FTF CPE courses in general. As indicated from descriptive statistics, the mean of the overall perception was 2.29 with a standard deviation of 0.914, and is judged to be significantly different from the hypothesized middle point (M=4) as shown in the one-sample t-test (*n=320; p<0.001*). As indicated in the results, professionals who participated in the study perceived that online CPE courses were less effective than FTF courses in general.

***Research Question Four****: Do professionals with different sociocultural and professional contexts (sociocultural and professional context factors include age, gender, ethnicity, education levels, years of working experience, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working) differ in their perceptions on the effectiveness of online CPE courses versus FTF CPE courses?*

The fourth research question was about professionals' perception differences in terms of sociocultural and professional contexts. Ten hypotheses derived from Research Question four were used to examine whether perceptions of professionals varied as a

function of sociocultural and professional contexts (Sociocultural and professional contexts included age, gender, ethnicity, years of working experience, education levels, working status, online training places, number of online courses and number of FTF courses and units/divisions that professionals were working). Multivariate Analysis of Variance (MANOVA) was run to test the ten hypotheses. For the global preliminary results where significant differences were obtained, a Bonferroni adjustment for the Post Hoc ANOVAs was used. As indicated in the final results, gender and professional units were the classification variables for which differences in mean perceptions were obtained: (a) *gender differences*: gender differences in perceptions were shown by the MANOVA tests ($F(3, 314) = 4.316$, $p = .005$; Wilks' Lambda= .960; partial eta squared=.040; observed power=.865). Even at the adjusted Bonferroni alpha level of 0.025, the researcher found significant difference in perceptions on the effectiveness of enhancing professional knowledge and practice (p=.001). As shown in the mean ratings of the two groups' (female and male) perceptions on the two constructs, female professionals tended to accept more the ability of online CPE courses to construct knowledge and improve professional practice than their male peers; and (b) *professional unit differences*: there were significant differences in perceptions of professionals from different professional units ($F (9, 759) = 2.578$, $p = .006$; Wilks' Lambda= .929; partial eta squared=.024; observed power=.875). Using a Bonferroni adjusted alpha level of .025, the researcher found significant difference in the two constructs studied: the effectiveness of improving Professional Knowledge and Practice (p=.001) and the effectiveness of Technology Context Link (p=.001). As shown in the mean ratings of the

four professions, professionals' perceptions on the two constructs differed. In general, Firefighters were the least negative about the effectiveness of online courses, followed by professionals from Public Work, Emergency Response and Safety & Health.

***Research Question Five:*** *What are the recommendations, if any, from CPE participants on how to improve online and FTF CPE courses to other stakeholders of CPE courses, such as course administrators and training professionals?*

The fifth research question was about the recommendations for improving FTF and Online CPE courses. Content analysis was used to analyze data collected from two optional open-ended questions. Two common themes emerged in recommendations for both online and FTF CPE courses: (a) increasing *interactions* in the courses: 14% of the recommendation responses for improving FTF CPE courses and 23% of the recommendation responses for improving online CPE courses mentioned increasing interactions as a solution to improve the effectiveness of CPE courses; (b) adopting *blended/hybrid* teaching methods, which is the call for the convergence of traditional and online delivery methods. 11% of the recommendation responses for improving FTF CPE courses and 14% of the recommendation responses for improving online CPE courses mentioned adopting blended/hybrid teaching methods as a solution to improve the effectiveness of CPE courses.

What made the difference between the recommendations to improve online courses and those to improve FTF courses was that the *instructor* is critical element to the success of FTF courses (42% of the responses) while the *content* presented through Internet is the key to the success of online courses (23% of the responses).

## Discussion of Findings

The discussion of findings was organized around the constructs and research questions of the study. First of all, the research design of the study was an exploratory study by nature; the result was not too surprising when factors were loaded differently from what was originally designed. Nevertheless, it was interesting to observe that the original three constructs- *Knowledge Construction, Technology Context Link, and Professional Practice Development*- were compressed into two. Some of the items that were expected to be loaded in the construct of Knowledge Construction merged with the items from the Professional Practice Development construct in the analysis, forming the first construct for the study (named Knowledge and Professional Practice Development). The indication of this change was that knowledge construction and professional practice development were the two concepts that go hand in hand in reality while they were viewed as separate components in professional learning from the review of literature.

### Perceptions on Professional Knowledge and Practice Development

Professionals in the study perceived online CPE courses were less effective in developing Professional Knowledge and Practice. This finding was different from what was found by Bates and Escamilla de Los Santos (1997), who found that distance education courses at the University of British Columbia (UBC) and the Monterrey Institute of Technology were able to encourage active learning and interpersonal communication independent of time and distance as well as encouraging the development of high order learning skills such as critical thinking, knowledge construction and collaborative learning. Nevertheless, one should also notice that the

Bates and Escamilla de Los Santos (1997) study was conducted from the perspective of online training providers. The findings of that study might have been different if participants' perspectives were taken into consideration.

**Perceptions on Linking Knowledge Learned to Technology Context**

The participants in this study perceived that online CPE courses were more effective than FTF CPE courses in improving professionals' ability to link knowledge learned with technology context. However, a close scrutiny of the subscale items under the construct revealed that professionals perceived that FTF CPE courses were equally effective as online CPE courses in learning technical skills needed in the workplace. This finding was interesting because it is very different from the public impressions about technology learning in traditional classes, who tend to think that online course is more effective in learning technical skills in the online environment. Furthermore, it can be inferred from the findings that TEEX, the surveyed organization, has a healthy technology context, meaning that: (a) professionals who were studied had a good knowledge of computers and the Internet. The use of computers and the Internet was not an obvious obstacle in their learning; (b) the organization studied provided a healthy environment and appropriate support for professionals to learn through computer, Internet and other related technologies. Although technology adoption did not seem to be a problem in the organization studied, the organization (TEEX) will still face some challenges if they want to complete the diffusion process at the pace that benefits the organization. To win over the challenges, the organization needs to take consideration of

the characteristics and interests of individual professional learners. Rogers (1995) categorized individuals in organizations into five based upon their innovations decision:

a) *Innovators* – These people are willing to take risks and try something new (2-3% of the population).
b) *Early adopters* – These people are usually respected leaders and are essential to successful adoption by the entire group (13-14% of the population).
c) *Early majority* – These people are more careful and deliberate in their actions. They are willing to adopt, but not at the risk of exposure in the process (34% of the population).
d) *Late majority* – These people are very skeptical of change. Often times peer pressures must be applied to prompt them to action (34% of the population).
e) *Laggards* – These people resist change, possibly out of fear. They will only comply through pressure or necessity (16% of the population). (Hairston, 2007, pp. 58-59).

Rogers (1995) and Sullivan (2002) also provided recommendations as to how to handle individuals with different innovation decisions in organizations. Hairston (2007) summarized the strategies of Rogers (1995) and Sullivan (2002) as follows: (a) communicate with both managers and employees in their own languages about issues that are important to them; (b) use near-peers to influence the attitudes of individuals; (c) provide ongoing incentives for encouraging people to adopt the technology; (d) get early adopters to try out the innovation before the majority is willing to follow; (e) provide top-level support including the necessary policies governing the use of technologies; (f)

adopt good pedagogy/Andragogy strategies in the training design. In Ham's (2002) study on students' perceptions of web-based distance learning courses, it was found that students' perceptions about the computer were positively correlated with overall satisfaction with the web-based course. If the diffusion process is implemented successfully and more professionals embrace technology in their professional life, the online education will be perceived more positively.

**Perception Differences Based on Age Category**

No difference was detected among different age groups. It might be because the number of professionals in the younger age groups was very small. Older people tend to be more motivated in online learning; however, fear of technology can lead to their resistance to online education.

Gender difference in perceptions was found in the study. The result is consistent with several studies on gender differences in online learning (Barrett & Lally, 1999; Caspi, Chajut, & Saporta, 2008; Joyce, Knight, Kohahi, & Shukla, 2000; Young, Dewstow, & McSporran, 1999). Rovai and Barnum (2003) analyzed nineteen on-line graduate courses to determine how perceived learning varied by course. Female students felt that they had learned more than their male counterparts. Although the study of Rovai and Barnum (2003) was conducted in a higher education setting, the finding is worth further study since it was echoed in this study that was carried out in a professional organization.

Gibson and Graff (1992) pointed out that students with two to three years of college experience were most likely to be successful in distance education. However, in

this study, no significant differences in perceptions at the .025 level were detected among groups of different education levels. This might be because the surveyed group was highly educated and only a small percentage of responding professionals (18.3% from Table 9) had had less than two to three years of college experience.

Professionals from four re-grouped professional units perceived the effectiveness of online versus FTF CPE courses differently. Firefighters were the least negative about the effectiveness of online courses, followed by professionals from Public Work, Emergency Response and Safety & Health. The finding is consistent with what was presented in the literature review. CPE is an applied profession; and *professional contexts* exert great impact on learning and workplace performance of professionals as revealed in adult learning literature. Among the four professional units identified in the study, professionals in Fire Service were least negative and professionals from Safety and Health were most negative about the effectiveness of online CPE courses while professionals from Public Work, Emergency Response were in between. As revealed from the overview of each professional unit on the TEEX website, jobs in Fire Service require mostly motor skills while those in Safety and Health require more cognitive skills than motor skills. "Cognitive skill acquisition is acquiring the ability to solve problems in intellectual tasks, where success is determined more by subjects' knowledge and are more difficult than by their physical prowess" (VanLehn, 1996, p. 513). Cognitive skills require more tacit knowledge and are more difficult to cover in the online environment than motor skills. This finding is also consistent with Donavant

(2009), in which surveyed police officers were not pleased with the inability of OE to provide the practical hands-on aspect in the law enforcement training.

While the perception differences might be associated with the different skills that need to be acquired for different professions, further conclusions should be made with some cautions because professional contents in each unit for the final analysis in this study were not mutually exclusive and reliability coefficients were low for the last two constructs.

**Recommendations for Improving CPE Courses**

The findings from the content analysis of open-ended questions, which provided advice for improving both online and FTF CPE courses, are consistent with what Eraut (1994) proposed. The availability of learning resources and people who are prepared (i.e. both willing and able) to give appropriate support are two must-haves for learning to occur within one's profession (Eraut, 1994; Mott, 2000). Closely paralleling earlier findings of Pratt (1998), it was revealed from professionals' recommendations on how to improve the effectiveness of FTF CPE courses that good instructors and their immediate direction and support are the key to the effectiveness of the learning.

One of the common themes that emerged from the content analysis was that the amount of interaction impacts the effectiveness of CPE courses, regardless of delivery methods. The finding is parallel to previous researches (Donavant, 2009; Hung & Cho, 2008; Kalsow, 1999; Menzel & Carrell, 1999; Powers & Rossman, 1985). The more interactions, the more knowledge will be constructed. From the responses to the survey question on peer communications and interactions, an overwhelming majority (86.6%)

of the respondents perceived that online CPE courses were less effective than FTF ones, which was a clear indication that measures need to be taken to increase peer communications and interactions when the CPE courses are delivered online. Using WebCT, Blackboard and other media technologies and increasing instructor immediacy are good interventions to increase interactions (Rovai & Barnum, 2003).

The other common theme was to use a blended learning approach to improve the effectiveness of professional learning. A blended learning approach has been a popular topic in the field of distance education, and numerous researches have focused on studying this method of teaching. As early as 1999, Kalsow (1999) posited that web-assisted (FTF blended with online) instead of Web-based (purely online) was for everyone and had potential to reach a population of students who otherwise would not have access to postsecondary education.

The finding that content is the key to success in online courses is consistent with findings in Anderson (2005), Kennedy (2002) and Bures et al. (2002). For FTF education courses, instructors and immediate support from instructors are critical (Eraut, 1994; Mott, 2000).

## Conclusions and Recommendations

As mentioned in the literature review, CPE and HRD are in convergence, and studying CPE issues will help to inform, further understand and improve HRD practice. The researcher attempted to fill the gap in the CPE field by studying the effectiveness of CPE course from the perspectives of CPE participants and situating this study in the non-academic setting. The issue of effectiveness of CPE courses is an issue of promoting

learning and improving performance, which falls into both learning and performance paradigms in HRD. The researcher attempted to use the results and findings of the study to inform providers/trainers of CPE courses and administrators of organizations with regard to the issue of improving the effectiveness of CPE courses, delivered through traditional classroom or online.

In Adult Education, Continuing Professional Education, Instructional Design are fields in which *learning* encompasses a broad range of concepts. In Human Resource Development, however, researchers and practitioners tend to separate *performance* from *learning.* In this study, both learning and performance were scrutinized around the two constructs indicated from the data analysis Professional K*nowledge and Practice Development and Technology Context Link*. From the view of HRD professionals, knowledge construction is in the learning domain, professional practice, mainly referred to as professional expertise and skills enhanced, belong to the performance domain. Technology context link bridges the learning and performance domains and sometimes exists in both domains.

Accordingly, recommendations for improving the effectiveness of online and FTF CPE courses were presented in the order of the two constructs identified from the data in this study:  Professional Knowledge and Practice and Technology Context Link. As shown in the findings of the study, participants perceived that online CPE courses, when compared with FTF CPE courses, were less effective in promoting professional knowledge construction and professional practice development, but equally effective in linking knowledge learned to technology contexts. Therefore, recommendations to

improve the effectiveness of CPE courses, with an emphasis on those delivered online, are focused on (a) improving professional knowledge and practice; (b) maintaining a healthy organizational environment for technology context link. Table 16 is a summary of recommendations for the purpose of addressing the above two concerns based on the literature reviewed. In Table 16, recommendations were presented to HRD professionals; the term *learning* is used instead of *performance* even when it means performance identified by HRD professionals.

**Professional Knowledge and Practice Development**

1. Recommendations for FTF courses:
    1) *Pre-training experiences*: encourage participants to share their pre-training experiences with peers.
    2) *Case Studies*: share experiences in case studies through group discussions, games, activities and peer debriefings.
    3) *Practice*: provide opportunities for participants to practice newly learned knowledge, expertise and skills.

**Table 16**

**Recommendations and Implications for HRD Professionals**

| | Professional Knowledge and Practice | | Technology Context Link | |
|---|---|---|---|---|
| | *FTF* | *Online* | *FTF* | *Online* |
| Symptoms of Ineffectiveness | Skills learned cannot solve real-life problems; new challenges in practice remain unsolved | | Learners are frustrated by technology needed for learning; learners quit because of the technology | |
| Top Three Recommendation Outlines* (*Note:* Please refer to the text for detailed recommendations) | 1. Share pre-training expertise<br>2. Share experience through case studies<br>3. Practice within groups | 1. Create case-based online learning community<br>2. Apply Mental Schema Model<br>3. Use learning objectives | 1. Communication with managers and trained employees<br>2. Near-peer Influence<br>3. Ongoing incentives for trying out new technology | |
| Goals | Improve problem-solving skills, decision-making skills, reasoning and judgment, reinforce expertise and develop intuition in professional practice | | Complete technology adoption and diffusion process; facilitate learning and professional practice with technology | |
| Major Literature(s) Referenced | Daley (2001); Dreyfus & Dreyfus, (1986) | Churchill, (2007); Jonassen, (2000); Jonassen & Hernandez-Serrano (2002); Kay & Knaack, (2008) | Rogers (1995); Sullivan (2002); Hairston (2007); Ham (2002) | |

*Note:* * Detailed recommendations are listed in the following texts.

2. Recommendations for online courses:

    1) *Case-based online learning community*: Case-based learning stimulates and fosters students' learning (acquiring knowledge and building skills) through providing them with cases (legal, medical, social work). Theoretical foundations of case-based learning are constructivism and distributed cognitions theory, which emphasize the importance of learning from problem solving and community learning. Case-based learning enables skill building through exposing students to real-life scenarios and providing students with hands-on experience in a collaborative learning environment. Modeling, coaching and scaffolding can be used to support learning in case-based environments (Jonassen, 2000; Jonassen & Hernandez-Serrano, 2002).
    2) *Mental Schema Model*: the model can be used to help acquire skills needed (Daley, 1999; Dreyfus & Dreyfus, 1986).
    3) *Learning objectives*: a learning object is "a digital, self-contained, reusable entity with a clear aim that contains at least three internal changing components: content, instructional activities, and context elements" (Laverde, Cifuentes, & Rodriguez, 2007, p. 675). Learning objectives emphasize on multiple factors, such as interactivity, accessibility, a specific conceptual focus, reusability, meaningful scaffolding and learning, from which one can see that learning objectives can develop professional practice as well as assisting knowledge

construction (Kay & Knaack, 2008). Churchill (2007) classified learning objectives into five, of which three categories are useful for developing professional practice:

a) *Practice object:* Drill and practice with feedback, educational game or representation that allows practice and learning of certain procedures. Example: quiz question requiring a learner to use representation of a protractor to measure angles and answer a question regarding radio between base and height of the right-angled triangle.

*b)* *Simulation object*: Representation of some real-life system or process. Example: simulation of a compass allowing a learner to draw a geometric shape (e.g., equilateral triangle).

*c)* *Contextual representation:* Data displayed as it emerges from represented authentic scenario. Example: representation tat shows real-life examples of triangles (e.g. roof of a building) and allows a learner to use representation of a tool (e.g. tape measure) to collect data about dimensions of these triangles (p. 482).

**Technology Context Link**

Recommendations for both FTF and online courses to help the process of technology adoption and diffusion:

1. *Communication* with managers and trained employees in their own languages about issues that is important to them.
2. *Near-peer Influence*: use near-peers to influence the attitudes of individuals.
3. *Ongoing incentives* for trying out new technology (Rogers, 1995).

## Recommendations for Future Study

The researcher views this study as a stepping stone to future studies that might focus on improving the effectiveness of continuing professional education delivered online. The following recommendations are concerned with both the methodology and the content of further studies.

### Methodological Issues

1. Two constructs originated from two major pedagogical concerns in the existing empirical studies were established in this study by exploratory factor analysis. In future studies, a much larger sample should be collected to test the stability of these two constructs by using confirmatory factor analysis.
2. The Cronbach's alpha for one construct within the survey instrument was not at an acceptable level. The instrument needs to be improved for future studies by deleting/revising some items and adding more items based on the results of the study.
3. The response rate of the survey study can be further improved by using alternate survey methods, such as a telephone survey, and sending survey invitations to alternate email addresses

4. Pre- and Post- surveys can be conducted to examine the differences between perceptions before and after certain CPE courses.

**Content Issues**

1. Studies in different professional settings. Significant differences in perceptions among participants from different professional units were found at the .025 level as the researcher had expected. However, the causes of the differences were not clearly identified. The reasons are: (a) the number of responses from some of the professional units was less than 30, so the researcher decided to combine data from some of the units to ensure validity for data analysis. Consequently, there was overlapping among different professional units for the final data analysis or it was possible that two different professions were merged into one to meet the requirement on the number of cells for analysis; (b) the nature of professions, some units in TEEX are very similar to each other; (c) as one of the limitations of the study, the researcher did not set the study in specific courses or courses for different professions. Therefore, the comparison of perceptions might not be able to reveal the impact of different professional context on the perceptions when general perspectives towards online and FTF CPE courses were asked. In future studies, it is recommended that data be collected in professions that have distinct professional features, such as medical, accounting, engineering, in order to examine the impact of professional context on professionals' perceptions.

2. Future studies can include an instrument that assesses and measures learners' preferred learning styles, and examines the perception differences influenced by learners' learning styles.
3. In this study, the three hypothesized constructs: Knowledge Construction, Technology Context Link and Professional Practice Development were kept as three distinct indicators of effectiveness. As revealed from the findings, however, the three constructs are interrelated and interdependent on each other and the first and the third constructs could be merged into one construct: Professional Knowledge and Practice. In really, there are other independent variables that should be taken into account in MANOVA around the three constructs that might impact the effectiveness of continuing professional education, such as prior-knowledge, context other than technology, learners' motivation, locus of control and more. It would be interesting to explore the relationships among these variables and attempt to build an online CPE course evaluation model based upon professionals' perceptions.
4. There have been a few media comparison studies (MCS) that were focused on gender differences around the globe. Interestingly, studies conducted overseas had different results from the studies conducted in the U.S. (Ong & Lai, 2006). More studies are needed to explore the gender difference in perception across culture.

## Summary

The issue of effectiveness is the key to e-learning. The purpose of the study was to obtain professionals' perceptions on the effectiveness of online continuing professional education (CPE) courses in promoting knowledge construction, improving their ability to link knowledge learned with technology context and developing their professional practice when compared with face-to-face (FTF) CPE courses. The researcher reviewed the literature from three fields: adult education, distance education, collected data from seven professional units in TEEX and analyzed the data using t-tests, multivariate analysis and ANOVA Post Hocs.

As revealed in the findings, professionals perceived that the online CPE courses were less effective than FTF courses in promoting knowledge and developing professional practice, but as effective as FTF courses in improving their ability to link knowledge with technology context. There was no significant difference in perceptions at the .025 level among different groups in terms of age, ethnicity, education level, working background, working status, online training place, professional units and the number of online and FTF courses. However, perceptions did vary between male and female professionals. Female professionals tended to approve the effectiveness of online CPE courses more than their male peers.

The results of the study may assist companies and CPE training providers in better understanding what actions to take and using the existing resources to help professional learners to learn and perform.

## REFERENCES

Akdemir, O., & Oguz, A. (2008). Computer-based testing: An alternative for the assessment of Turkish undergraduate students. *Computers & Education Journal, 51*(3), 1198-1204.

Anderson, K.C. (2005). *The relationship of course relevance, online features, and perceived learner readiness with corporate employee satisfaction with eLearning.* Unpublished Doctoral Dissertation, Twin City, MN, University of Minnesota.

Anderson, T. (1996). The virtual conference: Extending professional educationin cyberspace. *International Journal of Educational Telecommunications, 2*(2/3), 121-135.

Anderson, T., & Kanuka, H. (1997). On-line forums: New platforms for professional development and group collaboration. *Journal of Computer Mediated Communication, 3*(3), 1-14.

Andrusyszyn, M., Iwasiw, C., & Goldenberg, D. (1999). Computer conferencing in graduate nursing education: Perceptions of students and faculty. *The Journal of Continuing Education in Nursing, 30*(6), 272-278.

ASTD. (2008). *State of the industry report: ASTD's annual review of trends in workplace learning & performance*. Alexandria, VA: American Society for Training & Development.

Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.

Barnow, B. S. (1986). Evaluating employment and training programs. *Evaluation and Program Planning, 3,* 63-72.

Barrie, J., & Pace, R. W. (1998). Learning for organizational effectiveness: Philosophy of education and human resource development. *Human Resource Development Quarterly, 9*(1), 39-54.

Bates, A. W., & Escamilla de los Santos, J. G. (1997). Crossing boundaries: Making global distance education a reality. *Journal of Distance Education, 12*(1/2), 49-66.

Bernath, U., & Rubin, E. (2001). Professional development in distance education – A successful experiment and future directions. In F. Lockwood & A. Gooley (Eds.), *Innovation in open and distance learning: Successful development of online and Web-based learning* (pp. 213-223). London: Kogan Page.

Bersin, J. (2002). Measuring e-learning's effectiveness. *E-learning, 3*(3), 36.

Billings, D., & Kowaiski, K. (2005). Teaching for higher order learning. *The Journal of Continuing Education in Nursing, 36*(6), 244-245.

Bingham, M. J. (2002). *Effects of computer-assisted instruction versus traditional instruction on adult GED student TABE scores.* Unpublished Doctoral Dissertation, Hattiesburg, MS, University of Southern Mississippi.

Bolman, L., & Deal, T. (1997). *Reframing organizations: Artistry, choice, and leadership*. San Francisco: Jossey-Bass.

Brace-Govan, J., & Gabbott. (2004). General practitioners and online continuing professional education: Projected understandings. *Educational Technology & Society, 7*(1), 51-62.

Brown, J., & Duguid, P. (1996). Stolen knowledge. In H. McLellen (Ed.), *Situated learning perspectives* (pp. 47-56). Englewood Cliffs, NJ: Educational Technology Publications.

Brown, J., & Gray, S. (1995). *The people are the company*. Retrieved May 1, 2008, from http://www.fastcompany.com/magazine/01/people.html

Bullen, M. (1999). A review of "What's the Difference: A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education." *Journal of Distance Education, 14*(1), 109-112.

Cervero. (1989). Continuing education for the professions. In S. B. Merriam & P. M. Cunningham (Eds.), *Handbook of adult and continuing education* (pp. 512-524). San Francisco Jossey-Bass.

Cervero. (2001). Continuing professional education in transition, 1981-2000. *International Journal of Lifelong Education, 20*(1/2 ), 16-30.

Cervero, & Azzaretto, J. (1990). *Visions for the future of continuing professional education*. Athens, Ga.: University of Georgia Dept. of Adult Education College of Education Georgia Center for Continuing Education.

Chan, H., Tsai, P., & Huang, T. Y. (2006). Web-based learning in a geometry course. *Educational Technology & Society, 9*(2), 133-140.

Churchill, D. (2007). Towards a useful classification of learning objects. *Educational Technology Research and Development, 55*, 479-497.

Conceicao, S. C. O. (2007a). Editor's notes. *New Directions for Adult and Continuing Education, 113*, 1-3.

Conceicao, S. C. O. (2007b). Understanding the environment for online teaching. *New Directions for Adult and Continuing Education, 113*, 5-11.

Conceicao, S. C. O. (Ed.). (2007c). *New Directions for Adult and Continuing Education* (Vol. 113). San Francisco: Jossey-Bass

Conger, S. B. (2005). If there is no significant difference, why should we care? *The Journal of Educaters Online 2*(2), 1-4.

Cook, C., Heath, F., & Thompson, R. L. (2000). A meta-analysis of response rates in web- or internet-based surveys. *Educational and Psychological Measurement, 60*(6), 821-836.

Cook, D. A., Levinson, A. J., Garside, S., Dupras, D. M., Erwin, P. J., & Montori, V. M. (2008). Internet-based learning in the health professions. *Journal of the American Medical Association, 300*(10), 1181-1196.

Corrallo, S. (1994). The progress of a study identifying the speaking and communication skills of college graduates. In S. Morreale & M. Brooks (Eds.), *1994 NCA summer conference proceedings and prepared remarks: Assessing college student competency in speech communication* (pp. 51-54). Annandale, VA: National Communication Association.

Curran, V. R., Hoekman, T., Gulliver, W., Landells, I., & Hatcher, L. (2000). Web-based continuing medical education (II): Evaluation study of computer-mediated continuing medical education. *The Journal of Continuing Education in the Health Professions, 20*, 106-119.

Daley, B. (1999). Novice to expert: An exploration of how professional learn. *Adult Education Quarterly, 49*(4), 133-142.

Daley, B. (2000). Learning in professional practice. *New Directions for Adult and Continuing Education: Charting a Course for Continuing Professional Education: Reframing Professional Practice, 86*, 33-42.

Daley, B. (2001). Learning and professional practice: A study of four professions. . *Adult Education Quarterly, 52*, 39-54.

Daley, B. (2002). Context: Implications for learning in professional practice. *New Directions for Adult and Continuing Education, 96*, 79-88.

Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies, 38*(3), 475–487.

Dellana, S., Collins, W., & West, D. (2000). Online education in a management science course: Effectiveness and performance factors. *Journal of Education for Business, 76*(1), 43-48.

Dewey, J. (1933). *How We Think*. New York: D. C. Heath.

Dillman, D. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Donavant, B. W. (2009). The new, modern practice of adult education: Online instruction in a continuing education setting. *Adult Education Quarterly, 59*(3), 227-245.

Dreyfus, H. L., & Dreyfus, S. E. (1986). *Mind over machine: The power of human intuition and expertise in the era of the computer*. Oxford, U.K.: Basil Blackwell.

Eastmond, D. V. (1998). Adult learners and internet-based distance education. *New Directions for Adult and Continuing Education, 78*, 33-41.

Eraut, M. (1994). *Developing professional knowledge and competence*. London: The Falmer Press.

Ferguson, J., & Tryjankowski, A. (2009). Online versus face-to-face learning: Looking at modes of instruction in Master's-level courses. *Journal of Further and Higher Education, 33*(3), 219-228.

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Francis, B., Mauriello, S. M., Phillips, C., Englebardt, S., & Grayden, S. K. (2000). Assessment of online continuing dental education in North Carolina. *The Journal of Continuing Education in the Health Professions, 20*, 76-84.

Ghani, J. A., & Deshpande, S. P. (1994). Task characteristics and the experience of optimal flow in human-computer interaction. *Journal of Psychology, 128*(4), 381–391.

Gibson, C., & Graff, A. O. (1992). Impact of adults' preferred learning styles and perception of barriers on completion of external Baccalaureate Degree programs. *The Journal of Distance Education, 7*(1), 39-51.

Giguere, L. (2009). The impact of 'virtualization' on independent study course completion rates: The British Columbia Open University experiment. *Journal of Distance Education, 23*(1), 49-70.

Gilbert, T. F. (1995). *Human competence: Engineering worthy performance*. San Francisco: Pfeiffer.

Graham, C., Caglitay, K., Lim, B. R., Craner, J., & Duffy, T. M. (2001). Seven principles of effective teaching: A practical lens for evaluating online courses [Electronic Version]. *Technology Source*. Retrieved May 1, 2008, from http://technologysource.org/article/seven_principles_of_effective_teaching/

Grice, J. W. (2007). A truly multivariate approach to manova. *Applied Multivariate Research, 12*(3), 199-226.

Gronlund, N. E. (1981). *Measurement and evaluation in teaching*. New York: Macmillan Publishers.

Hairston, N. R. (2007). *Employee's attitude toward E-learning: Implications for policy in industry environments.* Unpublished Doctoral Dissertation, Fayetteville, AR, University of Arkansas.

Ham, M. K. (2002). *Student's perceptions of web-based distance learning courses.* Unpublished Doctoral Dissertation, Tucson, AZ, University of Arizona.

Hamilton, M. B. (2003). Online survey response rates and times: Background and guidance for industry [Electronic Version]. Retrieved Aug.8, 2009, from http://www.supersurvey.com/papers/supersurvey_white_paper_response_rates.pdf

Harrington, S. S., & Walker, B. L. (2002). A comparison of computer-based and instructor-led training for long-term care staff. *The Journal of Continuing Education in Nursing, 33*(1), 39-47.

Harrington, S. S., & Walker, B. L. (2009). The effects of computer-based fire safety training on the knowledge, attitudes, and practices of caregivers. *The Journal of Continuing Education in Nursing, 40*(2), 79-86.

Herrie, M. (2004). Online teaching and learning. *International Journal of Mental Health & Addition, 2*(1), 22-28.

Hiltz, S. R. (1993). Correlates of learning in a virtual classroom. *International Journal of Man-Machine Studies, 39*, 71-98.

Holley, C. A. (2002). *Student satisfaction with and sccess in on-line and on-site English composition classes* Unpublished Doctoral Dissertation, Hattiesburg, MS, University of Southern Mississipi.

Holton, E. F. I. (1999). An integrated model of performance domains: Bounding the theory and practice. . *Performance Improvement Quarterly, 12*(3), 95-118.

Houle, C. O. (1980). *Continuing learning in the professions*. San Francisco: Jossey-Bass.

Houle, C. O. (1961). *The inquiring mind*. Madison, WI: The University of Wisconsin Press.

Hui, W., Hu, P. J. H., Clark, T. H. K., Tam, K. Y., & Milton, J. (2008). Technology-assisted learning: A longitudinal field study of knowledge category, learning effectivness and satisfaction in language learning. *Journal of Computer Assisted learning, 3*(24), 245-259.

Hung, H., & Cho, V. (2008). Continued usage of e-learning communication tools: A study from the learners' perspective in Hong Kong. *International Journal of Training and Development, 12*(3), 171-187.

IBISWorld. (2007). *Professional and management development training in the U.S.*. (Industry Report No. 61143). (I. I. Report o. Document Number)

Jelfs, A., Richardson, J. T. E., & Price, L. (2009). Student and tutor perceptions of effective tutoring in distance education. *Distance Education, 30*(3), 419-441.

Johnson-Glenberg, M. C. (2007). Web-based reading comprehension instruction: Three studies of 3D-readers. In D. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions, and technologies.* (pp. 293-324). Abingdon, UK: Lawrence Erlbaum.

Jonassen, D. H. (2000). Toward a design theory of problem solving. *Educational Technology Research and Development, 48*(4), 63-85.

Jonassen, D. H., & Hernandez-Serrano. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development, 50*(2), 65-77.

Kalsow, S. C. (1999). *A comparison of student performance in human development classes using three different modes of delivery: Online, face-to-face, and*

*combined.* . Unpublished Doctoral Dissertation, Des Moines, IA, Drake University.

Kay, R., H., & Knaack, L. (2008). Assessing learning, quality, and engagement in learning objects: The learning object evaluation scale for students (LOES-S). *Educational Technology Research & Development, 57*, 147-168.

Ke, F. F., & Hoadley, C. (2009). Evaluating online learning communities. *Educational Technology Research & Development, 57*, 487-510.

Kirkpatrick, D. (1994). *Evaluating training programs: The four levels.* . San Francisco, CA: Berrett-Koehler.

Kirkpatrick, D. & McLaughlan, R. (2000). Flexible lifelong learning in professional education. *Educational Technology & Society, 3*(1), 24-31.

Knowles, M. S. (1970). *The modern practice of adult education*. Chicago: Association Press-Follett.

Krejcie, & Morgan. (1970). Determining sample size for research activities. *Educational Psychology Measurements, 30*(2), 607-610.

Kuchinke, K. P. (1995). Managing learning for performance. *Human Resource Development Quarterly, 6*(3), 307-316.

Lancaster, L. C., & Stillman, D. (2010). *The M-Factor: How the millennial generation is rocking the workplace*. New York: HarperCollins Publishers.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.

Laverde, A. C., Cifuentes, Y. S., & Rodriguez, H. Y. R. (2007). Toward an instructional design model based on learning objectives. *Educational Technology Research and Development, 55,* 671-681.

LeGrand Brandt, B., Farmer, J., & Buckmaster, A. (1993). Congitive apprenticeship approach to helping adults learn. *New Directions for Adult and Continuing Education, 59.*

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology?: A critical review of the technology acceptance model. *Information and Management, 40*(3), 191-204.

Leung, H. K. N. (2003). Evaluating the effectiveness of e-learning. *Computer Science Education, 13*(2), 123-136.

Levin, C. (2001). Banking on the virtual classroom [Electronic Version]. *PC Magazine*. Retrieved December 11, 2007, from http://findarticles.com/p/articles/mi_zdpcm/is_200112/ai_ziff19252

Lindeman, E. (1926). *The meaning of adult education*. New York: New Republic.

Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental analysis of a web-based training intervention to develop positive psychological capital. *Academy of Management Learning & Education, 7*(2), 209-221.

Mager, R. F. (1997). *Preparing instructional objectives.* Atlanta, CA: CEP Press.

Maki, W. S., & Maki, R. H. (2002). Multimedia comprehension skill predicts differential outcomes of Web-based and lecture courses. *Journal of Experimental Psychology: Applied, 8,* 85-98.

Mayadas, F. (2001). Testimony to the Kerrey commission on Web-based education. *Journal of Asynchronous Learning Networks, 5*, 134-138.

McAlpine, H., Lockerbie, L., Ramsay, D., & Beaman, S. (2002). Evaluating a Web-based graduate level nursing ethics course: Thumbs up or thumbs down? *The Journal of Continuing Education in Nursing, 33*(1), 12-18.

McDonald, J. (2002). Is 'As Good As Face-To-Face' as good as it gets? *Journal of Asynchronous Learning Networks, 6*(2), 10-23.

Menzel, K. E., & Carrell, L. J. (1999). The impact of gender and immediacy of willingness to talk and perceived learning. *Communication Education, 48*(31-40).

Merriam, S. B., & Caffarella, R. S. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult and Continuing Education, 89*, 3-13.

Mertler, C. A., & Vannatta. (2002). *Advanced and multivariate statistical methods: Practical application and interpretation.* CA: Los Angeles: Pyrczak Publishing.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied multivariate research: Design and interpretation*. Thousand Oaks, CA: Sage.

Mezirow, J., & Associates. (2000). *Learning as transformation: Critical perspecitves on a theory in progress*. San Francisco: Jossey-Bass.

Moore, J. C. (2002). *Elements of quality: The Sloan-CTM framework*. Needham, MA: Sloan-CTM Framework.

Morgan, P. D. (2007). *Adult learner satisfaction with web-based non-credit workforce training.* Unpublished Doctoral Dissertation, Denton, TX, University of North Texas.

Mott, V. (2000). The development of professional expertise in the workplace. *New Directions for Adult and Continuing Education*(86), 23-31.

Nadler, L., & Nadler, Z. (1994). *Designing training programs: The critical events model*. Houston, TX: Gulf.

Nafukho, M.F. (2007). The place of E-learning in Africa's institutions of higher learning. *Higher Education Policy, 20*(1), 19-43.

Nafukho, Thompson, D., & Brooks, K. (2004). Factors predicting success in a distance learning nontraditional undergraduate degree program. *International Journal of Vocational Education and Training, 12*(2), 82-95.

Ong, C., Lai, J., & Wang, Y. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information and Management, 41*(6), 795–804.

Ong, C. S., & Lai, J. Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior, 22*, 816-829.

Ortiz-Rodriguez, M., Telg, R. W., Irani, T., Roberts, T. G., & Rhodes, E. (2005). College students' perceptions of quality in distance education: The importance of communication. *Quarterly Review of Distance Education, 6*, 97-105.

Pallant, J. (2005). *SPSS survival manual* (2nd ed.). New York: Open University Press.

Pang, K. (2009). Video-driven multimedia, web-based training in the corporate sector: Pedagogical equivalence and component effectiveness [Electronic Version]. *The International Review of Research in Open and Distance Learning, 10,* from http://www.irrodl.org/index.php/irrodl/article/view/629/1265

Patten, M. L. (2001). *Questionnaire research: A practical guide* (2nd ed.). CA: Los Angeles: Pyrczak Publishing.

Phipps, R. A., & Merisotis, J. P. (1999). *What's the difference? A review of contemporary research in the effectiveness of distance learning in higher education*. Washington, DC: Institute for Higher Education Policy.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*(2), 531-544.

Ponzurick, T. G., France, K. R., & Logar, C. M. (2000). Delivering graduate marketing education: An analysis of face-to-face versus distance education. *Journal of Marketing Education, 22*(3), 180-187.

Powers, S., & Rossman, M. H. (1985). Student satisfaction with graduate education:Dimensionality and assessment in college education. *Psychology: A Quarterly Journal of Human Behavior, 22*(2), 46-49.

Pratt, D. (1998). Andragogy as a relational construct. *Adult Education Quarterly, 38,* 160-172.

Pullen, D. L. (2005). Online continuing professional education: An evaluative case study. *Journal of Adult and Continuing Education, 11*(2), 129-141.

Pullen, D. L. (2006). An evaluative case study of online learning for healthcare professional. *The Journal of Continuing Education in Nursing, 37*(5), 225-232.

Pyper, R., & Belanger, C. (2004). Adult learners and success factors: A case study. *Higher Education Perspectives, 1*(1), 15-35.

Rachal, J. R. (2002). Andragogy's detectives: A critique of the present and a proposal for the future. *Adult Education Quarterly, 52*, 210-227.

Reisetter, M., LaPointe, L., & Korcuska, J. (2007). The impact of altered realities: Implications of online delivery for learners' interactions, expectations, and learning skills. *International Journal of E-learning, 1*(6), 55-80.

Roach, R. (2002). Staying connected. *Black Issues in Higher Education, 19*, 22-26.

Roberts, V. W., Brannan, J. D., & White, A. (2005). Outcomes-based research: Evaluating the effectiveness of an online nurse refresher course. *The Journal of Continuing Education in Nursing, 36*(5), 200-204.

Robinson, D. G., & Robinson, J. C. (1989). *Training for impact*. San Francisco: Jossey-Bass.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Roth, G. (2004). CPE and HRD: Research and practice within systems and across boundaries. *Advances in Developing Human Resources, 6*(1), 9-19.

Rovai, A. P., & Barnum, K. T. (2003). On-line course effectiveness: An analysis of student interactions and perceptions of learning. *Journal of Distance Education, 18*(1), 57-73.

Rummler, G. A., & Brache, A. P. (1995 ). *Improving performance: How to manage the white space on the organization chart. (2nd Edition).* San Francisco, CA: Jossey-Bass.

Russ-Eft, D., Preskill, H., & Sleezer, C. (1997). *Human resource development review: Research and implications*. Thousand Oaks, CA: Sage

Russell, T. L. (Ed.). (1999). *The no significant difference phenomenon*. Raleigh: North Carolina State University

Russell, T. L. (2001). The no sigficance difference phenomenon. In *A comparative research annotated bibliography on technology for distance education.* Montgomory, AL: IDECC.

Sakurai, J. M. (2002). Traditional vs. online degrees. *E-Learning, 3*, 28-32.

Sankaran, S. R., Sankaran, D., & Bui, T. X. (2000). Effect of student attitude to course format on learning performance: An empirical study in Web vs. lecture instruction. *Journal of Instructional Technology, 27,* 66-73.

Santos, A., & Stuart, M. (2003). Employee perceptions and their influence on training effectiveness. *Human Resource Management Journal, 13*(1), 27-45.

Seibold, K. N. (2007). *Employer's perceptions of online education.* Unpublished Unpublished Doctoral Dissertation, Oklahoma City, Oklahoma State University.

Shah, S. (2009). *Influence of instructional technology on learning and persistence of tribal college students: A quasi-experimental study.* Unpublished Doctoral Dissertation, Phoenix, AZ, University of Phoenix.

Siegel, L. (2001). From symbols, stories and social artifacts to social architecture and individual agency: The discourse of learning and the decline of organizational culture in the New York Order. In R. Smith, J. Dirkx, P. Eddy, P. Farrell & M. Polzin (Eds.), T*he 42nd Annual Adult Education Research Conference*. East Lansing, MI.

Sleezer, C. M., Conti, G. J., & Nolan, R. E. (2004). Comparing CPE and HRD programs: Definitions, theoretical foundations, outcomes, and measure of quality. *Advances in Developing Human Resources, 6*(1), 20-34.

Smith, R. J., & Palm, L. J. (2007). Comparing learning outcomes between traditional and distance introduction to philosophy courses. *Discourse: Learning and Teaching in Philosophy and Religious Studies, 6*(2), 205-226.

Solimeno, A., Mebane, M., Tomai, M., & Francescato, D. (2008). The influence of student and teachers characteristics on the efficacy of face-to-face and computer supported collaborative learning. *Computers & Education, 51*(1), 109-128.

Stolovitch, H. D., & Keeps, E. J. (1999). *Handbook of human performance technology: Improving individual and organizational performance worldwide*. San Francisco, CA: Jossey-Bass/Pfeiffer.

Strauss, W., & Howe, N. (1991). *Generations: the history of America's future, 1584 to 2069*. New York, N.Y.: Harper Perennial.

Sullivan, C. (2002). Getting the organization to adopt e-learning: From challenge to action [Electronic Version]. Retrieved June 5, 2009, from http://www.e-learningguru.com/articles/adopting_elearning.pdf

Swanson, & Holton. (2001). *Foundations of human resource development* (1st ed.). San Francisco: Berrett-Koehler Publishers.

Swanson, & Holton. (2009). *Foundations of human resource development* (2nd ed.). San Francisco: Berrett-Koehler Publishers.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn and Bacon.

Tough, A. (1967). *Learning without a teacher: A study of tasks and assistance during adult self-teaching projects*. Toronto: The Ontario Institute for Studies in Education.

Training. (2008). Industry report: Gauges & drivers. *Training, 45*(9), 16-34.

Upcraft, M. L., & Schuh, J. H. (1996). *Assessment in student affairs: A guide for practitioners*. San Francisco: Jossey-Bass.

VanLehn, K. (1996). Cognitive skill acquisition. *Annual Review of Psychology, 47*, 513-539.

Van Loo, J. B., & Rocco, T. (2006). Differentiating CPE from training: Reconsidering terms, boundaries, and economic factors. *Human Resource Development Review, 5*(2), 202-227.

Varlejs, J. (2003). Continuing education tiptoes online: Where are the quality guidelines? *Journal of Education for Library and Information Science, 44*, 332-335.

Villar, L. M., & Alegre, O. M. (2007). Measuring the learning of university teachers following online staff development courses: A Spanish case study. *International Journal of Training and Development, 11*(3), 200-213.

Volery, T., & Lord, D. (2000). Critical success factors in online education *The International Journal of Educational Management, 14*(5), 216-223.

Vygostky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vygostky, L. S. (1999). *Thought and language*. Cambridge, MA: The MIT Press.

Waddill, D. D. (2006). Action e-Learning: An exploratory case study of action learning applied online *Human Resource Development Quarterly, 9*(2), 157-171.

Wang, A. Y., & Newlin, M. H. (2000). Characteristics of students who enroll and succeed in psychology web-based classes. *Journal of Educational Psychology, 92* (1), 137-143.

Watkins, K. E. (1995). The case for learning. In *Conference Proceedings of the Academy of Human Resource Development* (pp. 1-7). St. Louis, MO.

Weber, J. M., & Lennon, R. (2007). Multi-course comparison of traditional versus web-based course delivery systems. *The Journals of Educators Online, 4*(2), 1-19.

Webster, J., & Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning *The Academy of Management Journal, 40*(6), 1282-1309.

Wenger, E. (1998). *Communities of practice*. Cambridge, UK: Cambridge University Press.

Zahner, S. J., Tipple, S. M., Rather, M. L., & Schendzielos, C. (2009). Supporting nurse preceptors through online continuing education. *The Journal of Continuing Education in Nursing, 40*(10), 468-474.

Zhang, D. S., Zhao, J. L., Zhou, L., & Nunamaker, J. F. (2004). Can e-learning replace classroom learning? *Communications of the ACM, 47*(5), 75-79.

# APPENDIX A

## SELECTED JOURNALS FOR SPECIFIC SEARCH IN LITERATURE REVIEW

| *Area of Study* | *Journal Name* |
|---|---|
| Continuing Professional Education | Journal of Continuing Education in the Health Profession |
| | Studies in Continuing Education |
| | Journal of Continuing Education in Nursing |
| | New Directions for Adult and Continuing Education |
| | International Journal of Lifelong Education |
| Training and Human Resource Development | Human Resource Development Quarterly |
| | International Journal of Training and Development |
| | Advances in Human Resources Development |
| | Human Resource Development Review |
| | Human Resource Development International |
| Education | Academy of Management Learning & Education |
| | Adult Education Quarterly |
| | American Educational Research Journal |
| | Studies in Adult Education |
| | Adult Education and Development |
| Online Education/E-Learning | Educational Technology Research & Development |
| | Journal of Educational Technology & Society |
| | American Journal of Distance Education |
| | Journal of Computer Assisted Learning |
| | Distance Education |
| Human Resource Management & Organizational Behavior | Human Resource Management |
| | Human Resource Management Journal |
| | Human Resource Management Review |
| | Journal of Organizational Behavior |
| | Academy of Management Journal |

## APPENDIX B

## EFFECTIVENESS STUDIES SINCE 1990S

| No. | YR | JNL | Author (s)/ Article | Setting | Topic | Profession if CPE/CPD | Purpose of the Study | Sample | Criteria of Effectiveness | Conclusions |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 1997 | AM | *Webster, J.& Hackley P.* Teaching Effectiveness in Technology-Mediated Distance Learning | Academic | online alone | N/A | To examine factors affecting teaching outcomes | Both teachers and students | Medium richness, students' comfort with their images on the screen, instructor control over the technology, the quality of the technology, instructor's attitudes and teaching style | Teaching effectiveness factors are medium richness, students' comfort with their images on the screen, instructor control over the technology, instructor's attitudes and teaching style |
| 2. | 1999 | JCEN | *Andrusyszyn, M.A., Iwasiw, C. & Goldenberg* Computer conferencing in graduate nursing education | Academic | online CPE/CPD | Nursing | To elicit perceptions of students and faculty towards using Computer conferencing as delivery method | Students and faculty | Learning, interaction, environment, technical support and satisfaction with the medium | CC has some advantages, and nurse educators should use it for nurse education |
| 3. | 2002 | JCEN | *Harrington, S.S. & Walker, B.L.* A comparison of computer-based and instructor-led training for long-term care giver | Non-academic | online CPE/CPD versus FTF CPE/CPD | Fire Safety Training for nurses | To evaluate the effectiveness of a computer-based fire safety training program with owners, operators, and staff of small residential care facilities for the elderly. | 277 full- and part-time employees | knowledge, attitude and practices | CBT was an effective training tool for board and care owners, operators, and staff. |
| 4. | 2003 | HRMJ | *Santos, A. & Stuart, M.* Employee | Non-academic | FTF alone | Banking | 1) Evaluate employees' training | 167 Bank employees at Finance CO | 1)Knowledge and skill acquisition 2) Transfer of skills | The social and political forces shape the organizational training |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Perceptions and their Influence on Training Effectiveness | | | | experience; 2) how these experience of training shape the "transfer" of training | | | practices, therefore impacting the effectiveness of the training |
| 5. | 2005 | JCEN | *Roberts, V.W., Brannan, J.D. & White A.* Outcomes-based research: Evaluating the effectiveness of online nursing refresher courses | Non-academic | online CPE/CPD | Nursing | 1) Evaluate the successes and weaknesses of the online course design 2) to glean the participants' reflections of their experiences | nurses that are enrolled in the class | 1) Theory and lecture 2) critical thinking discussion 3) clinical experience and 4) examinations and tests | Most of respondents had a positive perception that theory and lecture, critical thinking, discussion questions, clinical experience, and examinations were all helpful. |
| 6. | 2005 | HRDQ | *Brown, K.G.I* A field study of employee e-learning activity and outcomes | Academic | online alone | N/A | To examine the degree to which different employees in the universities make use of e-learning and why | 311 employees who registered to have those online courses | The time spent on e-learning | Importance of motivation to learn and workload in determining how long employees use e-learning. In addition, the greater time employees spent using e-learning, the more their computer-related skill and performance improved, as judged by their supervisors. |
| 7. | 2006 | JCEN | *Pullen, D.L.* An evaluative case study of online learning for healthcare professionals | Non-academic | online CPE/CPD | Healthcare professionals | To determine the effectiveness of this learning medium in providing quality and effective learning opportunities to healthcare professionals | 300 healthcare professionals | Participant satisfaction, learning, achievement, self-reported practice performance change and e-pedagogical courseware characteristics | Learning online was an effective means for increasing CPE knowledge and improving self-reported practice performance change |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 8. | 2006 | ETS | *Chan, H., Tsai, P., & Huang, T.-Y.* Web-based Learning in a Geometry Course | Academic | online versus FTF | N/A | To find a way to help promote learning and van Hiele levels of geometric thought among elementary students. | The experimental group, which received Web-based instruction, included thirty-five 3rd grade students and thirty-nine 6th grade students. The control group, which received classroom instruction, included thirty-four 3rd grade students and forty 6th grade students. | Leaning | We observed that the 6th grade students' ability to learn with computers and the Internet was sufficient to handle problems and promote their van Hiele levels of geometric thought. But this instructional technology seemed to threaten 3rd grade students' learning. |
| 9. | 2006 | HRDI | *Waddill D.D.* Action e-learning: An exploratory case study of action learning applied online | Academic | online alone | N/A | To examine the impact of the action learning process on the effectiveness of management level web-based instruction | Management-level individuals | 1)reaction/perception 2). learning/knowledge construction 3). behavior change 4). results/performance | The action learning online method is effective and yields changes in participants' knowledge |
| 10 | 2006 | SCE | *Thorpe, M. & Godwin, S.* Interaction and e-learning: the student experience | Academic | online alone | N/A | To check the effect of interpersonal and content interactions on e-learning | A random sample of 4512 students on the 36 courses selected was surveyed in | Interpersonal and content interactions | The perceived benefits of interpersonal and content interaction are distinctive, and both can also have negative effects. Students value content interaction and interpersonal |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | June 2004, with a response rate of 46.9% | | interaction for different reasons, and it is not helpful to privilege one form of interaction over another. |
| 11 | 2007 | IJTD | *Villar, L.M., & Alegre, O.M.* Measuring the learning of university teachers following online staff development courses: a Spanish case study | Non-academic | online CPE/CPD | Teaching | To evaluate success in faculty online training by examining the learning experience of the participants | participants in curriculum and teaching capacity (CTC) in various universities | Knowledge and understanding of CTCs | The online CTC organization operates proactively in the classroom-learning environment involving a process of deconstruction and reconstruction |
| 12 | 2008 | IJTD | *Huang, H. & Cho, V.* Continued usage of e-learning communication tools | Academic | online alone | N/A | The focus of our study is on the impact of attributes and perceptions of learners on their decision to continue using web-based communications in an e-learning environment | students from seven higher education institutions | Learners' willingness to continue using e-learning communication tools | Both TAM and EDT are useful in explaining the continued usage of a given technology. Our findings suggest that when students are using e-learning communication tools, the perceived performance of such tools is an important perception that enhances a student's satisfaction with using e-learning communication tools, which in turn makes the student continue using e-learning communication tools. Moreover, the perception of usefulness is another important factor that prompts a user to maintain continued usage. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 2008 | AMLE | *Luthans, F., Avey, J.B., & Patera, J.L.* Experimental analysis of a web-based training intervention to develop positive psychological capital | Non-academic | online alone | A wide cross-section of industries including manufacturing, service, sales, and government | To analyze whether psychological capital can be developed through a highly focused, 2-hour web-based training intervention | 364 working adults | Hope, self-efficacy, optimism and resiliency | Psychological capital be developed by a highly focused, 2-hour web-based training intervention |
| 14 | 2009 | AEQ | *Donavant, B.W.* The New, Modern Practice of Adult Education: Online Instruction in a Continuing Professional Education Setting | Non-academic | online CPE/CPD versus FTF CPE/CPD | Police Officer | If potential performance is related to various demographic factors (gender, race, age, number of professional years, years of formal study, previous exposure and willingness to participate | 188 police offers | 1) Whether learning occurred 2) examined learners' efficacy/ willingness to accept online education | 1) no significant difference b/w OE and TI 2)significant difference related to the level of formal education 3) learners preferred TI, but thought OE could become useful in professional development |
| 15 | 2009 | JCEN | *Harrington, S.S. & Walker, B.L.* The Effects of computer-based fire safety training on the knowledge, attitudes, and practices of caregivers | Non-academic | online CPE/CPD versus FTF CPE/CPD | Fire Safety Training for nurses | To evaluate the effectiveness of a computer-based fire safety training program with owners, operators, and staff of small residential care facilities for the elderly. | 59 caregivers | Knowledge, attitude and practices | Computer-based instruction is an effective way to teach fire emergency planning to caregivers from small residential care facilities. |
| 16 | 2009 | JCEN | *Zahner, S.J., Tipple, S.M.,* | Non-academic | online CPE/CPD | Nursing | To assess the feasibility of | Experienced preceptors | Knowledge, self-efficacy | 1) Online continuing education is a feasible |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Rather, M.L. & Schendzielos, C.* Supporting nurse preceptors through online continuing education | | | | using an online continuing education course to increase knowledge and self-efficacy in nurse preceptors | | | strategy to support preceptor learning, 2) experienced preceptor participants were satisfied with the delivery and content of an online continuing education course |
| 17 | 2009 | DE | *Jelfs, A., Richardson, J.T.E., & Price, L.* student and tutor perceptions of effective tutoring in distance education | Academic | online alone | N/A | To investigate the concept of "good tutor" | 457 students and 602 tutors | Knowledge | Tutors should be task-oriented and student-oriented; knowledge oriented; impersonal |
| 18 | 2009 | ETS | *Diaz, L.A. & Entonado, F.B.* Are the functions of Teachers in e-Learning and FTF Learning Environments Really Different? | Academic | online versus FTF | N/A | To examine whether differences exist in work-related tasks carried out by teachers | 250 students | 1) theoretical content 2) practical content or activities 3) interaction 4) design | 1) Visualizing more in online-environment 2) Tutor decides activities and applies strategies in online 3) greater role to make interactions happen in online 4) teachers need to know technical design in online environment |

***Abbreviations for Journals**

1. AEQ - Adult Education Quarterly
2. HRMJ - Human Resource Management Journal
3. ETS - Educational Technology & Society
4. AM- Academy of Management
5. HRDQ - Human Resource Development Quarterly
6. IJTD-International Journal of Training and Development
7. SCE- Studies in Continuing Education
8. DE-Distance Education
9. JCEN- Journal of Continuing Education in Nursing
10. AMLE-Academy of Management Learning and Education
11. AJDE- American Journal of Distance Education
12. HRDI- Human Resource Development International

# APPENDIX C

## SURVEY QUESTIONNAIRE

## SELF-PERCEPTIONS TOWARDS EFFECTIVENESS OF E-LEARNING VERSUS TRADITIONAL LEARNING

**Part A**

Instructions: Please read each statement and then circle the number which best reflects your perception.

SD=Strongly Disagree; D=Disagree; U=Undecided; A=Agree; SA=Strongly Agree

Online courses/education events include the courses taken online (both self-paced and instructor-led) or through webinars; and face-to-face courses/events include annual conferences, schools, live seminars and in-house training.

| No. | Item | SD | D | U | A | SA |
|---|---|---|---|---|---|---|
| A1 1 | The information provided in or during online courses was more than what was provided in or during face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| A2 2 | Getting to know and communicating with other participants was easier with the online format than with the traditional face-to-face format. | 1 | 2 | 3 | 4 | 5 |
| A3 3 | Face-to-face courses gave me more time to reflect on the training content than did online courses. | 1 | 2 | 3 | 4 | 5 |
| A4 4 | Regardless of the courses taken, the online format has facilitated my understanding of new professional knowledge better than the face-to-face format. | 1 | 2 | 3 | 4 | 5 |
| A5 5 | The online courses reinforced my pre-training professional knowledge and expertise more than face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| A6 6 | I was exposed to more scenarios of the workplace in face-to-face courses than in online course. | 1 | 2 | 3 | 4 | 5 |
| B1 7 | Using emerging learning technologies, such as online courses, is personally important to me. | 1 | 2 | 3 | 4 | 5 |
| B2 8 | In my job, I use the technical skills needed to take online courses more than those needed to take face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| B3 9 | Online courses for continuing professional development are becoming a valued platform by my colleagues. | 1 | 2 | 3 | 4 | 5 |
| B4 10 | Activities and interactive tools used in online courses have helped me transfer learning from the training | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | sessions to the workplace more than those used in face-to-face courses. | | | | | |
| B5 11 | Face-to-face courses are more preferred in my workplace than online courses. | 1 | 2 | 3 | 4 | 5 |
| C1 12 | Online courses were structured such that they enhanced my information processing and problem solving skills more than face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| C2 13 | Learning decision making skills was more effective in online courses than in face-to- face courses. | 1 | 2 | 3 | 4 | 5 |
| C3 14 | Learning reasoning and judgment skills was more effective in online courses than in face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| C4 15 | Online courses were designed and conducted better than face-to-face courses because I was encouraged to use my intuition in conjunction with knowledge learned to solve problems in my workplace. | 1 | 2 | 3 | 4 | 5 |
| C5 16 | My expertise in the professional area has been updated and enhanced more effectively by online courses than traditional face-to-face courses. | 1 | 2 | 3 | 4 | 5 |
| D 17 | Overall, I think online courses were more effective than face-to-face courses. | 1 | 2 | 3 | 4 | 5 |

**Part B**

Instructions: Please answer the following questions and check the one that best describes you.

1. Please indicate your age category.

☐ Below 20
☐ 20-24
☐ 25-29
☐ 30-34
☐ 35-39
☐ 40-44
☐ 45-49
☐ 50-54
☐ 55-59
☐ Above 60

2. Please indicate your gender. ☐ Male ☐ Female

3. Please check the one option that best describes you.

☐ White, Non-Hispanic
☐ American Indian or Alaska Native
☐ Hispanic or Latino
☐ Black, Non-Hispanic
☐ Asian or Pacific Islander
☐ Mixed Origin
☐ Others

4. I have _____ years of working experience in the professional field that I am at now?

☐ Less than 1
☐ 1-5
☐ 6-10
☐ 10-15
☐ Over 16

5. Please check your highest achieved level of education.

☐ High school diploma or equivalent
☐ Technical school
☐ Up to 2 years of College
☐ Bachelor's degree
☐ Master's degree
☐ Doctoral degree

6. Please indicate your working status in TEEX over the past three years.
☐ Full-time
☐ Part-time
☐ Change from Part-time to Full-time
☐ Change from Full-time to Part-time

7. Please indicate where you took your online CPE/Professional Development courses.

☐ TEEX
☐ Both
☐ Outside TEEX

8. Please indicate the number of online CPE/Professional Development courses you have taken during the past three years (Your best estimation is fine) _____.

9. Please indicate the number of face-to-face CPE/Professional Development courses you have taken during the past three years (Your best estimation is fine) _____.

**Part C**

Instructions: Please answer the following questions.

1. What are your recommendations (if any) on how to improve the effectiveness of online education in delivering continuing professional education/training for professionals in your field?

2. What are your recommendations (if any) on how to improve the effectiveness of face-to-face education in delivering continuing professional education/training for professionals in your field?

## APPENDIX D

## CORRELATION MATRIX

| Measures | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Information Provided | | | | | | | | | | | | | | | | |
| (2) Peer Communication | .244** | | | | | | | | | | | | | | | |
| (3) Content Reflection | .097 | .112* | | | | | | | | | | | | | | |
| (4) New Knowledge | .408** | .463** | .153** | | | | | | | | | | | | | |
| (5) Pre-training Knowledge | .340** | .325** | .204** | .598** | | | | | | | | | | | | |
| (6) Real-life Scenarios | .200** | .165** | .127* | .175** | .141* | | | | | | | | | | | |
| (7) Emerging Technologies | .271** | .173** | .128* | .427** | .261** | .268** | | | | | | | | | | |
| (8) Technical Skills | .233** | .251** | .105 | .381** | .323** | .150** | .336** | | | | | | | | | |
| (9) Valued Platform | .234** | .120* | .103 | .278** | .273** | .170** | .485** | .304** | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (10) Activities and Tools | .403** | .386** | .161** | .579** | .449** | .159** | .347** | .470** | .293** | | | | | | | |
| (11) Workplace Preference | .081 | .070 | .119* | .207** | .205** | .191** | .146** | .217** | .169** | .082 | | | | | | |
| (12) Problem-solving Skills | .387** | .289** | .246** | .520** | .447** | .264** | .411** | .435** | .312** | .549** | .148** | | | | | |
| (13) Decision-making Skills | .277** | .333** | .282** | .501** | .489** | .240** | .335** | .416** | .220** | .495** | .198** | .544** | | | | |
| (14) Reasoning and Judgment | .266** | .273** | .196** | .467** | .475** | .153** | .325** | .294** | .187** | .469** | .111* | .478** | .724** | | | |
| (15) Intuition Utilization | .329** | .313** | .213** | .514** | .487** | .229** | .404** | .410** | .309** | .547** | .162** | .543** | .587** | .560** | | |
| (16) Expertise Reinforcement | .385** | .333** | .253** | .501** | .513** | .206** | .390** | .413** | .375** | .509** | .199** | .549** | .373** | .373** | .500** | |

** $p < .001$

## APPENDIX E

## COMMUNALITIES IN FACTOR ANALYSIS

**Communalities**

| | Initial | Extraction |
|---|---|---|
| KC1- Information Provided | 1.000 | .379 |
| KC2- Peer Communication | 1.000 | .349 |
| KC3- Content Reflection | 1.000 | .467 |
| KC4- New Knowledge | 1.000 | .628 |
| KC5- Pre-training Knowledge | 1.000 | .517 |
| KC6- Real-life Scenarios | 1.000 | .364 |
| CT1- Emerging Technologies | 1.000 | .569 |
| CT2- Technical Skills | 1.000 | .390 |
| CT3- Valued Platform | 1.000 | .611 |
| CT4- Activities and Tools | 1.000 | .633 |
| CT5- Workplace Preference | 1.000 | .461 |
| PP1- Problem-solving Skills | 1.000 | .576 |
| PP2- Decision-making Skills | 1.000 | .713 |
| PP3- Reasoning and Judgment | 1.000 | .632 |
| PP4- Intuition Utilization | 1.000 | .593 |
| PP5- Expertise Reinforcement | 1.000 | .545 |

Extraction Method: Principal Component Analysis.

# APPENDIX F

## DIRECT OBLIMIN ROTATED FACTOR LOADINGS

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total |
| 1 | 6.015 | 37.596 | 37.596 | 6.015 | 37.596 | 37.596 | 5.699 |
| 2 | 1.227 | 7.666 | 45.262 | 1.227 | 7.666 | 45.262 | 2.306 |
| 3 | 1.072 | 6.701 | 51.963 | 1.072 | 6.701 | 51.963 | 2.105 |
| 4 | .969 | 6.054 | 58.016 | | | | |
| 5 | .905 | 5.658 | 63.674 | | | | |
| 6 | .898 | 5.613 | 69.287 | | | | |
| 7 | .776 | 4.852 | 74.139 | | | | |
| 8 | .708 | 4.426 | 78.565 | | | | |
| 9 | .580 | 3.626 | 82.191 | | | | |
| 10 | .538 | 3.363 | 85.554 | | | | |
| 11 | .491 | 3.068 | 88.622 | | | | |
| 12 | .436 | 2.726 | 91.348 | | | | |
| 13 | .431 | 2.694 | 94.042 | | | | |
| 14 | .393 | 2.455 | 96.497 | | | | |
| 15 | .323 | 2.019 | 98.516 | | | | |
| 16 | .237 | 1.484 | 100.000 | | | | |
| 17 | 6.015 | 37.596 | 37.596 | | | | |

**Pattern Matrix[a]**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| KC1- Information Provided | .536 | | |
| KC2- Peer Communication | .491 | | |
| KC3- Content Reflection | | | .554 |
| KC4- New Knowledge | .764 | | |
| KC5- Pre-training Knowledge | .692 | | |
| KC6- Real-life Scenarios | | | .578 |
| CT1- Emerging Technologies | .583 | | |
| | | .572 | |
| CT2- Technical Skills | .586 | | |
| CT3- Valued Platform | .451 | .741 | |
| CT4- Activities and Tools | .746 | | |
| CT5- Workplace Preference | | | .722 |
| PP1- Problem-solving Skills | .756 | | |
| PP2- Decision-making Skills | .744 | | |
| PP3- Reasoning and Judgment | .687 | | |
| PP4- Intuition Utilization | .746 | | |
| PP5- Expertise Reinforcement | .719 | | |
| Overall Perceptions | .536 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

# APPENDIX G

## INFORMATION SHEET

## Professionals' Perception of the Effectiveness of Online Continuing Professional Education (CPE)

**Introduction**

The purpose of this form is to provide you (as a prospective research study participant) information that may affect your decision as to whether or not to participate in this research.

You have been asked to participate in a research study on learner's perspectives on effectiveness of online education versus face-to-face education. The purpose of this study is to obtain professionals' perceptions of the effectiveness of professional development courses (continuing professional education courses) taken online versus those through face-to-face formats. Continuing professional education courses are defined as professional development courses that are designed to certify (re-certify) or license (re-license) and improve professionals' knowledge, competence or performance. You were selected to be a possible participant because you have taken both online and face-to-face Continuing professional education courses from [redacted].

**What will I be asked to do?**

If you agree to participate in this study, you will be asked to fill out an online survey. This study will take about 5-10 minutes.

**What are the risks involved in this study?**

The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

**What are the possible benefits of this study?**

You will receive no direct benefit from participating in this study.

**Do I have to participate?**

No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University being affected.

**Who will know about my participation in this research study?**

This study is confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published.

Research records will be stored securely and only the researcher (Jie Ke) will have access to the records.

**Whom do I contact with questions about the research?**
If you have questions regarding this study, you may contact Jie Ke through phone number [redacted] or e-mail ([redacted]).

**Whom do I contact about my rights as a research participant?**
This research study has been reviewed by the Human Subjects' Protection Course and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458-4067 or irb@tamu.edu.

**Participation**
Please be sure you have read the above information, asked questions and received answers to your satisfaction. If you would like to be in the study, please click "I agree" and follow the instruction to take the online survey. Thank you for participation, and your time and effort are greatly appreciated.

## APPENDIX H

## LETTER TO SURVEY PARTICIPANTS

Dear TEEXans:

Greetings, I am a PhD student at Texas A&M University and I am planning to conduct a survey of perceptions of online continuing professional development courses versus face-to-face courses for my dissertation. You were selected to be a potential participant for the study because record shows that you have taken online and/or face-to-face continuing professional courses during the past three years ( ). It will take you approximately 5-10 minutes to complete the survey. Here is a link to the survey: . The survey will remain open until , please fill it out at your earliest convenience. Your time and efforts are greatly appreciated!

If you agree to participate, your responses will be submitted electronically through the online survey questionnaire and will be kept confidential.
Again, the purpose of this study is to obtain professionals' perceptions of the effectiveness of professional development courses (continuing professional education courses) taken online versus those through face-to-face formats.

[**INFORMATION SHEET** approved by IRB]

Again, here is a link to the survey: . This link is uniquely tied to this survey and your email address, please do not forward this message.

Thank you in advance for your time and participation in the survey.

Jie Ke
Doctoral Candidate
Department of Educational Administration and Human Resource Development
College of Education
Texas A&M University

## APPENDIX I

## FIRST REMINDER EMAIL

Dear TEEXans:

Greetings again, from a Ph.D. student in Human Resource Development! Recently you should have received an email message from me asking you to answer a brief survey. The survey is still online and ready for you to access. This will take less than 10 minutes of your time. The survey is to obtain your opinions on two different delivery methods of professional trainings. It is a part of my doctoral dissertation research, and it will also help TEEX gain valuable feedback on how best to direct employee training efforts. Your time is much appreciated and your opinions or feedbacks are greatly valued.

Here is the survey link [redacted]

For those who are interested in the study and the results, I will be more than happy to share with you the findings once the study is completed. Please let me know if you do. Also, for a better result of the study, please advocate it for me and encourage more of your colleagues to participate in the study as well.

If you have already completed the survey, thank you, and please disregard this email notification. If you have not completed them yet, please do so at your earliest convenience.

Respectfully,

Jie Ke
Doctoral Candidate
Department of Educational Administration and Human Resource Development
College of Education
Texas A&M University

## APPENDIX J

## SECOND REMINDER EMAIL

Dear TEEXans:

Greetings again, from a Ph.D. student in Human Resource Development! Recently you should have received an email message from me asking you to answer a brief survey. I understand that you are extremely busy at the time of the year, but I would really appreciate it if you could take 5-10 minutes to fill out the survey because the survey study is very important to my Ph.D. study as well as to the development of TEEX training courses. And you can make the difference!

Here is the survey link [redacted]

If you have already completed the survey, thank you, and please disregard this email notification. If you have not completed them yet, please do so at your earliest convenience.

For those who are interested in the study and the results, I will be more than happy to share with you the findings once the study is completed. Please let me know if you do. Also, for a better result of the study, please advocate it for me and encourage more of your colleagues to participate in the study as well.

Jie Ke
Doctoral Candidate
Department of Educational Administration and Human Resource Development
College of Education
Texas A&M University

## APPENDIX K

## THIRD/FINAL REMINDER EMAIL

Dear TEEXans:

Hope this message finds you well. Recently you should have received an email message from me asking you to answer a brief survey. We have received many great responses fro your folks, and decided to extend the deadline of the survey. If you would like to participate but have not got time yet, please follow the following link to participate. Your 5 minutes is really important to us!

Here is the survey link [redacted]

This link is uniquely tied to this survey and your email address, please do not forward this message.

If you have already completed the survey, thank you, and please disregard this email notification. If you have not completed them yet, please do so at your earliest convenience.

Respectfully,

Jie Ke
Doctoral Candidate
Department of Educational Administration and Human Resource Development
College of Education
Texas A&M University

# VITA

Name: Jie Ke

Address: Department of Educational Administration and Human Resource Development (EAHR)
Texas A&M University
511 Harrington Tower
College Station, TX 77843-4226

Email Address: jiejke@gmail.com

Education: B.A., English Language & Literature, Anhui University, China, 1994
M.B.A., Business Administration, EDHEC, Lille, 2002

Work Experience: Correspondent Banking Officer and Statistician, International Business Department, Industrial and Commercial Bank of China, Ningbo Branch, 1994-2001