

EDUCATION TECHNOLOGY IMPACT ON DEPARTMENT OF DEFENSE
FINANCIAL MANAGER CONTINUING PROFESSIONAL EDUCATION
PROGRAMS

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EDUCATION TECHNOLOGY IMPACT ON DEPARTMENT OF DEFENSE
FINANCIAL MANAGER CONTINUING PROFESSIONAL EDUCATION
PROGRAMS

Jeffrey Allan Bohler

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Jeffrey Allan Bohler graduated from Walterboro High School in 1977. He enlisted in the United States Navy in 1980 and served for two years as a Nuclear Power Electronics Technician before receiving a Naval Reserve Officer Training Corps scholarship to attend the Georgia Institute of Technology. In 1985, he earned a Bachelors of Science degree in Information and Computer Science and was commissioned as an Ensign in the United States Navy. Over the next several years, he completed flight training in various aircraft and flew the S-3B Viking in operational assignments around the world. From 1998 to 1999 he attended and graduated from the Air Command and Staff College located on Maxwell AFB, Montgomery, Alabama earning a Master of Science degree in Operational Art and Military Science. After assignments in Europe, he returned to Alabama and served as the Executive Officer of the Auburn University Naval Reserve Officer Training Corps unit, and began pursuit of his Doctorate degree in Management Information Technology and Innovation at the Auburn University Graduate School. He retired from active duty service in the Navy in October 2008 and started a management consultant firm, Decision Evolution, LLC. Upon graduation, he will continue working as a researcher, consultant, and academic instructor. He is married to the former Judith Rena Lawrence and they have two sons, David and Samuel.

DISSERTATION ABSTRACT
EDUCATION TECHNOLOGY IMPACT ON DEPARTMENT OF DEFENSE
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PROGRAMS

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This dissertation uses action research to examine, within the Department of Defense financial manager (DOD FM) community, how the rapid pace of information technology innovations may affect continuing professional education (CPE). Possible impacts include changes to knowledge area relevance, factors affecting learner understanding, and professional networking paradigms. Based on an analysis of real world data, the results of this research include the identification and discussion of relevant DOD FM knowledge areas; a model for analyzing factors affecting learner understanding; and a model for assessing the benefits and cost of traditional professional networking versus new information technology enabled opportunities. Organizations

providing CPE programs and financial managers may use this research to improve CPE program effectiveness.

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CHAPTER I. INTRODUCTION

“Education must focus on instilling the ability to continue learning throughout life. Fortunately, the information-technology revolution is creating a new form of electronic, interactive education that should blossom into a lifelong learning system that allows almost anyone to learn almost anything from anywhere at anytime.”

(Halal & Liebowitz, 1994, p. 21)

This study focuses on the how the introduction of information technologies may affect the continued professional education of financial managers that serve organizations whose mission is the security and defense of the people of the United States. As of 2008, the United States Department of Defense (DOD) is one of the largest, most complex organizations known to man. Global in nature, government reports (2007) identified a fiscal year 2008 budget of \$481.4 billion, not including the \$141.7 billion requested to continue the Global War on Terror (GWOT). That amount is more than the next four countries combined (see Table 1) and is based on estimates compiled and posted by the Central Intelligence Agency (CIA, 2009). According to the figures listed in the 2007 Fortune 500 List, the DOD ranks above the world’s largest commercial companies, more than Wal-Mart posting \$351 billion in earnings. The DOD employs more than 2.4 million people (active duty, reserves, and full time equivalent civilians), and requires the talents

of many professionals including those working in the medical, dental, legal, retail, transportation, financial, construction, shipping, education, space, and of course, defense fields. The multinational and multi-industrial nature of the DOD results in an extremely large public (not profit oriented) organization, with decidedly complex knowledge management (KM) needs, especially in the field of financial management. In a sense, continuing professional education (CPE) is a form of KM, in that organizations identify needed knowledge, enable personnel participating in CPE programs to acquire and create knowledge, which is retained within the organization's personnel for future use, who apply that knowledge to benefit the organization.

Table 1

Military Expenditures by Country (Top 5)

Country	GDP ¹	Defense Spending	Military Expenditures	Estimate Year
United States	13.860	4.06%	\$563 billion	2005
China	7.043	4.30%	\$303 billion	2006
Russia	2.076	3.09%	\$ 64 billion	2005
France	2.067	2.60%	\$ 54 billion	2005
United Kingdom	2.147	2.40%	\$ 52 billion	2005

Notes. 1. 2007 estimate in trillions of U.S. dollars.

2. PRC 2008 published military budget was US\$59 billion, but various studies reject this figure as too low and not inclusive of all defense spending.

To quote Davenport and Prusak (2000, p. 163), “If you’ve got a good library, a textual database system, or even effective education programs, your company is probably already doing something that might be called knowledge management.” There is a critical need for effective education programs across many services and agencies within the DOD. However, just as in the commercial sector, increasing workload has made getting adequate CPE a challenge (Alexander, 2008). History indicates that the DOD is an effective, if not efficient, organization. At least from a military perspective, the DOD has had success in world and regional conflicts for the past century. However, in the emerging global economy, the collective leadership of the United States cannot afford to misuse money, people or time if it wishes to remain a world power as the twenty-first century unfolds. As the major recipient of discretionary spending from the United States treasury, the DOD must make better strategic and tactical decisions to focus the efforts of multiple industries using scarcer resources to provide not only effective, but also efficient national defense. To do so will require continuously improving worker access to relevant and accurate knowledge, properly applied to solve complex problems, which will enable leaders and managers throughout the organization to make informed and rational decisions. To produce the competent financial management professionals DOD needs, an effective CPE programs must exist. Alexander (2008) quoted Ken Koskay, senior vice president and general manager of CPE & Training Solutions, when he said, “Firms are having difficulty recruiting, retaining and developing their staff. Part of the solution is training and learning development.” The challenge of keeping qualified personnel is exacerbated within the DOD when experienced employees are lost to the private sector chasing better compensation.

To paraphrase Cervero (2001) regarding continuing professional education, organizations must address three issues: What subjects to teach (knowledge versus practice), how to provide that education, and the amount of organizational resources (time, people, and money) to devote to the continuing education of its workforce. From the answers to these questions, a great deal can be ascertained about an organization and its chances for continued success. Today, the answers to those questions have grown in significance, as it has been postulated that the amount of information (and subsequently knowledge) available doubles each year (Masclat, 2007). Given the observed limitations of human intelligence, time, and resources, it is imperative that the “What to teach, how to educate, and at what cost” questions are answered thoughtfully.

While the questions of “what, how, and how much to spend” on continuing education are global issues (Spring, 2008), and are applicable to every type of organization, the answers for each will vary based on their particular culture, vision, mission, and objectives as applicable. It is not the intent of this research to offer a universal prescription to this challenge; rather, the goal is to produce a model to help understand the alternatives and tradeoffs available to organizations within the DOD that provide FM CPE. As information technology (IT) and educational requirements merge to produce innovative educational technologies (ET), organizations providing FM CPE will need help to make rational resource allocation decisions in an attempt to remain relevant. Emerging ETs offer the promise of providing a greater variety of subjects to more students, using more methods, thus enhancing learning (Noe, 2005). The objective of this research is to identify critical knowledge areas for DOD FM CPE, determine appropriate

methods of delivery that add value, and to provide a model that organizations can use to evaluate the educational value provided versus the cost of providing that education.

Best (1981) provides a classification for education based inquiry, and a roadmap for this research. This dissertation is comprised of six chapters, but it differs from a traditional dissertation in the following manner. Chapter 1 is an introduction. Chapter 2 provides a foundation through a literature review of the problem background and learning theory. Chapters 3, 4, and 5 are separate but related investigations into how emerging educational technologies may affect the nature of DOD FM CPE. Chapter 3 is a case study of Government Accountability Office (GAO) research reports, Army, Navy, Air Force, and Defense Financial Accounting Service (DFAS) financial manager career planning documents, and other relevant research in order to determine *what needs to be taught*. Readers unfamiliar with the organization of the DOD may not be aware that the United States Marine Corps actually falls under the Department of the Navy (DON). The Coast Guard, while one of five armed services, falls under the Department of Homeland Security and provides their own FM CPE. Chapter 4 uses experimental research to develop a “learner understanding” model, which may be used as a proxy to evaluate *CPE program value*. Chapter 5 provides a qualitative examination of the possible impact of ET on organization’s decision to send students to traditional in-residence CPE courses based on the perceived value of professional networking, an indicator of how *best to transfer professional knowledge through CPE*. Chapters 3, 4, and 5 will contain their own introduction, literature review, methods, and discussion sections. Finally, Chapter 6 summarizes the research conclusions from Chapters 3, 4, and 5, and provides research recommendations and topics for future research, concluding this dissertation.

Chapter 3, “An Investigation of Continuing Professional Education Knowledge Areas for Department Of Defense Financial Management Personnel” addresses the need to understand current learner needs of the DOD financial manager career field. As Drucker (1968, p. 189) pointed out, “nonbusinesses — government, armed services, the university, the hospital — have begun to apply to themselves the concepts and methods of business management. And this is indeed new. This is indeed startling.” The knowledge needs of DOD FM personnel have become dynamic in a challenging fiscal climate. To navigate, you must know two things: where you are, and where you are going. Similarly, DOD FM CPE providers must understand the value of their existing programs before they can “navigate” to educational programs that are more valuable. Government institutions that provide FM CPE may not effectively sense market forces (needs of their learners), because their funding does not come from customer sales, therefore other methods must be used to understand customer demand, or in other words, how the curriculum must change to remain relevant. The case study of career planning documents and other educational gap analysis contained in Chapter 3 should provide insight into the current state of DOD FM CPE, and provide perspective for program directors to consider when adapting their curricula to keep it relevant.

Chapter 4, “An Analysis of Factors Affecting Knowledge Transfer in a Department Of Defense Program Continuing Professional Education Program for Financial Managers,” is a quantitative analysis of learner understanding data, using learning theory to build a model of DOD FM CPE program value, and testing that model using existing data from DOD FM CPE End of Course satisfaction survey. CPE programs are constantly being evaluated, at least informally, by learners, instructors, and program

planners (Cervero, 1988). The objective of this research is to develop a reliable and useful model to measure the relative value of CPE programs using a formal methodology. In addition, a visual model, with relevant factors identified, provides practitioners a workable recipe, including critical ingredients, for adding value to DOD FM CPE programs. This visual model may be useful in helping program planners understand the interconnections of variables affecting CPE and their related effects (Creswell, 1994).

Chapter 5, “Educational Technology Impact on the Professional Networking Aspect of Department of Defense Financial Manager Continuing Professional Education Programs,” develops a qualitative economic model to consider the relative cost and possible benefits of professional networking opportunity provided by attendance at in-residence CPE programs. This model can be populated with actual cost data as organization develop and implement new programs. It is vital to understand this aspect of CPE within DOD because in the free market, efficient organizations perceive and respond to changes in the environment by diverting resources to new opportunities, but government organization are constrained in sensing and reallocating resources to take advantage of such opportunities (North, 1990).

It is the desire of the author that this combination of fundamental and applied, quantitative and qualitative research will provide an adequate theoretical foundation, clear cause and effect explanations, and actionable recommendations to decision makers in organizations tasked with providing effective and efficient CPE to DOD FM professionals. Additionally, this research can provide a springboard into providing similar models for other professional knowledge areas within DOD.

CHAPTER II. LITERATURE REVIEW

A literature review “identifies and organizes the concepts in relevant literature” (Rowley & Slack, 2004, p. 31). The hardest part of a literature review may be the decision of where to begin the search for relevant research; the next hardest task is deciding where to draw the line. If the research net is cast too broadly, extraneous results can obscure relevant themes. If you drill too deep into a single source of information, you risk missing valuable alternative perspectives. Several false starts resulted in too many current, but topical articles, or relevant but dated results. A method to identify relevant, but current research was needed.

Methodology

Holsapple and Luo (2003) and Olson (2005) suggest using citation analysis to identify quality research outlets, and by extension, quality research. Thus, the Journal Citation Reports database was used to find top journals ranked according to impact factor scores in the fields of education and educational research, and information science and library science. The two-year impact score was used as opposed to a five year impact score to emphasize currency. A journal’s impact factor is the average number of times articles published in the past two years from a particular journal have been cited in a particular year. For this analysis, the year 2007 was selected. Journals relevant to this

research and available online were selected from the top fifty ranked journals, with impact factor scores above the aggregate impact factor for IS journals (1.026) and education research journals (0.642), suggesting that the journals selected publish highly cited, quality research. Some of the journals selected for this review were not in the top twenty because some of the top ranked journals have a focus that is different than this research. For example, the *Journal of the American Medical Informatics Association* is ranked number two for impact, but the focus of this research is CPE for DOD FM personnel as opposed to continuing medical education (CME), thus journals with a medical orientation were not selected. See Appendix A for a complete list of journals selected and their associated impact factors.

Next, the International Standard Serial Number (ISSN) for each selected journal was used to find the journal in Auburn University's E-Journal collection. Once the journal was located, the exact term "educational technology" was used to find relevant articles within that publication. Results were collected into an EndNote™ database, and the process repeated for the next journal. During the keyword search, other related terms emerged that could prove significant to this research, so those terms (see Table 2) were collected for future research. In one journal, *Computers & Education*, the search resulted in 790 articles, so the search was refined using the additional term "continuing professional education," resulting in eight articles. However, the journal *Computers & Education* was identified as a gold mine of material regarding educational technology for future research.

Finally, the citations and abstracts were reviewed for relevance and currency. Relevant articles were obtained and reviewed, and references from particularly useful

articles were checked to see if other useful research had been missed by the methodology outlined above.

Table 2

Alternative CPE and ET Terms Identified Through Literature Review

Alternative CPE Terms	Alternative ET Terms
Adult Education	Blended Learning
Adult Learning	Communities of Practice
Continual Learning in the Professions	Computer Based Training
Continuing Professional Development	CSCL*
Continuing Professional Education	Distance Education
Continuous Learning	Educational Technology
Knowledge Management	eLearning
Lifelong Learning	Mobile Learning
Networking	mLearning
Organizational Behavior	Virtual Campus
Organizational Knowledge	Virtual Classroom
Professional Education	Virtual Learning
Social Networking	Virtual Schools

*CSCL: Computer-supported collaborative learning

The strength of this method is that it is reproducible. Another researcher could follow the methodology identified above and obtain nearly identical results, except for the interpretation of the articles, which was subjective. Alternatively, this analysis could

be repeated later to produce a longitudinal review of literature in education technology research. The weakness is that, undoubtedly, some significant, relevant existing research may have been missed. However, this process should be able to “identify and organize the concepts,” (Rowley & Slack, 2004, p. 31) in educational technology research.

In addition to the search for educational technology related research, this review also needed to review research relevant to DOD financial management. This additional search was conducted in the Government Accountability Office database, which is a valuable resource for researcher. The terms “financial management,” “professional education,” and “DOD” were used to obtain 41 government reports relating to the issue of DOD FM CPE that range from January 1989 to December 2008 and include profiles of DOD FM personnel by service.

Obviously, a journal citation search does not identify highly cited books in a field. While there are several methods to accomplish this task, for this research, a Google™ Scholar search was conducted to identify highly cited authors in the CPE and ET fields by using the terms “continuing professional education” and “educational technology” in the Advanced Scholar Search web page, omitting the terms “nurse, nursing, medical, and medicine” for reasons previously mentioned. This search identified the CPE and ET authors and books listed in Table 3 by year of publication.

Table 3

Relevant CPE or ET Authors and Research

Author	Year	Noted Research	Cited
Houle	1981	Continuing Learning in the Professions	387
Knowles	1984	Andragogy in Action	466
Cervero	1988	Effective Continuing Education for Professionals	198
Nowlen	1988	A New Approach to Continuing Education for Business and the Professions	106
Best	1989	Research in Education	593
Lester	1995	Beyond Knowledge and Competence: Towards a Framework for Professional Education	31
Clark	2001	Virtual Schools: Trends and Issues	71
Mott	2000	The Development of Professional Expertise in the Workplace	30
Swan & Shea	2005	Learning Together Online	29
Pan, et al.	2006	Virtual Reality and Mixed Reality for Virtual Learning Environments	13
Moore & Anderson	2007	Handbook of Distance Education	91

Houle (1980), Knowles (1984), and Cervero (1988) were especially useful in establishing a foundational knowledge of continuing professional education (CPE) programs within the United States, and Lester (1995) proposed a new view of

professional education for the 21st century in order to prepare the needs of the Information Age. Nowlen (1988) identified and expounded on three models for CPE: the update, competence, and performance models. Mott (2000) reviewed relevant learning theory as it applies to CPE, including discourse on how adults learn and who should be responsible for providing CPE to working professionals. Insights into effective research within the education domain were provided by Best (1981), and Clark (2001) identified issues affecting virtual education that included funding, technology, curriculum, and assessments. Swan and Shea (2005) refined a theoretical model for virtual online learning communities that involved the concept of computer supported collaborative learning (CSCL) and Pan, Cheok, Yang, Zhu, and Shi (2006) discussed the use of virtual reality to enhance the online learning experience. Finally, Moore and Anderson (2007) as editors assembled a wide range of articles exploring the state of the art in distance education.

Discussion

The collection of research material was last updated July 2009. The remainder of this literature review provides background on the issues motivating this research, followed by a discussion of CSCL research, a brief review of educational technology theories, models, and frameworks. Finally, a conclusion section recaps major elements of this literature review and outlines the rest of this dissertation.

Background

DOD Financial Managers represent a relevant research population because of their role and responsibility in our society. This group, collectively, is responsible for the effective allocation of nearly 50% of the discretionary spending made by Congress each

year. In 1997, the DOD Inspector General stated that there were “continuing pervasive weaknesses in the personnel area, including incomplete or no training, insufficient management oversight, and an inability to respond to a rapidly changing accounting environment,” (GAO, 1998, p. 30). The GAO report went on to recommend that the DOD could improve the professional skills of FM personnel by ensuring critical competencies are addressed, FM personnel receive annual financial management technical training, and a specific curriculum to support needed competencies was developed.

Although improvements have been made, and many good decisions involving billions of dollars of resources are made throughout the DOD, seven years later the GAO continues to challenge the DOD via congressional testimony to transform ineffective business practices and improve poor financial decision-making (Kutz & Hite, 2004). Thus, answers to the questions of what to teach, what affects learner understanding, and how financial management professionals share their knowledge with each other is of vital interest to our economy and national security. The connection between national security and the economy was clearly identified by the Director of National Intelligence, Director Dennis Blair (2009, p. 2) when he noted, “The primary near-term security concern of the United States is the global economic crisis and its geopolitical implications.” The statement, made at the highest levels of the government, emphasizes that the challenging fiscal environment that DOD FM personnel will experience for the near to midterm future will require effective use of many knowledge areas, including acquisition, budgeting, and comptrollership. Acquiring this critical knowledge will require effective FM CPE.

According to information provided by the Office and Personnel Management (OPM), the number of civilians employed by the DOD and the armed services over the last eight years has only increased by one percent as listed in Table 4 (OPM, 2009). However, over the same eight year period, the DOD base budget has grown by over 74% (Whitehouse, 2009) suggesting that the financial responsibilities of DOD FM personnel has also increased dramatically. Additionally, recent news reports indicate that the government may be preparing to hire more personnel to oversee economic stimulus expenditures (Rucker, 2009). Most of those new hires will need extensive initial training, and eventually CPE to remain valuable to their organizations. Regardless of the current state of conflict in Iraq, additional troops and supplies will soon be heading for Afghanistan, resulting in continued expenditures throughout the DOD for the foreseeable future.

Table 4

Comparison of Total Civilian Employment by Branch

Branch	2008 Total	2001 Total	Change
Army	249,057	227,870	21,187
Navy	175,076	182,557	-7,481
Air Force	154,794	154,438	356
DOD	673,654	670,568	3,086

Demographics for individual career fields are difficult to obtain, and one might assume that gender and age distributions for the FM career field are similar to the gender

and age distributions of civilians working throughout DOD (including the armed services), where men outnumber women, as indicated by Table 5. However, that is not the case. Statistics indicate that women make up 65.8% of the Management and Program Analyst workforce and 60.9% of the Contracting workforce (OPM, 2009), a fact corroborated by an analysis of students attending a four-week DOD FM CPE course that found 54.5% of the students were female. This changing workforce demographic is significant because research suggest that gender differences may affect learning outcomes in technology driven environments (Volman & van Eck, 2001).

Table 5

Selected DOD Civilian Demographics as of 2004

Branch	Total	Men	Women	Average Age		Average Years of Service	
				Men	Women	Men	Women
Army	226,111	142,586	83,525	46.9	45.6	15.9	16.2
Navy	177,419	123,906	53,513	47.0	45.9	17.5	17.2
Air Force	149,929	101,369	48,560	45.8	45.4	15.4	16.4
DOD	651,415	413,177	238,238	46.8	45.5	16.4	16.1

For example, in a study of an online learning environment, Barrett and Lally (1999) found differences in male and female communications related to the learning objectives. Specifically, they found that men and women had significantly different social and interactive behavior in a specific learning context that used computer mediated

communications. This finding indicates that gender differences may emerge in CSCL environments.

The average age of federal employees is also changing. The difficult economy and lack of younger workers may enable older workers to remain “on the job” longer than anticipated. Age related factors can affect computer self-efficacy (Reed, Doty, & May, 2005), and may affect the development of DOD FM CPE that uses education technologies that enable distributed learning or virtual class room programs. There may also be an educational technology gap existing in DOD CPE, in that educators have not learned how to use existing ET effectively, much less emerging capabilities (Bohler, Weigel, & Hall, 2009).

The remaining sections of this literature review discuss research of the use of technology in education. Educational technology is advancing so quickly that any particular type of technology discussed (CBT, On Line Learning, Virtual Classrooms, etc.) below may well be superseded before this research is published, however, research relating the use of educational technologies to improve learner performance would still be relevant. Thus, in order to embrace the variety of educational technology identified in Table 2, the remainder of this literature review will use the generic term “computer-supported collaborative learning” (CSCL) for brevity and consistency.

Learning, Education, and Training

The concepts of learning, education, and training overlap and are often interchanged. To establish how these terms will be used in this research, a brief discussion is in order. Learning, Kolb (1973) observed, is a dynamic cycle involving four stages: concrete experience, reflective observation, abstract, and active experimentation.

Drucker (1989) observed that in a knowledge society, all members must learn how to learn. Education and training, in DOD parlance, differ in that education prepares personnel to understand and adapt to complex, dynamic operational environments, while training develops specific skill sets to operate complex systems as discussed in Air Force Doctrine Document 1-1, Appendix C (USAF, 2006). In comparing education to training, four aspects were considered. The first aspect refers to the desired outcome or focus of the education or training. If the desired result (outcome) is for the learner to be able to understand and apply what they have learned to a variable situation (be adaptive) then education is required. If the learner should respond in a specified manner to a standard situation, then training may be more appropriate. The second aspect, value of the education or training correlates with the uncertainty of the situation in which the learner must use the new knowledge. Higher levels of uncertainty make education programs more valuable and training programs less valuable. The third aspect identifies the differing benefit to the learner from the two different programs. An education program provides the learner with critical thinking skills that may be useful over the long term, whereas training provides the learner with specific skills that may not be useful when the task is changed. In a similar fashion, education is the preferred mode when the learner will operate in an unfamiliar or transformative environment, where training may be more effective when the environment is unlikely to change. The final aspect to consider is “Parameters.” If the learner will likely operate within a specific parameters (this aircraft, this engine, this part, this nut, this bolt) then training is recommended. However, if the learner must synthesize solutions to problems that could possibly occur outside of established (or known) parameters, then education is recommended. Table 6 is a

summary of information discussing the difference between education and training contained within Air Force Doctrine Document 1-1.

Table 6

Comparison of Education and Training

Aspect	Education	Training
Outcomes / Focus	Adaptive / Process Oriented	Standardized / Task Oriented
Value	Increases with uncertainty	Decreases with uncertainty
Skills / Benefits	Critical Thinking / Long Term	Task Specific / Short Term
Environment	Unfamiliar, transformative	Restricted to known situation
Parameters	Outside defined parameters	Within specific parameters

Collaborative Learning Compared to Individual Learning

One definition of “collaborative learning” would be “a situation in which two or more people learn or attempt to learn something together” (Dillenbourg, 1999, p. 1). However, critical elements of that definition (group size, learning material, method) may open to misinterpretation. A majority of research on collaborative learning has been on small groups (two to five subjects) collaborating for an hour or so (Dillenbourg, 1999) and may not generalizable to other scenarios. An individual learner would be a student who accesses an educational information system and does not interact with another human (instructor, facilitator, or peer). For the purposes of this chapter, in preparation for research conducted in the next chapter, collaborative learning refers to a small (5 to 20)

group of adult learners collaborating via educational technologies over the course of a five-day continuing education program.

Challenges to the Use of Computer Supported Collaborative Learning

CSCL is growing at over 30% per year (Sun, Tsai, Finger, Chen, & Yeh, 2008), but research linking the use of CSCL to improved learner outcomes has not been definitive. A meta-analysis of 232 studies containing 688 independent achievement, attitude, and retention outcomes indicated effect sizes of essentially zero with wide variability, suggesting that sometimes CSCL works, and sometimes it does not (Bernard et al., 2004). Some research indicates improved technology self-efficacy after using CSCL, but also found decreased learner satisfaction, and non-significant learning outcomes (Piccoli, Ahmad, & Ives, 2001). Research suggests that learner satisfaction in CSCL environments may be affected by interaction with the content, interaction with the instructor, interaction with other students, and interaction with the system (Bouhnik & Marcus, 2006) and identifying methods to measure that interaction are important (Miksa, 2007). A factor affecting CSCL effectiveness may be use of an appropriate synchronous (Hrastinski, 2008) or asynchronous application as warranted by the educational material (Bernard et al., 2004). Factors affecting CSCL learners' continued use of CSCL may include learner computer anxiety, instructor attitude toward CSCL, CSCL flexibility, CSCL quality, perceived usefulness, perceived ease of use, diversity in assessments methods (Sun et al., 2008), and knowledge of CSCL technology (Wei & Zhang, 2008).

Perceived Benefits of Computer Supported Collaborative Learning

The perceived advantages of using CSCL are many, but may require a reengineering of the instructional design process (Kirschner, 2001; Puntambekar,

Stylianou, & Goldstein, 2007). In particular, the ability to visualize processes, learner interactivity with the course material, the ability to provide the learner with almost instant and tailored feedback, collaboration with other learners, and the increased opportunities of assessing learner progress have been identified as advantageous to the learner. Within certain applications, knowledge transfer appears to be higher with CSCL (Kapa, 2007; Rieber, Tzeng, & Tribble, 2004).

Visualization

Visualization, the ability to use instructional animation to illustrate difficult concepts can significantly enhance learning (Höffler & Leutner, 2007; Lowe, 2004; Wouters, Paas, & van Merriënboer, 2008), and helps students achieve deeper and more sustained learning (Jacobson & Archodidou, 2000; Rutar & Mason, 2005). Michael Manore may have said it best, “Visualization enables communication, learning, problem solving, collaboration, and decision making at a higher level of thought” (Manore, 2008). However, the effect of using the other senses to enhance learning in a virtual world is still not well understood (Minogue & Jones, 2006), a opportunity for future research.

Interactivity

Interactivity, visualization, and “hands on experiments” have been shown to improve learner satisfaction (Dori & Belcher, 2005). The important factor seems to be that the learner must have some control over the learning to have any significant level of satisfaction and perceive the program to be effective. Ways that the learner can control learning include the place (work, home, library, learning institution, while traveling, etc.), time (at a time convenient for the learner), or the pace (the learner’s pace rather than other learners, the instructor, etc.) (Kirkup & Jones, 1996; Race, 1994). Interestingly,

interactivity appears to be significant, even if the interactivity is with a video (Zhang, Zhou, Briggs, & Nunamaker, 2006) and the learner can pause, rewind, and review segments of the material as needed.

Feedback

The ability to give learners effective performance feedback also affects learner outcomes (Corbalan, Kester, & van Merriënboer, 2008; Hattie & Timperley, 2007; Roselli & Brophy, 2006; Shute, 2008; Vollmeyer & Rheinberg, 2005). One research effort based on a statistics curriculum determined that the use of feedback “clearly supported learning,” especially for learners with little prior knowledge (Krause, Stark, & Mandl, 2009). A study using college students taking a psychology course reported higher learner outcomes from groups that received peer and tutor feedback, allowing the students to adjust their self-regulating learning style (van den Boom, Paas, & van Merriënboer, 2007).

Collaboration

Learner outcomes is often found to benefit from the use of collaboration enabled by CSCL environments (Alavi, Wheeler, & Valacich, 1995; Benbunan-Fich & Arbaugh, 2006), and cooperative learning seems to enhance perceived performance and perceived competence (Krause et al., 2009), but some research indicates that collaborative work is not always better for learners with higher abilities. Webb, Nemer, and Zuniga (2002) discovered that students with lower abilities generally benefited from group work and by extension CSCL, but not high achieving learners. One possible explanation for this phenomena is that high achievers help improve the learning outcomes for low achievers, but at a cost to their own achievement. Other studies have found that small group work is

positively related to higher learner outcomes, but that those results can be affected by technology related factors (Lou, Abrami, & d'Apollonia, 2001).

Assessment

Applying research on learner assessment (Falchikov & Goldfinch, 2000; Scalise et al., 2007; Topping, 1998) may address achievement issues by identifying learners with differing achievement potentials and designing curricula accordingly. Kommer proposed basic characteristics of rich environments for active learning (REALs) that are “student-centered environments focusing on developing student responsibility, making learning meaningful, promoting over knowledge construction, and learner assessment,” (Kommers, Grabinger, & Dunlap, 1996, p. xi). Just as in traditional courses, learner assessment “should be responsive to the needs and characteristics of the students, the instructor, and the subject matter being studied” (Palloff & Pratt, 2003, p. 93). Properly designed educational courses in a virtual environment can provide more opportunities for learner self-assessment, which could also increase the learner’s perceived control over the learning environment.

Educational Technology Theory, Models, and Frameworks

Part of the problem of CSCL research is trying to find an appropriate theory of learning that explains learner behavior in this different environment. Traditional CPE theories insist that learners need to be “self directed,” and at least one research effort has demonstrated that “self regulated” learners (high levels of “self directed” and “independent learning” behavior) experience better learning outcomes (Santhanam, Sasidharan, & Webster, 2008). However, not all learners exhibit high levels of “self regulation” (Vermetten, Vermunt, & Lodewijks, 2002). Therefore, a theory, model or

framework that can help identify factors of effective CSCL programs would be helpful to researchers and practitioners alike.

Activity Theory

Activity theory is a conceptual framework allowing multiple theoretical perspectives that has been applied widely in educational studies and increasingly in human-computer interaction research (Roth & Lee, 2007; Wilson, 2006). A full explanation of Activity Theory would take many pages, but a summary of several dichotomies that encapsulate the concept of activity theory as identified by Engeström (1999) may suffice. Activity Theory is concerned with the psychic process and goal-directed action rather than object-related activity. Activity Theory focuses on internalization of ideas as opposed to creation and externalization. Finally, Activity Theory is more of a principle of explanation than an object of study. Activity theory has as its key elements “motivations,” “goals,” and the concept of activity as discussed above. Activity Theory also encompasses concepts such as “tools,” “objects,” “outcomes,” “rules,” “community,” and “division of labor.” These elements are applicable to information behavior research, and CSCL research.

Cognitive Load Theory

Cognitive Load Theory (CLT) attempts to identify factors affecting the cognitive load directly relevant to learning (van Merriënboer, Schuurman, de Croock, & Paas, 2002) by recognizing that learning is limited by human processing capacity (Amadiou, van Gog, Paas, Tricot, & Mariné, 2009), and provides guidelines for maximizing knowledge transfer. Technology may be advancing at an exponential rate, but learners are still Human Version 1.0. It is possible to overwhelm learners with too much content

(Palloff & Pratt, 2003), and too many choices; this condition could actually prevent them from learning (Bodemer, Ploetzner, Feuerlein, & Spada, 2004). However, CLT does show promise in explaining some variation of learner outcomes when examining cognitive issues (Rourke & Sweller, 2009).

Problem Based Learning

Problem-based learning (PBL) attempts to present problems to learners as unresolved, ill structured problems as a professional would encounter them; this is an ideal method for CPE (Barrows, 2002; Closson, 2008). In PBL, learners are responsible for their own learning, which is enabled by CSCL (van Aalst & Chan, 2007), but the teacher/instructor has to be engaged with the learner, which can be problematic when there are large transactional distances (Barrows, 2002; Lemak, Reed, Montgomery, & Shung Jae, 2005). Research on PBL has delivered mostly positive results. A meta-analysis of PBL research suggests that learners in courses using PBL gained slightly less knowledge, although they remember more of the knowledge acquired over a period of five years covered by the research (Dochy, Segers, Van den Bossche, & Gijbels, 2003).

Social Development Theory

Vygotsky's Social Development Theory (SDT) has three components: The role of social interaction, the More Knowledgeable Other (MKO), and the Zone of Proximal Development (ZPD). Learners proceed through a "spiral" of knowledge building on previous knowledge by "scaffolding" and extending their understanding. Vygotsky believed that social interaction and social learning lead to cognitive development (Riddle, 1999). This theory has found new application within education technology enabled environments, in that group learning effectiveness in asynchronous distributed learning

groups is dependent on the level of social interaction (Kreijns, Kirschner, Jochems, & Van Buuren, 2004).

Other Learning Theories Relevant to CSCL

The Virtual Learning Environment (VLE) framework offers a method for evaluating CSCL program effectiveness (Piccoli et al., 2001) and the Technology Acceptance Model (TAM) may explain cognitive absorption issues as they relate to the use of CSCL (Saadé & Bahli, 2005; Teo, 2009). A relatively new concept, fuzzy-logic based modeling of professional education, suggests that professional learning is influenced by climate and planning, measured by mutual respect, collaboration, mutual trust, supportiveness, and openness (Gravani, Hadjileontiadou, Nikolaidou, & Hadjileontiadis, 2007). Finally, the designs, functions, and tasks (DeFT) framework identifies a broad range of factors that influence learning: design parameters, functions that support learning, and cognitive interactive learner tasks (Ainsworth, 2006).

Action Research

With the lack of a unifying theory or definitive frameworks to address the many facets of CSCL CPE, perhaps the best way to proceed is to use action research. Action research is a method whereby academic researchers and professional CPE instructors collaborate (Hertzum, 2008) to inquire into the real-life problems associated with the development and delivery of CSCL enabled CPE and formulate solutions based on theory and practice (Ziegler, 2001). In addition, action research would facilitate sharing the lessons learned about program implementation. This sharing amongst researchers and professional associations would help improve the effectiveness of other DOD CPE

programs, leveraging the investment of time, people, and money (Alavi & Gallupe, 2003; Janosik, Carpenter, & Creamer, 2006).

Continuing Professional Education Issues

For adults pursuing FM continual professional education through CSCL, other technological and non-technological issues may be a primary concern. For example, privacy (Buchanan, Paine, Joinson, & Reips, 2007), accessibility (Jaeger, 2006), management philosophy differences (Monaghan & Cervero, 2006), culture and diversity (Hewling, 2005), and feedback and assessments (Halttunen & Järvelin, 2005) that students need to enhance learning (Gulikers, Kester, Kirschner, & Bastiaens, 2008).

Technological CPE Issues

Acquiring CPE directly affects the career potential of DOD FM personnel. If there are problems in the program, there is a risk that certain segments of the population could be unfairly penalized for not being able to effectively use CSCL CPE. Thus, lack of technology efficacy and negative emotions associated with IT use may unduly impact career potential (Järvenoja & Järvelä, 2005). Current professionals in mid-career may also have information credibility issues from knowledge acquired in using CSCL (Murphy, Long, Holleran, & Esterly, 2003). The knowledge gained must be relevant to their work (Jonassen, Strobel, & Chwee Beng, 2006). Because the focus of CPE is to build on several critical knowledge areas (reflective and critical thinking, academic and statistical literacy, collaboration and interaction), research on whether CSCL should be used as the only approach, or as an addition to traditional CPE learning environments has not been conducted (Muukkonen, Lakkala, & Hakkarainen, 2005).

CPE Non-Technological Issues

Finally, the professional social network that is created in traditional learning environments is important to the careers of working professionals. Research concerning whether virtual social networks (LinkedIn, MySpace, etc.) can fill this void as CSCL displaces in-residence training has not been accomplished (Bielaczyc, 2006) and virtual social networks may actually shift “social power” to those with higher levels of CSCL efficacy (Ryymin, Palonen, & Hakkarainen, 2008).

With these technological and non-technological concerns in mind, the future expectation is that there will be a more integrated CSCL CPE environment that continues to evolve (Karen, Ciara, & Eoin, 2005). This new environment will emphasize teamwork, collaboration, and corporatization of the CPE effort (Cervero, 1988, 2001). To conclude this literature review, two important final issues still need review: who is teaching the teachers, and how do we know what works?

Educating the Educators

Very few DOD FM instructors are prepared to use ET to provide CSCL programs (Bohler et al., 2009) and there are few definitive sources of guidance (Tallent-Runnels et al., 2006). Before effective CSCL programs can be constructed, today’s CPE providers need to know how to produce effective educational technology based programs (Wolf-Wendel, Baker, Twombly, Tollefson, & Mahlios, 2006). Existing research provides a framework for teaching with the Internet, and by extension CSCL. That framework addresses the boundaries, authority, stability, pedagogical context, and disciplinary context of the technological resources (Wallace, 2004). Training instructors will take time and resources (Haydn & Barton, 2008), but without effective instructor training, there is a risk of

inferior course development and delivery. This prospect has negative consequences for professionals seeking CPE, and is a challenge shared at all levels of education (Lawless & Pellegrino, 2007).

Program Effectiveness

Measuring CSCL learner outcomes, and by extension, program value, is itself poorly understood (Beers, Boshuizen, Kirschner, & Gijsselaers, 2007). Program directors need effective models to measure program value in order to understand what works for their learners and where to best allocate precious resources. Implications of effectiveness results could affect how CSCL is deployed throughout the DOD, either strategically with strong central control, or decentralized with organizations adopting divergent emerging technologies that learners appropriate as they see fit (Conole, de Laat, Dillon, & Darby, 2008; Hamner & Al-Qahtani, 2009; Tseng, Yen, Hung, & Wang, 2008). Research suggests that the use of neural networks may help predict student success in the CSCL environment, allowing program directors to improve the course as needed (Lykourentzou, Giannoukos, Mpardis, Nikolopoulos, & Loumos, 2009). Content analysis of learner collaboration can provide insight into knowledge transfer effectiveness and new knowledge construction (De Wever, Van Keer, Schellens, & Valcke, 2007). Using similar concepts as those outlined above, a model of program value and program effectiveness may be constructed.

Conclusion

In this review of educational technology literature, several themes were identified, including the perceived benefits of CSCL, ET theories, models, and frameworks, and

implementation issues. Some of the perceived benefits of CSCL include the ability to visually animate objects to enhance learning, interactivity with the learner, the improved ability to provide feedback to the learner, improved collaboration tools, and the opportunity of assessing the learner throughout the program to tailor the educational program to the learner's needs.

The literature reviewed for this study focused on research that provided classic and emerging theories and concepts that provide a basis for understanding how emerging educational technologies may affect the development and delivery of continuing professional education. With such a wide and deep body of knowledge, this review cannot possibly cover all aspects of this promising research stream in a few pages, and may not be a complete review of all relevant literature. Given that limitation, Table 7 is provided as a summary of the literature reviewed in this chapter for this research.

Table 7

Literature Review Summary

Concept	Summary
Learners	All members of a knowledge society must learn how to learn (Drucker).
Learning	Concrete experience, reflective observation, abstract and active experimentation (Kolb).
CSCL	<p><u>Computer Supported Collaborative Learning Benefits:</u></p> <ul style="list-style-type: none"> • Visualization – Animate processes and abstract concepts • Interactivity – Provides learner control of learning environment • Feedback – Providing learner with more feedback increases learning • Collaboration – Acquiring knowledge in collaboration with others allows elaboration of new knowledge and enhanced understanding • Assessment – Innovative use of assessments using ET can support learner, instructor, and organizational goals • Retention – Learners have better recall of knowledge over time <p><u>Computer Supported Collaborative Learning Concerns:</u></p> <ul style="list-style-type: none"> • Quantity of knowledge transfer • Educator technical ability to implement effective CSCL environments • Application of appropriate learning theories in the CSCL environment: <ul style="list-style-type: none"> ○ Activity Theory: Motivation, goals, activity, tools, objects, outcomes, rules, communities, and division of labor ○ Cognitive Load Theory: Humans have limited processing capacity ○ Problem Based Learning: Real life problems ○ Social Development Theory: Social interaction, MKO, ZPD

Several ET theories, models, and frameworks were identified including Activity Theory, Cognitive Load Theory, Problem Based Learning, Social Development Theory, the Virtual Learning Environment framework, adaptations of the Technology Acceptance Model, fuzzy-logic based modeling and the designs, functions, and tasks (DeFT) framework. Finally, using the concept of Action Research was identified as a valid

method to use in this interdisciplinary investigation. Implementation of ET into CPE has both technical and non-technical concerns for learners and education providers that may challenge the status quo. Finally, questions still exist about how best to train CPE providers to effectively use ET, and how best to evaluate program effectiveness.

Limitations of this CSCL research review include the observation that few of the studies have focused on adult or continuing education learners and that increasingly, educational technology research is being published in languages other than English, not easily accessed by this researcher. It is critical to understand how educational technology may be managed to produce effective CPE for DOD FM personnel for improving critical knowledge areas and skills (Daley, 2002; Smith, 2003). For example, improving critical thinking skills is difficult in traditional learning environments (Abrami et al., 2008). What types of instruction most effectively transfer critical knowledge in evolving CSCL environments? Regardless, it is important to remember that today's teenagers will be tomorrow's working adults and they are already learning in a CSCL environment (Cilesiz, 2009). Further, today's professionals are turning to CSCL CPE to meet their needs (Alexander, 2008). The challenge then is to improve the integration of learning and educational technologies into existing CPE programs. Without using valid educational practices, the full potential of emerging ETs will go unrealized (Slavin & Lake, 2008), emphasizing the idea that the teaching process is still important, regardless of the delivery method (Seidel & Shavelson, 2007). Without a focus on objective outcomes for organizations and the learners, resources will be wasted. Without good curriculum design, even the benefits of virtual classrooms (Bailenson et al., 2008) will only provide opportunities for more people to receive bad instruction, more quickly.

The literature review for Chapter 3 will discuss existing research relating to case studies and content analysis to understand the context for determining what knowledge areas are important to DOD FM professionals. Chapter 4 introduces literature relating to various learning theories relevant to CSCL. Understanding how adult professionals learn is a key element of developing a model of learner understanding. For example, Fisher and Ford (1998) observed that college educated employees may have fixated on rehearsal (forced learning, repetitious procedure) as the default learning strategy based on their experiences, leading to suboptimum knowledge transfer. Finally, Chapter 5 will review professional networking research and postulate on how educational technologies may alter how DOD FM personnel establish and nurture social networks. Chapter 6 summarizes findings and concludes this collection of research.

CHAPTER III. AN INVESTIGATION OF CONTINUING PROFESSIONAL
EDUCATION KNOWLEDGE AREAS FOR DEPARTMENT OF DEFENSE
FINANCIAL MANAGEMENT PERSONNEL

Abstract

The Department of Defense (DOD) financial management (FM) career field is a challenging profession requiring extensive knowledge in many domains. To refresh and expand on the knowledge needed to be effective, DOD FM personnel receive continuing professional education (CPE) from various sources. This exploratory study uses qualitative research to identify critical knowledge areas as identified by service oriented financial manager career planning documents. The primary goal of this chapter is to produce a consolidated list of recommended professional knowledge areas for a workforce undergoing tremendous change. Using the results of this research, DOD CPE program directors may be able to identify existing gaps in current FM CPE curricula.

Introduction

Drucker (1989, p. 233) observed that “Engineers ten years out of school are already ‘obsolescent’ [*sic*] if they have not refreshed their knowledge again and again.” He extrapolated that observation to other professions, including physicians, lawyers, teachers, and pertinent to this research — managers. He concludes by stating that the “knowledge society is a society of continuing learning and second careers.” Based on recent research, a ten year period before obsolescence may be optimistic (De Grip, 2006; Mays & Lumsden, 1989). In a study of industries in the Netherlands, De Grip (2006) found that workers employed with banking and insurance organizations scored highest on technological and organizational change indicators, indicating that they had the highest need for continuing professional education (CPE). The CPE landscape is also transforming. Commercial providers of CPE are negotiating changing government regulation, changing demographics, increased demand for distributed learning technologies, and economic uncertainty (Jeris & Conway, 2003). These issues also challenge government CPE providers, and provide the motivation for this research.

A qualitative research scheme, as suggested by Creswell (1994), was used to investigate this issue. The first section of this chapter will provide a statement of the problem, followed by a descriptive purpose for conducting this inquiry in light of the entire research effort. Next, a discussion of the major questions requiring a qualitative review of career planning documents, governmental and commercial providers of CPE, and other various texts ensues, followed by a review of limitations affecting the validity of the results. The final section of the first half of this chapter will explain the significance of this research.

Statement of the Problem

Throughout the federal government, 42% of workers possess a college degree (Damp, 2008). Even though three years of general experience may be substituted in many fields for formal education at the entry level, formal education and/or experience is needed to ensure career progression. In addition to education and experience, professional certifications like Certified Defense Financial Manager (CDFM) and Certified Public Accountant (CPA) enhance promotion potential. To acquire and retain these certifications, professionals must regularly obtain CPE credits (usually 80 CPE units every two years). Many CPE providers seek to have their programs registered with the National Association of State Boards of Accountancy (NASBA) that certifies CPE courses meet nationally recognized academic standards. This combination of required formal education, documented experience, and professional certifications highlight the importance of effective CPE (or lifelong learning) programs for government professionals. See Table 8 for education and experience requirements by grade which summarizes information found in *The Book of U.S. Government Jobs* (Damp, 2008, p. 40). General Schedule pay scale has 15 levels for civilian white-collar and service workers. The General Experience listed in column three of Table 8 refers to the demonstrated ability to analyze problems, plan and organize, and communicate. Above GS-15 is the Senior Executive Service (SES) level with a different set of requirements and outside the scope of this research.

Table 8

Federal Government Education / Experience Requirements

Grade	Education	General Experience	Special Experience
GS-5	B.S./B.A.	3 yrs, 1 yr @ GS-4	None
GS-7	2 yrs graduate level	None	1 yr at GS-5
GS-9	M.S./M.A. or equivalent	None	1 yr at GS-7
GS-11	Ph.D. or equivalent	None	1 yr at GS-9
GS-12	None	None	1 yr at grade level

In the commercial world, customer demand may guide the supply of CPE. Free market providers of CPE that do not respond to market demand will soon see market share and revenue decrease. However, DOD CPE providers may not have direct market signals to allow them to effectively respond to changing customer needs, as organizational resources are allocated rather than earned as revenue from paying customers. Because of their non-profit nature, the answers to the question of what to teach, how to teach it, and how many resources to use may be different from the free market. The question is “What critical knowledge areas should be included within relevant DOD FM CPE programs?”

Purpose of the Study

There are many organizations, both private and governmental, providing CPE to DOD FM personnel. The purpose of this study is to identify knowledge areas identified by the Army, Navy, Air Force, Defense Finance and Accounting Service (DFAS)

financial manager (FM) career planning documents, and other related materials, so that organizations providing FM CPE can address possible redundancies and gaps in knowledge areas covered by their curricula. The term knowledge area conveys the concept of the knowledge, skills, and abilities documented as important for personnel to acquire to perform expected duties. Further, it is the effective demonstration of these knowledge areas that provides the basis for career promotion.

It is important to emphasize that learners attending various forms of governmental supplied CPE have varied educational backgrounds, different CPE needs, and varied opportunities to acquire needed knowledge. DOD FM CPE providers are not the only venue for FM personnel to pursue CPE, but the primary mission of these organizations is to provide relevant, effective CPE programs for DOD FM personnel. Thus, while DOD CPE programs directors are the primary audience for this study, any educator interested in improving CPE programs may find this research useful.

Major Questions to Be Answered

In a resource scarce world, on which knowledge areas should a DOD CPE curriculum focus? Regardless of delivery method, resource scarcity will limit choices. There is a scarcity of learner time to acquire the new knowledge, a scarcity of instructor time to provide the new knowledge, and scarcity of monetary resources to provide for bringing the learner, instructor, and curriculum together. Because there is scarcity, it is simply not feasible to teach everything, all of the time. Thus, there must be a prioritized exposure to knowledge. In other words, new knowledge acquisition should happen before the need exist. This line of reasoning poses a secondary question with two parts: 1) what

knowledge is needed, and 2) at what point in an individual's career is it needed? Answers to these questions will enable CPE providers to optimize their curriculums to meet the evolving needs of learner populations as educational technologies continue to evolve and affect the learning environment.

Definitions

According to the Oxford English Dictionary (OED) 3rd edition, page 358, the term "comptroller" is actually an erroneous misspelling of the word "controller" that occurred circa 1500. However, the term "comptroller" is used throughout the DOD. A "controller" is "a person who supervises accounting and financial reporting within an organization." Thus, someone in a comptroller billet (the term "billet" is DOD parlance for a personnel position or assignment) is responsible for the financial and accounting activities for that organization. The focus of this research is on DOD FM personnel who are at, or who are approaching, the level of "comptroller" within their respective organizations. While the term "comptroller" is usually reserved for a command's senior financial manager, the services use other duty titles to identify equivalent positions. For example, other United States Air Force position titles include Financial Management Director, Senior Budget Analyst, and Senior Cost Analyst. Other United States Army titles equivalent to comptroller include Director of Resource Management, or Resource Management Division Chief. United States Marine Corps equivalent billet titles include Comptroller, Budget Officer, and Accounting Officer. The United States Navy also uses the title Comptroller, but also uses a plethora of other titles that denote the responsibilities of senior Supply Officer billets. Defining the term "professional" is problematic. In fact,

entire chapters of books dedicated to professional education concern themselves with the definition of professional. For the purposes of this study, we will define a professional as someone who must not only understand a large body of knowledge, but they must also know how to apply that knowledge effectively to real world problems to make their living (Cervero, 1988; Freidson, 1986). Using this definition of professional, we can extend the investigation of professional education to the financial management knowledge area (career), using the term “continuing professional education” (CPE) for consistency.

Becher (1994) argues that professionals are members of knowledge based groups, and that this knowledge is a mixture of theoretical knowledge and skill. Recognizing the competitive advantage of intellectual capital and knowledge-based assets requires organizations to strengthen relationships and ensure collaboration among all stakeholders (Hall & Paradice, 2005). Wolpers and Grohmann (2005) made the connection between an organization’s intent to acquire knowledge and the education of employees. The image of a professional (e.g. doctor, lawyer, and accountant) supports this perspective.

A list of the knowledge areas identified by Boyatiz, Cowen, and Kolb (1994) is provided in Table 9, and a list of CPE Fields of Study identified on the National Association of State Boards of Accountancy (NASBA) website as possibly relevant to the continuing education of professional financial managers is provided in Table 10. These two sources provided the initial constructs used for a establishing a common lists of knowledge areas that were evaluated by the advisory board to a federal program providing CPE to DOD FM professionals.

Table 9

Examples of Continuing Professional Education Knowledge Areas

Accounting	Marketing	Social Objectivity	Efficiency Orientation
Banking	Ops Research	Decision Support	Intellectual Value
Budget	Planning	Attention to Detail	Economic Value
Finance	Speaking	Systems Thinking	Professionalism
Flexibility	Empathy	Developing teams	Use of Concepts
HR Policy	IT Innovation	Managing Diversity	Quantitative Analysis
Human Value	Writing	Ops Management	Emotional Intelligence
Networking	Negotiating	Self-Confidence	Group Management
Policy	Economics	Comptrollership	Developing Others
Self-Control	Initiative	Persuasiveness	Pattern Recognition
Statistics	Org Behavior	Theory Building	Use of Technology

Table 10

NASBA CPE Fields of Study

Accounting	Marketing
Accounting (Governmental)	Behavioral Ethics
Auditing	Communications
Auditing (Governmental)	Personal Development
Administrative Practice	Personnel/HR
Finance	Computer Science
Social Environment of Business	Economics
Business Law	Mathematics
Business Management & Organization	Production
Specialized Knowledge and Applications	Statistics
Management Advisory Services	Taxes
Regulatory Ethics	

Limitations and Delimitations

Critical DOD FM knowledge areas continue to evolve. Business transformation, reorganizations, and advances in information technology continue to challenge personnel in supporting roles across the DOD. While this study used the most current version of career planning documents available for public release, newer versions may be under review. Regardless, this research provides additional perspective for DOD FM CPE curriculum improvement.

Another limitation of this study involves the possible subjective analysis of the collected data. A single rater (the researcher) identified and interpreted the career planning and CPE related documents, rather than using two or more research assistants. This method was chosen because of the wide variety of documents reviewed, and the manner of analysis. Agreement on meaning was not as important as identifying concepts associated with the specific knowledge areas, which required extensive experience with the subject matter. While it is possible that the researcher's bias will have influenced the analysis, an effort was made to remain objective throughout the document evaluation process.

An obvious delimitation to discuss is the narrow scope of this review. The decision to focus only on financial managers within the Department of Defense was made to identify critical knowledge areas specific to the profession. Expansion of the scope may have added additional "noise" to the research, disguising relevant results.

Significance of the Study

There are several approaches to curriculum design, including Performance Based Training (PBT), Criterion Referenced Instruction (CRI) and Instructional System Design (ISD). PBT is more of training methodology, focusing on proficiency in essential job tasks. CRI emphasizes learner initiative by providing self-paced learning modules that are tied to specific learning objectives. ISD encompasses many aspects of cognitive processes and learner behavior to develop a systematic plan for moving the student to a desired educational end state. Regardless of the method used, common elements that must be considered include understanding the knowledge, skills, or abilities needed; the

sequence of lessons; a method to efficiently track required changes to the curriculum; and evaluation mechanisms. This study attempts to identify CPE knowledge areas that may be beneficial to career DOD FM personnel, and thus may prove beneficial to organizations reviewing/renewing program offerings. In addition, information from this investigation establishes a foundation for an instrument to survey DOD FM professionals to quantify answers to what knowledge areas needed for CPE, what is the best time in an individual's career to receive that education, and what is the preferred educational delivery method.

This research incorporates the concept of action research, partially defined as "... seeking to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities" (Reason & Bradbury, 2007). The practical significance of this research is that FM personnel will be able to acquire needed professional education more effectively, resulting in better resource allocation decisions across DOD. Finally, this research extends the practice of action research into a new field, that of DOD FM CPE.

Procedure

As this research effort is exploratory in nature, and the boundaries of the investigation unidentified, a qualitative approach is reasonable. The next few sections discuss the rationale for performing a qualitative study, the role of the researcher, and data collection and analysis. Future research can take the foundation established by this

foundation and verify models and frameworks identified in this phase of the inquiry into DOD FM CPE.

Rationale for Using Qualitative Research

Unfortunately, there is not much research available focused on the specific CPE needs of FM professionals. Using the terms listed in Table 11 for an initial search of the Professional Development Database, and limiting the results to articles that were published in scholarly (peer reviewed) journals that also had the full text available resulted in a list of 158 articles published between 1994 and 2009 in 48 different journals. However only five of the 158 articles (3%) identified in this manner were relevant to the continuing professional education needs of financial managers. Four percent of the articles addressed health related CPE, and 46% of the articles addressed research relating to the educational needs of college students. Research on higher education may be partially applicable to working adults, but Berryman, et al. (1987) questions the link between school education and practice, stating “research literature relating to issues of education, training, and employment does not support assumptions of positive correlations between educational processes and objectives” (Hoberman & Mailick, 1994). Therefore, to address a small part of the FM CPE research gap, the scope of this research will focus on the DOD Financial Manager career field by using qualitative research, using an educational development point of view.

Table 11

Professional Development Database Search Terms

Initial Search Terms

Continuing Professional Education

Financial Management

Education

CPE

Financial

Education Curricula

Researcher's Role

Qualitative research is interpretive research; thus it is useful to state the researcher's experience with the subject matter (Creswell, 1994). By understanding the relationship between the researcher and the research, the biases, values, and judgments that will invariably be interwoven into the interpretation can be better evaluated.

The researcher for this effort served initially as an instructor, and ultimately as the deputy director at one of the governmental CPE providers. In this role, the researcher was responsible for development, delivery, and evaluation of the CPE curriculum. Before arriving at the CPE-providing organization, the prior experience of the researcher was with another service, in an operational capacity. By being an "outsider" to the world of career FM personnel, the researcher was able to provide an objective analysis of the processes and procedures used within the organization to develop relevant educational material. In addition, the researcher was completing studies in Management Information

Systems, with an emphasis on Knowledge Management and Decision Making. Thus, the operational versus support and academic versus practitioner “lens” through which the researcher observed the organization may have influenced the subjective evaluation of phenomena observed throughout the research effort.

Data Collection Procedures

The data collection protocol for this research was straightforward. Points of contact in the various organizations’ Financial Management career field provided Internet links to web pages containing career planning information. These pages had links to other portable document format (PDF) or Word™ documents. This research did not use any classified or privileged material. The documents were reviewed for content and for additional leads (references to regulations, guidance, or planning documents) and other locations (websites, online publication repositories, etc.) where additional information could be found. This process was repeated until equivalent foundational documents, outlining FM personnel career planning for the Army, Navy, Marine Corps, Air Force and Defense Financial Accounting Service (DFAS), were located.

The primary source of data used for this analysis phase of this research consists of the career planning documents used by members of the armed services and DFAS to communicate to their respective FM personnel expectations concerning knowledge, skills, and abilities needed to ensure career progression. The documents collected for this research are available for inspection upon request.

Data Analysis Procedures

The data collection produced many unique documents; the sheer size of some text would have made manual searching for relevant information laborious. Fortunately, a

majority of the documents were digital, allowing automated textual searches on relevant terms (professional development, professional education, financial management, continuous learning, etc.) that help focused the data analysis to pertinent portions of each text. As the review primarily consisted of identification of keywords, matching of concepts to programs, and a great deal of subjective evaluation, rater reliability with multiple researchers would have been difficult to establish, thus other methods were used to develop a measure of reliability of the results, which will be discussed in next section.

Methods for Verification

Using the separate career planning documents as separate cases allowed the use of case study research methods. Case study research allows researchers to understand complex social phenomena, as well as the organizational and managerial processes involved (Yin, 2003). However, to ensure that the research is valid, it must have construct validity, internal validity, external validity, and reliability (Yin, 2003).

Carmines and Zeller (1979) state that construct validation is comprised of three steps: specify the theoretical relationship between the concepts, examine the empirical relationship between the measures of the concepts, and interpret the empirical evidence in terms of how it clarifies the construct validity of the related measure. To meet the criteria of construct validity, it is hypothesized that the more relevant the financial management curriculum the greater the number of value added subject areas contained within the curriculum.

The next step is to examine the empirical relationships between the knowledge areas, skills, and abilities that may correlate to a relevant financial management curriculum. In a study of Operations Management and Information Systems Curricula,

Silva and McFadden (2005) listed topics that alumni perceived as important for future career success (Cronbach's alpha = 0.861) in order of highest importance (Problem solving skills) to lowest importance (Global awareness) which is reproduced in part in Table 12.

Table 12

Important General Business Skills

Business Skills ¹	Importance
Problem solving skills	94.50
Verbal communication skills	92.50
Listening skills	90.00
Time management skills	88.25
Organizational skills	86.50
Written Communication skills	84.50
Leadership skills	84.25
Handling ambiguous situations	84.00
Team-building skills	83.75
Cross-functional perspective	83.00
Managing projects	82.25
Working independently	81.25
Negotiation/conflict resolution	74.50
Follows structured format	72.75
Appreciating diversity	72.00
Global awareness	66.50

Note 1. Excerpt from Silva and McFadden, 2005, p. 315, Table 5

Next, a consolidated list of the items identified in Table 9 and Table 10 were submitted to a government organized FM CPE school advisory board, a group of five senior DOD FM executives representing each of the services (Army, Navy, Air Force), the Defense Financial Accounting Services, and the DOD Comptroller's Office. This group reviewed the list of collected constructs and indicated a degree of concurrence (7 = strongly agree to 1 = strongly disagree) on the list of knowledge areas as relevant to DOD FM CPE mid career professional education. Using a macro written by Andrew Hayes for SPSS™ to determine Krippendorff's alpha for inter-rater reliability of the advisory board's survey results produced an insignificant (Krippendorff's alpha = 0.17) agreement (Hayes, 2005; Krippendorff, 2004). However, the means for the measures are still an indication of the relative value that the Advisory Board placed on the respective knowledge area. In addition, based on the Advisory Board's feedback, several topics were added (internal controls, auditing for management, collaboration, performance management, portfolio management, and joint operations) to the list of topics areas to review. A list of knowledge areas, in order of highest mean to lowest mean and the related standard deviation, is provided in Table 13. These two sources provided empirical evidence that those who should know (alumni assessing the value of a curriculum and senior members providing advice to a CPE program provider) identified a similar set of knowledge areas that they perceived as part of a relevant business curriculum. A consolidated list of some of the knowledge areas that appear on both Table 12 and Table 13 with their averaged score (out of 100) is provided in Table 14 for review. The list of value added knowledge areas that was considered by the advisory board is more inclusive

of applicable knowledge areas that may be relevant to personnel attending a DOD FM CPE program.

Table 13

Federal CPE Program Advisory Board FM CPE Knowledge Area Value Assessment

Concept	Mean	Std Dev
Negotiating	6.40	0.55
Comptrollership	6.40	0.89
Oral Communications	6.20	0.84
Written Communications	6.20	0.84
Planning	6.00	0.71
Networking	6.00	1.00
Decision Support	6.00	1.41
Developing as a team leader/member	6.00	1.41
Group Management	5.80	0.84
Use of Concepts	5.80	0.45
Budget	5.80	0.45
Identifying Economic Value	5.80	0.84
Systems Thinking	5.60	1.14
Developing Policy	5.60	0.55
Stimulating Professionalism	5.60	1.52
Flexibility	5.40	1.14
Quantitative Analysis	5.40	1.52
Accounting	5.40	0.89
Operations Research	5.40	0.89
Using Managerial Statistics	5.40	0.55
Persuasiveness	5.20	1.30

(table continues)

Table 13 (continued)

Concept	Mean	Std Dev
Economics	5.20	0.84
Using Information Technology Innovatively	5.20	1.30
Attention to Detail	5.00	0.71
Use of Information Technology	5.00	0.71
Understanding Human Value	5.00	1.00
Developing Others	4.80	0.84
Pattern Recognition	4.80	0.84
Banking and Finance	4.80	1.10
Understanding Human Resource Policy	4.80	1.10
Managing Diversity	4.80	0.84
Operations Management	4.60	0.55
Initiative	4.40	0.89
Empathy	4.40	0.89
Self-Confidence	4.40	1.52
Theory Building	4.40	0.55
Organizational Behavior	4.40	1.34
Marketing	4.20	1.30
Determining Intellectual Value	4.20	1.30
Social Objectivity	4.00	1.58
Overall	5.25	0.97

Table 14

Consolidated List of Relevant Knowledge Areas

Relevant Knowledge Area	Average Score
Problem solving skills / decision support skills	92.96
Oral communication skills / verbal and listening skills	90.36
Planning / time management and organization	86.82
Written communication skills	86.54
Team leader / member skills	84.57
Negotiation / conflict resolution	82.96
Flexibility / handling ambiguous situations	80.57
Follows structured format / attention to detail	72.09
Working independently / initiative	72.05
Managing / appreciating diversity	70.29

Clearly, there is empirical evidence that the selected knowledge areas are indicative of a relevant financial management curriculum construct, and by extension a relevant continuing professional education program. The final step to achieve a level of construct validity is to interpret the empirical data as it relates to the construct. In this case, the relative level of agreement between the two lists developed from different perspectives would support an argument that a select group of knowledge areas may suffice to form the core of a relevant CPE program. Based on the research detailed above, essential knowledge areas should include decision-making, communicating, leadership, and the skills to negotiate and resolve conflict. Additional topics that are more oriented to

the particular profession (i.e., comptrollership, budgeting, and accounting in the case of FM CPE) increase the perceived relevance. Having satisfied the criterion for construct validity, we next examine internal validity.

To address the internal validity of the results, an analysis of the results of an end of course (EOC) survey for three sets of students ($N = 83$) that attended an extended financial manager CPE program in fiscal year 2009 was conducted. Students indicated strong agreement ($M = 1.36$, $SD = 0.62$) when asked to rate the statement, “The course content was current and pertinent to financial management and comptrollership” on a five point Likert scale (anchored at 1 = Strongly Agree and 5 = Strongly Disagree). This extended financial manager CPE program curriculum contains many of the knowledge areas that discussed in this chapter. However, confounding variables (instructor personality or professionalism, student motivation or student prior knowledge, for example) cannot be completely ruled out. Thus, in collecting the source documents to review for this chapter, data analysis and interpretation results were discussed with DOD FM CPE instructors representing the three services and one agency that provide learners to similar CPE programs. Their understanding of the knowledge areas identified in this researched proved relevant as they were able to explain the context of financial management specific knowledge areas, and suggest other possible sources of relevant documents to aid interpretation. This research attempts to maximize internal validity by minimizing inferences regarding the connections between the FM career planning documents used for this study and the measures under study. Where an inference is made, it will be clearly noted so that readers are aware of possible bias of the author. When

applicable, multiple explanations are provided and evaluated objectively to resolve ambiguity.

Admittedly, generalizability of the results of this research is limited and is a weakness of this study, but within the community of DOD FM personnel, external validity of this particular inquiry should be substantial. The culture and duties of DOD FM professionals is markedly different from professionals in the commercial world. To provide but one example, DOD civilian FM professionals are currently deploying to hostile environments in order to manage the disbursement of funds used for peace keeping and rebuilding in Iraq. These duties expose them to potentially lethal environments daily. Thus, it is hard to export any findings of this research directly to the needs of FM personnel outside of DOD. However, given that limitation, many of the knowledge areas, skills, and abilities needed for FM CPE within DOD are similar to those found outside DOD. Outside of this rather distinctive group, this study will have only limited generalizability. The input assumptions and the singular focus of the data collection regulated the results to marginal utility to other forms of CPE. Indeed, the medical or legal community would have little need for many of the themes found in this research, but given the limitation mentioned above, non-governmental accountants, auditors, and financial managers would recognize and agree with many of the findings found through this research.

Finally, reliability is the extent to which a measuring procedure produces identical results on repeated trials (Carmines & Zeller, 1979). By collecting relevant passages into sections identified by the established constructs, the data was categorized and recorded simultaneously during the search effort. Some passages fit into more than one category,

but each document was reviewed for any substantive information that could help identify critical subject matter for FM professionals.

The purposeful data collection method describe should enable other researchers to replicate the data collection and data analysis methods. Interpretation of the results will of course result in subjective differences, but as the collection matrix required little more than key word recognition for classification, this variance should also be minimal. Thus, the reliability of the study should be robust in terms of qualitative research.

Results

The following sections outline the findings from a qualitative review of the DOD FM career planning documents. One objective of qualitative research is to make sense of multiple realities (Creswell, 1994) that can provide a narrative for the reader and help them understand the context and meaning of the research. The next section begins with a discussion of the analysis, followed by a conclusion and recommendations for FM CPE providers and future research.

Discussion

Mark Twain, in *A Connecticut Yankee in King Arthur's Court*, paraphrases an applicable proverb when he wrote "...she was wise, subtle, and knew more than one way to skin a cat", meaning there is more than one way to get what one wants. Reviewing the career planning literature provided an interesting glimpse of the "organizational personalities" of each of the armed services and agencies. Each organization chose to meet a common need, to develop a professional financial management workforce, in dissimilar ways. Some services' career planning documents provided detailed

information; other documents lacked depth but were broader in scope. Some plans were more direct in nature, while some were more suggestive. The difficulty comes in trying to weave the many facets of CPE evident in these documents into a single construct that is informative, focused, and leads to practical transfer of actionable knowledge, without overwhelming the reader with detail, yet retaining some of the essence of the original documents. With these cautions in mind, and recalling the role of the reviewer to interpret qualitative research, we begin.

The first impression from reviewing the documents is that each of the services approaches the FM task from a different perspective. The rank of the personnel assigned to equivalent duties is one indicator. Another measure is the scope of responsibility entrusted to personnel at different phases of a career. Finally, even the type of personnel (officer, enlisted, civilian, combinations of all three) may shed light on how the services and agencies see FM, and thus how they suggest personnel prepare themselves for future assignments, and increased value to the organization. Several USMC training and education roadmaps outlined this process with the following guidance in the preface:

“As you progress through your career, skill training, which is predominate early on, diminishes while professional military education gradually increases.

Experience is the ever-present constant that determines the rate at which a Marine trades skill training for professional development.”

USMC Finance Management Resource Officer

MOS Roadmap – 24 February 2006

The guidance provided above also provides an analogy for the scope for this review. All of the services provide introductory skill training to newly acquired

individuals, whether they have just finished recruit training and attending a technical training school, or recent college graduates enrolled in an FM intern program. Each service *trains* these new “hires” to accomplish their primary duties, much as would any commercial organization. The focus of this research is past that initial training period, when the individual is approaching a mid-career point, and having mastered a majority of the skills needed to do their job. At this time in their career, the professional is acquiring new knowledge, or updating old knowledge. This requires education and learning, not skill training. To provide an equitable comparison, the review will be further limited to personnel that have arrived at the journeymen level in their careers. The journeyman level may be defined as the level past apprentice and before master (Little, 1944), used in this context by several of the service career planning documents. For each of the services, this happens at a slightly different point.

It has been argued that in many research articles, case study investigators fail to identify operational measures, leading to subjective judgments to collect data (Yin, 2003). To address this concern, the CPE knowledge areas, skills, and abilities relevant identified in the previous literature review and rated by a senior advisory council consisting of representatives from each of the primary services and agencies guides this narrative. Each knowledge area is identified, defined, and then discussed in light of the various career-planning documents, listed in order of rater agreement strength, *not* necessarily the overall importance of the knowledge area to DOD FM personnel.

Strongly Agreed Upon Knowledge Areas

The first group of knowledge areas discussed contains those that the government organized FM CPE program advisory board (referred to as the advisory board for the

remainder of the chapter) strongly agreed were important topics to include in mid-career CPE. Table 15 near the end of this chapter contains a summary of recommendations.

Comptrollership. Financial managers oversee the preparation of financial reports, direct investment activities, and implement cash management strategies. Managers also develop strategies and implement the long-term goals of their organization (BOLS, 2009). DOD CPE providers incorporate the term “Comptroller” in their title, yet it would be hard to identify a specific comptroller course because comptrollership is a generalized description of duties. The definition at the start of this section acknowledges the breadth of the subject. What exactly would one learn in the “Comptroller Knowledge Area?” The Army only uses the term as a title (e.g. Comptroller career field accreditation requirements), similar to the USMC (e.g. Comptroller Division – made up of Accounting, Budget, Finance, and Analysis Branches). The Air Force identifies personnel at the expert or master level as “Comptrollers” but never identifies specific comptroller related knowledge. Rather, comptrollership appears to be a catch all term to identify all of the various financial management knowledge, skills, and abilities. Therefore, comptrollership, while all encompassing, may be too generic of a term to use as a specific CPE knowledge area. Further research to identify which facets of comptrollership (accounting, budget, finance, and cost analysis, leadership, management, etc.) discussed in later sections may help identify knowledge areas that CPE can provide value.

Decision support. One definition of decision support is providing rational, informed recommendations to organizational decision makers based on objective, quantifiable analysis of relevant data. One interesting aspect of this result was the disparity between the raters. Three of the five members of the advisory board strongly

agreed that Decision Support was an important topic for mid career CPE, while one just agreed, and the last Advisory Board member had no opinion. Decision support, decision making and other similar terms relate to the primary function of DOD FM personnel, which is to provide recommendations on how to best allocate resources to achieve the desired military effect. The Air Force identifies the Decision Support Body of Knowledge (DS BOK) that includes the areas of accounting, budget, cost, and finance. Additionally, the Air Force identifies optional attendance at a Defense Decision Support Course. The Army lists courses in Financial Decision Support at all levels for military and civilian personnel in the Comptroller career field, and further identifies it as a responsibility of managers to expose personnel to the financial stewardship decision-making process. The Navy explicitly states that part of the financial analysis competency at the Journey level includes having “working knowledge of financial analysis, research, forecasting and planning sufficient to produce financial information and support decision making,” and identifies attendance at the Defense Financial Management and Comptroller School (DFM&CS), which has substantial decision support education as part of its FM curriculum. Finally, the Marines do not directly specify any decision support related courses, but do identify the Defense Financial Management Course (DFMC) for journey level personnel, and recommend “Organizational Leadership and Decision Making” for graduate level education. It appears evident that the services concur that decision support is a relevant CPE topic area. Given the aforementioned discussion, CPE curricula should include Decision Support education.

Developing teams. Selecting, developing, and providing the collective motivation for producing result-oriented teams. The Army lists team building skills as a learning

objective under human resource management. Army career planning documents discuss a course that teaches junior personnel how to develop strategies to create fully functioning teams. Also mentioned is the “Organizational Leadership for Executives (OLE)” course where senior personnel learn how to “build high-performing teams.” The other services and agencies do not specifically identify developing teams as a knowledge area for FM personnel, but view it as inherent to leadership training. With the emergence of collaborative information technologies, this gap may be a prime area for innovative DOD CPE programs to explore. There is an emerging stream of research that is linking massively multiplayer online games (MMOs), virtual worlds, and other online social engagement to the emergence of new leadership and management challenges and opportunities (Duarte & Snyder, 2006; Huang, Wei, Watson, & Tan, 2003; Malhotra, Majchrzak, & Rosen, 2007). Research indicates that personnel entering the workforce are already engaged in this form of collaboration, and it is easy to imagine a world of geographically distributed teams, connected only by video teleconference and collaboration software. What management techniques are applicable? How do you assess performance and give feedback? Research into this leadership knowledge area has been underway (Reeves & Malone, 2007), what is left is to apply the theory to practice through CPE. Thus, developing teams, especially virtual teams, is a crucial knowledge area for effective leaders within the DOD FM career field.

Negotiating. This knowledge area refers to the ability to achieve conflict resolution through open dialogue (Boyatzis et al., 1994). The high level of agreement by the advisory board on this knowledge area. Negotiation is a valued skill, but only appears in the career-planning documents in subtle ways. The Army identifies the negotiating

knowledge area for executives (senior personnel) to moderate internal and external conflicts, and the Navy lists the ability to “influence and negotiate” as a Business Acumen Skill for Journey and Expert level personnel. The lack of direct reference to negotiating may indicate disconnect between the perceived educational needs on behalf of the customers (services and agencies that send students to CPE programs), career planning guide creators, and providers of CPE. At a minimum, identification of this knowledge area should initiate a conversation between all stakeholders to clarify the need for negotiation skills and education for today’s FM workforce. If there is concurrence by stakeholders that this is a critical knowledge area, then design of an appropriate educational curriculum is required.

Oral communications. There was also a high level of concurrence by the advisory board for this knowledge area, indicating a perception that the FM work force could use improvement in this area. Oral communication is comprised of both speaking and listening skills. Speaking is the ability to use oral communication effectively, using well-organized material, a clear message, and a clear voice (Boyatzis et al., 1994). Listening is also an important aspect of oral communication. Research has continued to find that public speaking, or speaking formally to a group that is evaluating your performance is still a major source of stress for many adults (Esposito, 2000). Drafts of National Security Personnel System job descriptions for Management and Program Analyst clearly identified that supervisor’s work requires application of fact-finding and investigative techniques; oral and written communications; and development of presentations and reports. Based on the need identified in the career planning documents, recommend retaining this knowledge area within a FM CPE program.

Written communications. This knowledge area had a response similar to the oral communication knowledge area. Personnel who can effectively communicate complex thoughts through written media can be said to have an high level of writing ability (Boyatzis et al., 1994). Anecdotal evidence indicates that the predominance of short emails and portable digital assistant (PDA) or cell phone text messaging, have handicapped the current workforce when it comes to producing accurate, brief, and clear writing. Thus, being able to quickly produce effective written products (memos, proposals, executive summaries, emails) is critical for mid-career personnel (HBS, 2006). The Navy career planning guidance clearly identifies the ability to communicate effectively, orally and in writing, as a required business acumen skill for entry, journey, and expert level employees. Air Force documents consider communication an institutional competency that personnel perfect throughout their career and as part of a concept called “Thought Leadership” that embraces professional reading, writing, speaking, and listening. The Army lists communication skills as part of interpersonal skills included in the Leadership and Organizational Management Core Competency Group. Clearly, effective communication skills are a required competency by personnel throughout their career, and mid-career CPE programs should provide additional communication knowledge, practice, and feedback to learners attending CPE courses. Based on the need identified in the career planning documents, recommend including this knowledge area in FM CPE programs.

Planning. Individuals who set measurable goals and objectives and anticipate obstacles and alternatives in order to organize future actions may display a high degree of the “planning” quality (Boyatzis et al., 1994). Army planning guidance identifies

program planning as part of the project management core competency, needed to enhance job performance, and as part of the strategic planning process to enable strategic vision. The Navy identifies levels of planning ability coincident with the level of the employee; for example, one document specified that journey level employees should have working knowledge of financial analysis, research, forecasting and planning processes sufficient to produce financial information and support decision making. The Air Force documents do not directly specify planning skills, but address the need for strategic thinking, managing organizations and resources, and having an enterprise perspective at the transition from the journeymen to expert level. Finally, the Marine Corps specifically recommends that mid-career FM professionals enroll in the Marine Corps Planning Process distance-learning course. Planning, an inherent function of management, should be emphasized in mid-career CPE courses.

Networking. Personnel who work at building and maintaining relationships that might be useful to accomplish a future task may be said to be good at “networking” (Boyatzis et al., 1994). This knowledge area may require more research before any curriculum change is considered. Is it knowledge about how to network that is important, or is the opportunity to network? Attendance at in-residence CPE courses provide an opportunity to network, but none of the career planning guides specifically identified networking as a critical knowledge area. Anecdotal discussions about networking with FM personnel identify networking as important to career growth, career opportunities, and job execution. Often, professional conferences will have a session devoted to networking skills, but given that, there are limited opportunities to use networking skills, professionals should acquire effective networking skills and knowledge ahead of time.

Thus, it is plausible that a complete CPE program may include curriculum designed to enhance one's networking abilities.

Moderately Agreed Upon Knowledge Areas

The next section of knowledge areas were categorized as mid-career CPE knowledge areas that the advisory board agreed are important, but there was more disparity in determining how important the topic was to FM professional CPE.

Use of concepts. The ability to use concepts, frameworks, or theories to explain or interpret situations will allow the person to identify similarities and discrepancies from what was expected (Boyatzis et al., 1994). Only the Army career planning documents were detailed enough to actually identify the "use of concepts" knowledge area, although each of the other services discussed the need to understand budgeting, planning, and organizational leadership needs, which require an understanding of concepts and frameworks to discuss abstract ideas. Based on the response of the advisory board, time spent on improving a learner's knowledge of concepts and frameworks to understand complex issues would be well spent, and would provide a foundation for increased knowledge transfer in CPE courses.

Budget. A necessary skill for a financial manager is the ability to develop, analyze, and execute budgets, which are used to allocate current resources and estimate future financial needs (BOLS, 2009). The Army is again very detailed in specifying what is meant by budgeting competencies and identifies that personnel should have knowledge of budget and financial analysis techniques and current developments in the budget field. The Marines recommend that Captains (O-3s) take a "Controlling a Budget" course at the United States Department of Agriculture (USDA) Graduate School. The USDA GS offers

many types of adult continuing education, including 13 different budget related courses. These courses could properly be identified as CPE, and provide CPE credit. As a major, the Marines recommend that FM personnel attend a “Budget Analysis Workshop” also provided by USDA. Therefore, even though the Marines identify these classes as skill training, these courses are more like CPE. As mentioned in a previous section, the Air Force identifies budgeting initially as a skill that is enhanced with practice and additional education throughout a person’s career and the Navy specifies journey level knowledge in budget formulation and budget execution, and identifies a web based Budget Execution course that FM personnel should complete. Because of the importance of creating a realistic and compliant budget, all DOD FM personnel should attend a CPE course on “Budget Formulation” similar to the four-day course offered by USDA GS. Budgeting is therefore recognized as a CPE relevant knowledge area and a candidate for inclusion in a FM CPE program.

Group management. A person who can motivate group members to work together effectively displays high levels of the “group management” quality (Boyatzis et al., 1994). This knowledge area was perceived to be different from team development. There may be overlap between group management, team development, and leadership topics, which can be combined within a mid-career CPE program. In the Army career planning guidance, the use of group management seems to have a broader meaning, as in the addressing the diversity needs of a work center, as part of the leadership and management knowledge development plan. More research is required to understand this knowledge area. It may be as general as diversity training, or related to more specific leadership skills.

Economic value. Economic value, the ability to produce an estimate of the true economic profit after making corrective adjustments to GAAP accounting was agreed upon as a relevant CPE area by the advisory board. The ability to provide a robust economic analysis is important to many complex resource allocation decisions within the DOD. Within the DOD FM career field “economic value” seems to most closely associate with the concept of performing an economic analysis. The Army lists economic analysis skills as a facet of the Cost and Operations Research Analysis core competency. The Navy discusses financial analysis knowledge areas at the journey level, but does not specifically address the concept of economic value. All of the services conduct business case and economic case analyses, as required by regulations when acquisitions meet certain thresholds. However, it may be that personnel do not appreciate the potential benefit that these tools have for improving resource allocation decisions. Recommend discussions with concerned stakeholders regarding this critical knowledge area.

Developing policy. In his book *Administrative Behavior*, Herbert Simon (1997, p. 254) discusses the process of “policy determination” in governmental institutions. In his discussion, Simon makes the argument that developing policy is an inherent part of the decision making process, whether the policy is determined deliberately, or by implication of decisions made. Within this framework, developing policy is an extremely important function of FM professionals working within the DOD. The detailed Army career documents do not identify any “developing policy” education requirements. Neither the Marine Corps, Air Force, nor the DFAS FM career maps suggest “developing policy” as a knowledge area for CPE programs. The Navy documents provides a small clue to this discrepancy, listing the Expert level FM Analysts and Financial Technicians as the

“organization’s financial policy point of contact.” Perhaps DOD FM personnel do not see themselves as policy developers, rather they operate under the principle that they exist to execute policy produced at higher levels within DOD. This knowledge area deserves more discussion with the DOD FM career field. If personnel are never educated about how to develop effective policies throughout their career, how can they be expected to develop effective policies when they reach the senior executive service level? The ASMC lists “Public Policy and Structure” as a suggested topic for CDFM CPE credit. Thus, exposure to issues associated with “developing policy” and organizational decision-making could prove beneficial to DOD FM personnel.

Systems thinking. Systems thinking is demonstrated by the ability to properly order multiple causal events, reflecting an understanding of multiple causality, demonstrated by production of plans of action, flow charts, or prioritized list (Boyatzis et al., 1994). Systems thinking techniques would allow FM personnel to see a “bigger picture” that allows better perspective on second and third order effects of decisions made at their level. Systems thinking is effective with complex problems, or recurring problems (Aronson, 1998), the types of problems that plague DOD FM personnel.

Any discussion of system in the service and agency career planning documents refers to tangible systems (weapon, information, improvement systems, etc.) rather than the concept of systems thinking. Systems thinking may be so involved that it belongs in a graduate level class rather than a mid-career DOD FM CPE course, but learning how to embrace a systems thinking perspective is no more difficult than learning how to write effectively, or learn how to develop an effective budget. The systems thinking knowledge area should be a part of an effective FM CPE course.

Stimulating professionalism. Stimulating professionalism encompasses the concepts of encouragement, mentorship, coaching to peers and subordinates, and providing a role model for others to emulate. All of the reviewed career planning documents allude to this knowledge area, but not as education. Instead, stimulating professionalism is viewed as an increasing responsibility of leadership as one career's develops. The Army documents provided detailed responsibilities for the Mentor; the Air Force and DFAS documents extol personnel to mentor and coach as they reach upper levels of their careers, and the Navy and Marine Corps discuss the concept of "developing others" when personnel reach senior levels. Without specific education in this critical knowledge area, there may be great variability in the effectiveness of senior leaders when it comes to stimulating professionalism. Providing mid-career DOD FM personnel with tools, techniques, and methods to mentor and coach junior personnel may result in a more professional, more prepared future workforce. The stimulating professionalism knowledge area should be part of a robust CPE program.

Agreed Upon Knowledge Areas

This section of knowledge areas discusses those topics that the DFM&CS Advisory Board agreed were important for mid-career CPE, but not as important as knowledge areas discussed in the preceding sections.

Accounting. "Accounting is the art of measuring, describing, and interpreting of economic activity of an organization," (Meigs & Meigs, 1990, p. 4). Typical tasks include providing advice on, administering, supervising, or performing professional, technical, or clerical work of an accountant, budget administrator, or financial manager (Damp, 2008). The American Society of Military Comptrollers (ASMC) also identifies accounting

principles and standards, and accounting systems as topics suitable for CPE credit to maintain Certified Defense Financial Manager credentials.

From the Air Force Civilian, Civilian Technical, Enlisted, and Officer FM Force Development Roadmaps, accounting, budget, cost, and finance are identified as skills training to be obtained from the FM Distance Learning Center (DLC) and from on the job training (OJT). These subjects are within the Decision Support Body of Knowledge (BOK) and should be a part of CPE for FM personnel up to the journeyman level (NSPS Band 2 / GS 9-14). Likewise, the Navy views basic knowledge of accounting procedures and processes, including the concepts of budgetary and proprietary accounting part of the Entry level core competencies. When Navy personnel arrive at the Journey level, they should have a working knowledge of the core general accounting procedures and processes, but further, they should understand how to use these tools to analyze issues and provide solutions. The Marine Corps MOS Roadmap specifies Accounting 101 and Accounting 102 to be completed by distance learning (MarineNet) at the Second Lieutenant level, and then suggest that upper grades attain graduate level training that includes Managerial and Financial Accounting classes. The Army provided the most detailed documentation of exactly what type of accounting competencies were expected with four distinct knowledge areas. For example:

“Knowledge of the design, development, operation, or inspection of accounting systems; the application of accounting standards, policies, and requirements; the examination, analysis, and interpretation of accounting data, records, or reports, and the provision of accounting or financial management advice and assistance to management.”

While knowledge of accounting procedures is reiterated at the journeyman level, it appears that all of the services view accounting as a core competency to be acquired at the apprentice, intern level as a useful skill. Accounting, while fundamental, should not be considered as a primary focus for CPE, unless a learner is acquiring a CPA certification or graduate level accounting degree.

Operations research. The activity called “operations research” is generally attributed to the military’s use of scientist to apply a scientific approach to allocating scarce resources in support of strategic and tactical operations (Hillier & Lieberman, 2004). For the purposes of this chapter, the term “operations research” describes the act of using mathematical modeling, statistics, and algorithms to solve complex problems, or using scientific methods for making decisions. Operations research is often synonymous with management science as part of the business management knowledge area. The Army identifies operations research as part of the Financial Decision Support Core Competency Group. The Air Force identifies Cost Analyst as a job experience to build depth, and DFAS recommends Lean Six Certification as part of the Process Improvement education and training. According to the “Career Roadmaps for the Department of the Navy Financial Management Community” enclosure 2, page 2, Journey level Financial Management Analysts are expected to have “Working knowledge of financial analysis, research, forecasting and planning sufficient to produce financial information and support decision making.” At the expert level, according to the same document mentioned above,

Navy Financial Management Analyst are expected to have expert knowledge of operations research concepts, but it is not clear where Navy FM personnel are expected to acquire this practical knowledge. A recommendation to include operations research as a useful knowledge area is obvious, but how to implement such a demanding curriculum addition is less clear. Operations research requires a strong foundation in critical thinking, statistical literacy, systems thinking and many other knowledge areas discussed in this section. How best to include challenging knowledge areas, such as operations research into a DOD FM CPE program will require much thought and discussion with CPE providers. However, even an introduction to the concepts and a plan for acquiring the necessary foundational courses may be a good first step, thus this knowledge area should be considered for inclusion in a FM CPE program.

Quantitative analysis. The term “quantitative analysis” refers to the ability to use statistical models and concepts to analyze and interpret job related data (Boyatzis et al., 1994). Only one member of the DFM&CS Advisory Board disagreed with the statement that quantitative analysis was an important knowledge area. According to GAO reports, statistical literacy and competence in interpreting statistical reports continues to be a challenge for DOD FM personnel. The DOD spends less on statistical activities (the collection, processing, or tabulation of statistical data for publication, dissemination, research, analysis, or program management and evaluation) and the training of statisticians than any other department of the executive branch (Nussle, 2008). In fact, the Defense Manpower Data Center (DMDC) expends most of the money that is spent. Like the previous knowledge area *Operations Research*, the quantitative analysis knowledge area requires a strong foundation in many disciplines in order to use in day-to-day work

activities. While the ability to apply quantitative analysis techniques would help DOD FM personnel to be more effective, how to achieve a useful level of expertise is difficult to determine. The Army identifies quantitative analysis as part of a 14-month graduate level program of study, and DFAS identifies Lean Six training which embraces quantitative analysis concepts. However, while the Air Force, Navy and Marine Corps documents do not directly address the quantitative analysis knowledge area, it could be considered an acquired skill in support of FM duties. In order to improve DOD FM decision support skills, in accordance with GAO research recommendations, it is recommended that greater emphasis be put on the quantitative analysis knowledge area and inclusion in a FM CPE program.

Using managerial statistics. Managerial statistics is a knowledge area understood to mean being statically literate: the knowledge, skills, and ability to collect and analyze data to draw conclusions and make predictions. This is similar to the knowledge area discussed in the previous section, *Quantitative Analysis*. The difference would be that the quantitative analysis knowledge area addresses the need to produce a quantitative analysis, where managerial statistics is the ability to understand and apply quantitative analysis to help make better resource allocation decisions. None of the career planning documents directly addresses the need for DOD FM personnel to be statistically literate, and that may be a partial explanation for many of the problems identified in numerous GAO reports indicating that DOD financial management is deficient in many quantitative skill related areas. It is unknown how many personnel within the DOD FM community can create, understand, or apply statistical methods to improve processes, improve decision-making, or understand historical data, but it should be almost every professional

financial manager. We must ask, who is looking at the data? One recommendation based on the results of this research is that efforts to improve statistical literacy, especially through effective CPE courses, be considered as a first step toward improving DOD FM effectiveness. Thus, the knowledge area of managerial statistics should be included in a relevant FM CPE program.

Flexibility. Adaptability to changing circumstances is a form of flexibility. This quality is associated with a tolerance for ambiguity, and the ability to modify a plan or behavior to one more appropriate for the milieu. The Army identifies flexibility as a competency acquired in several executive development courses. The Navy identifies flexibility as a leadership competency at the Journey and Expert levels. The Air Force, DFAS, and Marine Corps documents do not specifically identify flexibility as a required knowledge area, although it may be inferred in other overarching knowledge areas discussed. Is flexibility better acquired on the job, in the classroom, or in a graduate level leadership development course? Without a good answer to that question, flexibility is another area that requires further discussion among stakeholders before a recommendation can be made to include it in a CPE program.

Economics. Economics is a knowledge area that enables FM personnel to understand and apply macro and micro economic theories to assist in providing optimum resource allocation. The ASMC suggested topic list for CDFM CPE credit also lists economics as a valid knowledge area. However, none of the services or agencies specifically identifies economics knowledge in their career roadmaps. DFM&CS provides instruction in economics during the extended FM CPE course. They consider this education so important that the school instituted a program to have a faculty member

with a Ph.D. in economics on staff for the past ten years. The Army relegates economic training to long-term educational programs like the fourteen month Army Comptrollership Program conducted at Syracuse University. Neither the Navy nor Marines specifically identify economic knowledge areas as part of their respective roadmaps. Few of the commercial providers of CPE list economics as available course; however, the USDA Graduate School list over ten economics related courses. Economics can be classified as education versus training, but is it relevant to mid-career FM personnel? Macro and micro economic theory provide a basis for many of the policies and regulations that guide DOD FM personnel. Additionally, there is a great deal of evidence to indicate that a critical lack of economic literacy has contributed to numerous erroneous political, strategic, and financial decisions by otherwise intelligent statesmen (Lucas Jr, Krueger, & Blank, 2002). Thus, the “economics knowledge area”, though not mentioned by name in career road maps, provides a foundation for many of the other knowledge areas, and contributes to improved decision making throughout a financial manager’s career and should be consider a critical part of a CPE curriculum.

Persuasiveness. Persuasiveness can be understood as the ability to effectively convince others to adopt an idea, attitude, or plan through various means (Boyatzis et al., 1994). The ability to persuade others is needed to effectively usher in change, lead teams, and manage projects. Further, persuasion allows individuals to affect the adoption or rejection of innovations (Rogers, 1995). Though the career planning documents reviewed for this research did not specifically identify persuasiveness as formal knowledge area to be learned, this ability is critical to organizational leaders during a time of transformation as is being experienced within the DOD FM career field. Based on the perceived need, a

discussion of persuasiveness should be included in the discussion of other knowledge areas (e.g. leadership, negotiation, etc.).

IT innovation. IT innovation refers to the ability to incorporate, exploit, and transform emerging information technology into innovative services and products that provide an organization with a competitive advantage. The advisory board were asked if using Information Technology innovatively is an important ability to be learned or expanded on within the extended FM CPE program. The advisory board was split (three agreed and two neither agreed or disagreed) on recognizing IT Innovation as a valuable knowledge area to be added to the extended FM CPE curriculum. The conclusion is then that there are other institutions and programs that provide graduate level management information system (MIS) education that are resourced for this type of education that may provide a better venue for this type of instruction.

Attention to detail. This quality reduces uncertainty in the organization by seeking order and predictability (Boyatzis et al., 1994) and is present when personnel double check information, ensure the accuracy of their own work, and keep excellent records. Although none of the services or DFAS specifically mentioned attention to detail as a knowledge area, it was identified by ASMC intuitively as they suggested assessment of internal controls, and assessment of management controls as worthy areas for CDFM CPE credit. In addition, the Air Force documents stated that training and education opportunities could occur during compliance inspections, staff assistance visits, and self-inspections. These various inspections and assessments are apparently how the services and DFAS educate personnel on the providing attention to detail in day-to-day work.

Thus, the evaluation of this construct identifies “attention to detail” as a useful skill, gained through experience, but not necessarily a knowledge area appropriate for CPE.

Use of information technology. The ability to use computers or other advanced technology to accomplish job related tasks (Boyatzis et al., 1994). Based on personal experience and on anecdotal reports from instructors and several mid-career learners attending in-residence CPE programs, this knowledge area needs a great deal of attention. Many students lack the minimum skills required to effectively use email, browser, spreadsheet, and presentation software installed on their computers. This lack of knowledge is costly to the DOD in terms of time, and money. There are many training programs available that have been purchased by the DOD for this very purpose, but it is unclear if personnel are taking advantage of the opportunity. All of the services provide free word processing, spreadsheet, and presentation graphics training online. Many software providers offer beginning office productivity software training that is included in the software package. Thus, this topic offers a fertile avenue for further investigation. How can we accurately assess an individual’s knowledge of personal productivity IT? How can personnel be persuaded to improve their knowledge of personal productivity IT? Even the new personnel that are entering the DOD workforce are not as adept at using office productivity applications as might be assumed. The ability use IT effectively provides the foundation for many of the skills needed to thrive in Information Age organizations. As the Utah Valley State College (UVSC) School of Business phased it: “Graduates will be proficient in the use of information technology to facilitate communication, collaboration, problem solving, decision making, personal productivity, and lifelong learning” (Johnson, Bartholomew, & Miller, 2006, p. 82). Although the

inclusion of learning how to effectively use office productivity software is beyond the traditional scope of a FM CPE program, in the Information Age, IT skills allow FM professionals to collaborate more effectively. Based on this research, several recommendations are made. The first recommendation is that an “Office Productivity Software” proficiency test be provided to learners attending a FM CPE program to validate if there is a real need for additional training. This skill inventory test should be administered whether the program is online or delivered in-residence. Learners that are identified as deficient in basic IT skills should be offered remedial training so that they can use available software more effectively. The second recommendation is that learners should be given an opportunity to expand IT skills while enrolled in a formal FM CPE program. Effective IT skills are a necessary tool for professional working within DOD in the Information Age.

Human value management. Human value management is an evolving human resource strategy that incorporates the concept that human resource can be managed as other business assets. Relevant to this research is the idea that organizational knowledge development is key to an organization’s competitiveness and innovation capability (Carneiro, 2000), and that corporate social responsibility (CSR) is a product of how an organization develops its workforce (Schoemaker, Nijhof, & Jonker, 2006). Thus, human value management requires that managers understand the cost of acquiring, developing, and retaining human assets, and can consider the contributions of individuals that add value to an organization’s workforce, ensuring that individuals are not undervalued, or taken for granted by the organization. As this HR strategy is still evolving, additional

research is needed to understand how this knowledge area could be beneficial to DOD FM professionals.

No Opinion Knowledge Areas

The next five knowledge areas represent those topics that the DFM&CS Advisory Board did not express a strong opinion for or against its inclusion in a mid-career CPE program.

Developing others. Developing others refers to the ability to improve the performance of others using feedback, information, work opportunities, and encouragement (Boyatzis et al., 1994). This knowledge area overlaps with a previously discussed knowledge area, *Stimulating Professionalism*. The difference appears to be that *Developing Others* is focused on career progression, while *Stimulating Professionalism* is focused on improving professional performance in the current position. The Air Force recommends that learners in the expert or master level attend leadership development courses, which would conceivably offer instruction in how to develop others. As illustrated in the Force Development Roadmap, this is the phase of one's career where developing the next generation of leaders is expected from senior personnel. The Marine MOS Roadmap does not identify any particular course on how to develop others, but advises that individuals should seek out mentors to help them navigate the training and education continuum. The Navy identifies executive leadership programs and leadership training for both the journey and expert levels, and identifies "Develop Others" as a Leadership Skill core competency. The Army identifies eight courses to assist personnel in developing leadership and management knowledge and skills, and specifically identifies motivating, coaching, and mentoring as core competencies. Most aspects of

developing others are skill based, other parts are experienced based, but a great deal of this construct consists of acquiring knowledge about human resource management concepts and falls into the knowledge area domain. For example, the knowledge area of Self-Control, or when a person remains calm during stressful situations, never exhibit impulsive behavior, and generally thinks of the group, family, or organization before they think of their own needs (Boyatzis et al., 1994), is an important leadership skill.

However, Self-Control as a behavior, may not be a strong candidate for DOD FM CPE.

Pattern recognition. Personnel who have this ability can identify and interpret patterns in unorganized information or seemingly random data (Boyatzis et al., 1994) and pattern recognition has been identified as a factor for explaining novice versus expert level of knowledge (Cohen, 2008). Cohen (2008, p. 212) states, “The ability to interpret and respond to a current experience depends crucially on being able to recognise [*sic*] that it is analogous to a previous experience.” Pattern recognition may also play a part in skilled group task coordination, providing recognition of team strengths and weaknesses, and for recognizing functional and dysfunctional routines (Wolff, Pescosolido, & Druskat, 2002). This analytical skill may belong more to the realm of experience rather than education and is probable not appropriate for inclusion in a FM CPE program. However, awareness of the ability can be discussed, and tools that can enhance an individual’s ability to recognize patterns can be introduced as part of other knowledge areas (e.g. Decision Support).

Managing diversity. Appreciating and managing diversity requires planning and implementing organizational systems and practices to manage people so that the potential advantages of each individual are recognized by the organization. The career planning

documents reviewed for this chapter did not specify managing diversity as a separate knowledge area. However, each of the services, and all DOD agencies promulgate diversity awareness through a number of programs. An effective ability to manage a diverse workforce in a global environment has at least six benefits for the organization that include lower cost, better resource acquisition, more effective marketing, enhanced creativity, improved problem-solving processes, and greater organizational flexibility (Cox & Blake, 1991). Although the DOD has adequate training programs addressing the appreciation of diversity in the workplace, a better understanding of how to manage diverse workforce to achieve a competitive advantage is not. However, CPE programs that focus on diversity issues may be a better venue than the general business curriculum that is the focus of this chapter.

Banking and finance. Banks employ personnel to provide financial and customer service. Finance is the ability and skills to properly allocate and manage resources, and provide resources to fund acquisitions. Typical duties include taking deposits and handling cash withdrawals, and accepting payments for loans (BOLS, 2009). None of the career planning documents reviewed mentioned banking as a separate knowledge area, but billets such as “Assistant Disbursing Officer” probably include banking like services, especially in a deployed environment. This aspect of the FM career field has decreased with the advent of IT and electronic banking. Currently, the services mandate the use of direct deposit, electronically transferred funds, and use systems such as Wide Area Work Flow (WAWF) to process invoices, receiving reports, and authorize payments. The customer service aspect has been realigned to helping customers (service members and external vendors) navigate the various information systems used to distribute funds.

Thus, an evaluation of *Banking* finds that it is more of a skill, rather than a knowledge area relevant to mid-career CPE, although competence in banking information systems is required throughout the apprentice and journeymen levels. With reservations, the recommendation is that Banking and Finance be further researched to see if there are any relevant topics (e.g. Deployed banking systems) within this knowledge area that would provide value to learners attending an FM CPE program.

Understanding human resources (HR) policy. Understanding human resource policy refers to the ability to produce, explain, and manage human resource policies to an organization's personnel and the ability to produce and implement a deliberate plan of action to guide decisions and achieve rational outcome. This topic has immediate relevance to the FM career field as the National Security Personnel System (NSPS) transition continues. NSPS has not been well received by career personnel, and part of the complaint appears to be inconsistent implementation, miscommunication by supervisors to employees concerning expectations, and confusion regarding the responsibilities for all stakeholders. All of the career planning documents alluded to the management of organizations and resources as required duties of mid-level to upper-level FM personnel. If mid-career FM personnel who are moving into supervisory positions do not get training on understanding HR policy through an in-residence CPE course, where do they get this relevant knowledge? Based on the need of the learners to be aware of critical human resource issues, recommend that this knowledge area be included as part of a relevant FM CPE program.

Knowledge Areas Not Agreed to as Needed in Mid-Career CPE

The knowledge areas listed in this section represent those topics that the Advisory Board felt were not important to a mid-career DOD FM CPE course. This does not mean that the board necessarily felt that these knowledge areas were unimportant, but that other venues (introductory training, advanced training, skills enhancement courses) might be more effective in providing the needed skills.

Operations management. Operations Management “involves the planning, coordinating, and executing of all activities that create goods or services” (Shim & Siegel, 1999, p. viii). Operations management turns strategic and tactical business plans and turns them into operational plans and schedules (Shim & Siegel, 1999). The knowledge, abilities, and skills to manage day-to-day operations, and implementation of organizational goals and strategies is key to the successful financial management support of DOD goals and objectives. Concepts such as business process reengineering (BPR), continuous improvement through Lean Six Sigma and other DOD initiatives would be much better understood if financial managers were provided a basic introduction into Operations Management during a FM CPE course. Although not specifically identified in the career planning documents reviewed for this study, topics key to the operations management knowledge area are interwoven throughout billet descriptions and required job competency descriptions. Based on the prevalence of the need for Operations Management knowledge for career advancement, Operations Management should be considered as an awareness topic in an effective DOD FM CPE program.

Organizational behavior. Organizational behavior is “the study of human behavior, individual differences, and performance in organizational settings” (Hellriegel,

Slocum, & Woodman, 1995, p. xxi). For financial managers that are moving into positions of increased supervisory responsibility, having the ability to systematically study and carefully apply the knowledge how people — as individuals and as groups — act within organizations can be very valuable. A better understanding of organizational behavior may also enhance some of the other knowledge areas discussed in this chapter, especially leadership, team participation, negotiating conflict, etc. While organization behavior per se may be too broad of a knowledge area for inclusion in a FM CPE program, selected topics may be appropriate. For example, one extended financial manager CPE course devotes several hours to a personality inventory exercise called “True Colors™,” and a “Readiness for Change” seminar discussion. Discussion in both of these presentations is reflected back onto how the individual can better understand and influence organizational behavior in a positive way with a better understanding of individual strength and weaknesses. The feedback from learners on a five point Likert scale (anchored with 1 = no value and 5 = very valuable) associated with these two courses (True Colors™ Presentation Value: $n = 141$, $M = 4.51$, $SD = 0.798$; and Readiness for Change Presentation Value: $n = 144$, $M = 4.17$, $SD = 7.60$) was above the overall ($n = 15,835$) mean of 4.07 and standard deviation of 0.824 for all presentations provided by the extended FM CPE over the past three years. Based on this positive result, Organizational Behavior knowledge areas may be very useful to future leaders and should be included in a relevant FM CPE program.

Self-confidence. Self-confidence is the quality of being consistently assured, forceful, and unhesitating in manner, expressed as a belief in one’s own ability to accomplish the mission (Boyatzis et al., 1994). Self-confidence was not identified as

separate required knowledge area in the career planning documents reviewed for this chapter. Rather than being a knowledge area unto itself, increased self-confidence may be a byproduct of participation in a FM CPE program. A research study conducted by the National Institute of Adult Continuing Education (England and Wales), found that 89% of the participants reported positive emotional or mental health benefits, including increased confidence (Dawe, 2004). Based on that study and the conclusion of the DFM&CS Advisory Board, self-confidence should not be a separate knowledge area in a FM CPE program. However, exercises and opportunities within the FM CPE program that promote learner self-confidence may be advantageous to the DOD FM career field.

Theory building. Theory building is the ability to develop new theories, models, or frameworks to explain existing information and predict future events (Boyatzis et al., 1994). For example, the initial models of continuing professional education were based on models that considered only the individual learning; however, as our understanding of how adults learn grows, we realize that social interaction is a significant factor, requiring the use of different models (Woodall, 2006). In a similar manner, education in critical and innovative thinking techniques may all FM personnel to observe reality and create new models and frameworks that may better explain phenomena that affect their profession. The career planning documents reviewed for this chapter did not single out theory building as a necessary knowledge area for career advancement. Additionally, the scope of such education may exceed the resources allocated to a short FM CPE program and may be better learned in a longer graduate program. In concurrence with the Advisory Board, and the discussion in this section, the knowledge area of Theory Building may not be an appropriate topic for an FM CPE program.

Initiative. This individual takes action without being asked; looks for information creatively (Boyatzis et al., 1994). Although there are many scenarios when individual and leader initiative are invaluable to an organization, a better understanding how initiative may affect an organization can be very useful knowledge. For example, research has shown that leaders that are not considerate but initiate structure by defining their and their employee's roles, scheduling, assigning tasks, emphasizing deadlines, and being very directive can improve productivity in the short run, but generally these leaders also have a higher number of grievances, experience higher employee absenteeism, and higher workforce turnover (Hellriegel et al., 1995). In this context, the term "considerate" refers to the extent that a leader maintains professional relationships characterized by mutual trust, open communication, and respect for employees' ideas (Hellriegel et al., 1995). The career planning documents reviewed for this chapter did not specify initiative as a required knowledge area. Within DOD, initiative may be viewed as a character trait to be nurtured as applied as appropriate. An FM CPE course should include a discussion on leadership and personal initiative as part of a larger knowledge area, such as leadership.

Empathy. Empathy is the ability to understand the strengths, limits, moods, and behaviors of others (Boyatzis et al., 1994). None of the career planning documents indicated that empathy was a suggested knowledge area for mid-career FM personnel, nor is it clear how one could be educated to become more empathetic, rather, empathy should be considered a trait of an effective leader, and part of any leadership training course. Based on this discussion, empathy is not considered a valid knowledge area for inclusion in a FM CPE program.

Marketing. Managing the creative, communicative, delivery, and exchanging processes that provides value to customers is a concept of marketing. The Advisory Board did not heavily endorse marketing as a knowledge area in a FM CPE course. Although marketing of ideas, marketing of self, and marketing of one's organization are important aspects of a career within the DOD, they are not prevalent needs for most personnel. Additionally, the career planning documents reviewed for this chapter did not provide any evidence that market per se was a required knowledge area for job execution or career advancement. Based on the lack of demonstrated need for mid-career FM personnel to overtly market goods or services, it is recommended that marketing not be included in a FM CPE program.

Determining intellectual value. Determining the intellectual value of personnel refers to the ability to recognize, manage, and effectively use the intangible intellectual value of the organization's personnel to contribute to the organization's success. Recognizing intellectual value is not always easy in a busy professional environment. None of the career planning documents mentioned intellectual value, except as inferred as part of human resource management. A related concept, intellectual capital may provide insight into what is meant by the term "determining intellectual value." Brooking (1996) separates intellectual capital into four categories of assets: market, human-centered infrastructure, and intellectual property. For the purposes of research into DOD FM CPE, market (brands and distribution channels) and intellectual property (copyrights, patents, etc.) are not as applicable to this discussion as the other two categories. Human-centered assets are the expertise, problem-solving capability, leadership, and managerial skills contained within the organization's employees, while infrastructure assets refer to

the technology, methods, and processes that enable the organization to function (Brooking, 1996). An understanding of intellectual value and intellectual capital are fundamental to any discussion of knowledge management (KM), and as such should be part of a presentation on KM. This topic, although not high on the list of the Advisory Board, will likely increase in importance as the DOD organizations transform for success in the Information Age. Although not listed as required by the service and DOD agency career planning documents, and not endorsed by the Advisory Board as a priority, it is the recommendation of this researcher that the knowledge area “Intellectual Capital Management” be consider for inclusion in a relevant FM CPE program.

Social objectivity. Social objectivity is when personnel can perceive another person’s beliefs, emotions, and perspectives objectively, without bias (Boyatzis et al., 1994). Similar to the topic of empathy, social objectivity is a subset of effective leadership rather than a knowledge area unto itself. The Advisory Board did not have any concurrence on the importance of this topic, but decidedly agreed that it should be included as a separate topic. The career planning documents did not identify social objectivity as a valued knowledge area for career growth, thus the recommendation is that social objectivity not be included as a knowledge area of a FM CPE program.

Additional Topics

The following knowledge areas were included in feedback from the DFM&CS Advisory Board and other documents reviewed for this research. Because these topics were not initially included in the study, there are no prioritization measures available. However, these topics should be considered for inclusion in any survey instrument created based on this study.

Auditing for management. The primary purpose for audits with the DOD is to ascertain the effectiveness of internal controls, and to guard against fraud, waste, and abuse, resulting in reduced costs, improved performance, and compliance with rules and regulations that affect the DOD (DODIG, 2009). The career planning documents did not specifically address the need for financial managers to acquire this knowledge area, however, the auditing function, and audits are part of the life of a financial manager. FM personnel who are not assigned to duties involving auditing would benefit from education about the audit process, procedures for doing effective self-audits, and how to prepare for audits by external agencies. Improved understanding of the audit process may benefit DOD immensely. It is recommended that “Auditing for Management” be included as an awareness topic in a relevant FM CPE program.

Collaboration. Collaboration, where two or more people work together to achieve common goals, has been further enabled by innovations in information technology. Collaboration software has provided tools to encourage and assist personnel wishing to collaborate on complex problems. In addition, geographically and temporally separated personnel can be brought together to form teams to accomplish organizational tasks. Given the increasing need for effective collaboration, education related to increasing the effectiveness of collaborative behavior would be beneficial, thus this knowledge area should be considered for inclusion in mid-career CPE programs.

Efficiency orientation. When an individual clearly perceives input and output relationships with a concern for improving efficiency, they are said to have an “efficiency orientation.” Examples of behavior may include a concern for cost versus benefits, improving the quality of products and services, or looks for ways to maximize resource

use (Boyatzis et al., 1994). No reference to an efficiency orientation was noted in a review of the career planning documents, thus it is the recommendation that more research is required to understand this knowledge area more before it is included in a FM CPE program.

Emotional intelligence. Emotional intelligence refers to the ability, capacity, skill or a self-perceived ability, to identify, assess, and manage the emotions of one's self, of others, and of groups. Emotional intelligence can be “nurtured, developed, and augmented” (Weisinger, 2006, p. 1) and can be used to promote self-awareness, emotional management, and self-motivation (Weisinger, 2006). For the organization, personnel who are capable of effectively exercising emotional intelligence can improve relations with clients, peers, and the chain of command (Weisinger, 2006). As emotional intelligence is a newer concept, its value to DOD FM organizations is not well understood, and was not mentioned in the career planning documents reviewed for this chapter. Thus, emotional intelligence may not be a good candidate for inclusion in a DOD FM CPE program at this point. Although emotional intelligence theory may have some useful concepts for general business skill development, practical application is needed to justify the use of time available for professional education.

Joint operations. Joint Publication 1, *Doctrine for the Armed Forces of the United States*, states that “Joint matters relate to the integrated employment of military forces in joint operations,” and continues with “The capacity of the Armed Forces of the United States to operate as a cohesive joint team is a chief advantage in any operational environment” (DOD, 2009, pp. I-2). A majority of the career planning documents reviewed for this chapter indicated that having knowledge of joint operations is important

job requirement and beneficial to career development. Given the importance of effective resource management to the supply the war fighters with the supplies needed to conduct operations, and the growing interdependency among the services on resources, an improved understanding of joint operations and how to finance joint warfare is very important. By extension, understanding unified operations, which includes the State Department and non-governmental organizations (NGOs), is also important. Mid-career DOD FM CPE curricula should definitely include an education on how FM personnel contribute to joint operations, and how the DOD conducts warfare in a joint and/or unified environment.

Performance management. Drucker (1989, p. 230) states that “market standing, innovation, productivity, development of people, quality, and financial results—are all crucial to an organization’s performance.” Performance Management purports to link employee objectives with organizational objectives, as Drucker further reminds us that results only exist on the outside of an organization, and that “The results of a business is a satisfied customer.” Although not mentioned specifically as a required knowledge area in the career planning documents reviewed for this chapter, performance management education would help supervisors and managers learn how to direct effort to those tasks that help the organization effectively achieve organizational objectives. As performance management is an evolving concept, more research is needed to identify which aspect of this field would be beneficial to DOD FM personnel.

Portfolio and project management. Portfolio and project management may refer to similar concepts (i.e. the planning, organizing, and managing of resources to achieve project goals and objectives). Portfolio management is extended to include the oversight

of multiple projects. As it relates to financial managers in general, portfolio management is closely related to limiting risk through diversification. While the career planning documents reviewed for this chapter did not identify portfolio management as a required knowledge area, they did specifically address project management concepts repeatedly. Thus, the project management knowledge area should be seriously considered for inclusion in a FM CPE program for mid-level managers.

Discussion Summary

The collection of knowledge areas, skills, or abilities listed in the preceding sections is not intended to represent a complete list of every relevant CPE knowledge area, but does comprise a robust list of items that can be used to validate career-planning documents and assist in creating an effective survey instrument to understand the CPE needs of DOD FM professionals. In addition to the questions about specific knowledge areas, the government organized FM CPE school advisory board was asked for their opinion about how educational technologies might affect the future of CPE delivery. There was moderately strong agreement that changes in the DOD workforce will change how mid-career CPE providers deliver curricula, and that IT innovation will shape those new delivery methods. There was also agreement that time demands at work may prevent more learners from attending in-residence training in the future.

However, the advisory board expressed strong agreement that in their opinion, curricula delivery via methods using ET (distance learning, webinars, podcasts, computer based training, etc.) was not necessarily more effective, inexpensive to develop, or inexpensive than in-residence training. It is important to understand the perspective of

this group, as they are in a position to influence how resources are allocated for DOD FM CPE programs, including any future CSCL initiatives.

Finally, the board disagreed with the idea that in-residence FM CPE would become cost prohibitive, or that organizations would not have the flexibility to allow personnel to attend in-residence CPE programs. Because the members of the board are responsible for allocating the resources that allow personnel to attend in-residence training, this is a significant observation. Their perception is that there is value in in-residence education that exceeds the cost of providing that opportunity. Some of this value is the professional networking that occurs and is the subject of chapter 5 of this dissertation.

There was unanimous agreement by the advisory board of the statements “The changing DOD workforce will change how government organized FM CPE schools delivers curricula to students” and “Information Technology innovation will change how a government organized FM CPE school delivers curricula to students.” However, there was less agreement on how changes in the DOD environment (time available, money available, workforce flexibility) would precipitate CPE program changes.

The advisory board’s observations on how educational technologies would contribute to the future of in-residence FM CPE can be categorized into two groups. The first group is comprised of four members of the advisory board that disagreed with the statement that in-residence CPE would become cost prohibitive, and that “other course delivery methods (distance learning, webinars, podcasts, computer based training) are as effective or less costly than in-residence training. One member wrote that providing funds for in-residence training is “leadership issue.” A comment from another member

indicated that they did believe that the cost of providing live guest speakers may become excessive and that the use of video teleconferencing would help. This same member also indicated that they believed that the size of the future FM workforce and the operational tempo of uniformed members of the FM community may affect how government organized FM CPE schools deliver CPE programs to students in the future.

Only one member of the advisory board indicated agreement with the statement that “course delivery methods using information technologies are less expensive to than in-residence courses to develop.” There was moderate agreement with the statement that courses delivered using information technologies are less costly to operate.

In summary, while the advisory board does agree that changes in the DOD workforce, the DOD resource environment, and information technology innovation will change how government organized FM CPE schools deliver continuing professional education to FM personnel, they do not agree that education delivered through current distance learning methods is as effective, or less costly than, in-residence training.

Table 15 is a summary of knowledge areas reviewed in this chapter. Knowledge areas are listed in order of research recommendation for inclusion in a FM CPE program and then alphabetically. The right most column lists the DFM&CS Advisory Board level of agreement for the related knowledge area. For those additional knowledge areas that were provided by the Advisory Board later (e.g. collaboration) no level of agreement information is available.

Table 15

Summary of Knowledge Areas and Recommendations

Knowledge Area	Research Recommendation for Inclusion in FM CPE	DFM&CS Advisory Board Evaluation
Negotiating	Include, requires new curriculum	Strongly Agree
Developing as a team leader/member	Include, especially the concept of virtual teams	Strongly Agree
Use of Information Technology	Include (Note 1)	Agree
Persuasiveness	Include as part of another knowledge area	Agree
Pattern Recognition	Include as part of another knowledge area	No Opinion
Determining Intellectual Value	Include as “Intellectual Capital Management”	Disagree
Oral Communications	Include	Strongly Agree
Written Communications	Include	Strongly Agree
Planning	Include	Strongly Agree
Decision Support	Include	Strongly Agree
Use of Concepts	Include	Moderately Agree
Budget	Include	Moderately Agree
Developing Policy	Include	Moderately Agree
Stimulating Professionalism	Include	Moderately Agree
Using Managerial Statistics	Include	Agree
Operations Research	Include	Agree
Quantitative Analysis	Include	Agree
Economics	Include	Agree
Understanding Human Resource Policy	Include	No Opinion
Operations Management	Include	Disagree
Organizational Behavior	Include	Disagree
Social Objectivity	Include	Disagree
Auditing for Management	Include	N/A
Collaboration	Include	N/A
Joint Operations	Include	N/A
Portfolio and Project Management	Include	N/A

(table continues)

Table 15 (continued)

Knowledge Area	Research Recommendation for Inclusion in FM CPE	DFM&CS Advisory Board Evaluation
Systems Thinking	Include	Moderately Agree
Self-Confidence	Do not include (Note 2)	Disagree
Accounting	Do not include	Agree
IT Innovation	Do not include	Agree
Attention to Detail	Do not include	Agree
Developing Others	Do not include	No Opinion
Managing Diversity	Do not include	No Opinion
Theory Building	Do not include	Disagree
Initiative	Do not include	Disagree
Empathy	Do not include	Disagree
Marketing	Do not include	Disagree
Emotional Intelligence	Do not include	N/A
Comptrollership	Additional research needed	Strongly Agree
Networking	Additional research needed	Strongly Agree
Group Management	Additional research needed	Moderately Agree
Identifying Economic Value	Additional research needed	Moderately Agree
Flexibility	Additional research needed	Agree
Human Value Management	Additional research needed	Agree
Banking and Finance	Additional research needed	No Opinion
Efficiency Orientation	Additional research needed	N/A
Performance Management	Additional research needed	N/A

Note 1. Proposes a skill assessment to validate need for additional training.

Note 2. Self-confidence may be a byproduct of attendance in a CPE program. See section on self confidence for additional information.

Conclusion

The purpose of this exploratory investigation into relevant DOD FM CPE knowledge areas was to develop a foundation for a quantitative investigation to explore the perceptions of all stakeholders involved in DOD FM CPE. Using the topics identified and refined in this research, a survey instrument will need to be created, and authority granted from the DOD to distribute to an adequate number of FM personnel across all of

the services and agencies that have need of CPE to obtain a significant sample size. There are very strict protocols in place to protect DOD personnel from unauthorized research, and further investigation will require approval from all of the services, agencies, and DOD Headquarters to proceed. Before that can take place, sufficient foundation must be established to validate the research request. This research should provide that foundation.

This research identified comptrollership, negotiation, decision support, and team leader and/or member development as important knowledge areas. Comptrollership, encompassing accounting, budgeting, and costing should be the foundation of a DOD FM CPE course. Finally, team development (and by extension collaboration) are vital in this dynamic and challenging environment, where the issues are complex, global in nature, and require extensive expertise in many knowledge domains. Effective teamwork enables organizations to take better advantage of intellectual resources available to solve complex problems.

Recommendations for DOD FM CPE Providers

In a document entitled *2003 Army Civilian Training, Education, and Development System: Comptroller Plan*, the Army identified several centrally funded professional development programs. The Professional Resource Management Course (PRMC) at Syracuse University, the Professional Military Comptroller School (PMCS) at Maxwell AFB — now known as the Defense Financial Manager and Comptroller School (DFM&CS), the 14-month Army Comptrollership Program at Syracuse University, and other long-term formal education programs at other colleges and universities.

The Air Force identifies DFM&CS as the primary mid-career CPE provider. They lists the Basic Financial Manager Officer Course (BFMOC) for initial training, and the Financial Manager Squadron Officer School (FMSOC) as follow on training within the first four years of a FM officer’s career. Additionally, the Air Force suggests that personnel acquire graduate education and obtain test-based certifications (CDFM, CGFM, CPE, etc.)

In the Navy’s recently released career roadmaps, it is highly recommend that Financial Management Analysts (series 501) and Auditors (series 511) can acquire mid-career (or journey level) education at the Practical Comptroller Course (PCC), DFM&CS, and the Enhanced Defense Financial Management Training Course (EDFMTC). In addition, the Manager’s Internal Control Program (governed by SECNAV Instruction 5200.35E), and courses in basic governmental accounting are encouraged.

The Marine Corps MOS roadmap recommends the Defense Financial Management Course (DFMC) at DFM&CS, the Enhanced Defense Financial Management Training (EDFMT), and the Budget Analysis Workshop offered by the USDA for additional *skills training*. The words “skills training” are emphasized to highlight the disparity of defining CPE within the DOD.

The American Society for Military Comptrollers suggests 52 topics for CDFM CPE credit. Most of those topics are covered by the knowledge areas considered in the preceding sections of this chapter. However, this list does provide another external source validating information regarding relevant CPE knowledge areas.

Recommendations for Future Research

Recommendations for future research include creating a survey instrument that can assess DOD FM personnel's perceptions of the CPE program knowledge areas that they would find useful and compare it with the results from this initial research effort. Secondly, proceed with obtaining permission from the necessary authorities to pilot test and deploy a research instrument to appropriate groups of DOD FM personnel to ensure statistical significance. The instrument should collect relevant demographic data (supervisor, non-supervisor, time in career, time in position, education, etc.) that will help interpret research results. With quantifiable research results in hand, CPE providers can make effective decisions regarding future CPE curriculum knowledge areas and delivery methods.

CHAPTER IV. AN ANALYSIS OF FACTORS AFFECTING KNOWLEDGE
TRANSFER IN A DEPARTMENT OF DEFENSE PROGRAM CONTINUING
PROFESSIONAL EDUCATION PROGRAM FOR FINANCIAL MANAGERS

Abstract

This research extends existing learning theories to develop a model of learner understanding for a United States Department of Defense (DOD) Financial Manager (FM) continuing professional education (CPE) course. The model, tested using End of Course (EOC) survey data collected from adult learners attending a one-week course on decision support skills, suggests that student understanding is primarily affected by textual and multimedia materials, and computer based simulations and exercises. Faculty and guest speaker effectiveness were of secondary importance. The implication for CPE program managers, and information systems researchers designing computer supported collaborative learning (CSCL) programs is that the quality of the course material is paramount as the role of faculty moves from that of “instructor” to “facilitator.”

Introduction

Emerging educational technologies (ET) have the potential to leverage existing training and educational resources (time, people, and money) to enable more personnel to be educated more effectively. As in the commercial sector, the United States Department of Defense (DOD) is researching alternatives to improve continuing professional education (CPE) programs. The primary purpose of this research is to identify factors, some of which may be unique to the military training environment, that may influence knowledge transfer (understanding). By extending established learning theories, a composite model of adult learner understanding is created and evaluated using End of Course (EOC) learner satisfaction data from a one week DOD Financial Manager (FM) CPE course on decision support.

Following a format suggested by Creswell (1994) for quantitative research, the following paragraphs provide background by discussing the primary questions that motivated this research, the context, and the purpose for the study. The introduction concludes with a discussion of study limitations, and addresses the significance of this research to academics and CPE program directors. The second section of this chapter consists of a review of literature to include various theoretical perspectives, and hypotheses development. Following the theoretical development, the methods and results sections provide statistical evidence to evaluate the research results. The conclusion provides a discussion of results, real world implications and possible future research.

Research Question

To understand the primary research question, we must first discuss a basic question “What is the purpose of continuing professional education?” Cyril Houle (1980), who contributed immensely to the understanding of continuing professional education stated:

The ultimate aim of every advanced, subtle, and mature form of continuing education is to convey a complex attitude made up of a readiness to use the best ideas and techniques of the moment but also to expect that they will be modified or replaced.... Everyone must expect constant change and with it new goals to be achieved and new understanding and skill to be mastered. The major lesson of continuing education is to expect that the unexpected will continue to occur. (p. 75)

Although Houle proceeds to argue that lifelong professional learning is much more complex than the description provided above, it should suffice to establish a common framework for the remainder of this discussion. In the most basic sense, the transfer of knowledge to help solve new problems is the objective of organizations that provide CPE. The research question then becomes “what factors may affect the transfer of knowledge (understanding) of adult learners?”

Context

As the U.S. economy continues shifting from the industrial age to the information age, and the knowledge society continues to expand, CPE will become more of a reality for workers across the United States (Daley, 2002). With advancements in IT progressing

at a geometric rate, continuous learning will be required for personnel to become or remain IT literate. However, additional knowledge, skills, and abilities beyond IT training will be required for personnel to thrive in an information society organization so that workers continue to provide value to their organizations.

The cost of attending in-residence CPE courses continues to rise. Travel, lodging, and per diem cost prevent organizations from sending many of their personnel to in-residence training; as a result, they seek other, less costly alternatives. It is in this environment of increasing CPE need and declining resources that this research takes place.

Purpose of the Study

The primary purpose of this study is to identify factors that may influence learner understanding. By identifying possible factors, a model of knowledge transfer (understanding) effectiveness may be identified. Using this model, CPE program directors can make decisions about how changes to curricula may affect learners' perceived value of the knowledge transferred. Factors affecting learning programs, especially those with a significant educational technology (ET) component, are not well understood (Hickey, Kindfield, Horwitz, & Christie, 2003; Wallace, Kupperman, Krajcik, & Soloway, 2000). By better understanding the factors affecting program value, program directors can make rational decisions to optimize value and minimize cost. At the extremes of this argument are two anchor points. At the low end of cost, simply provide no CPE to DOD FM personnel. The probability is that this course of action would have greater long term cost because of less effective administration of billions of taxpayer

dollars that would be misspent while providing national security. At the other extreme, do not worry about the cost, provide every type of CPE imaginable, all of the time, in every mode available. Obviously, this alternative would be very costly, and would likely waste many resources, providing CPE capabilities that are not used. Somewhere between these two extremes is an optimum solution, which provides the best mix of relevant CPE with a minimum use of resources. However, how can we find that optimum solution, if we do not understand how to evaluate a particular program's ability to affect learner understanding? As fiscal pressure to provide CPE via virtual learning methods increases, understanding factors affecting knowledge transfer (learner understanding) will also become more important (Argote, Ingram, Levine, & Moreland, 2000).

Limitations and Delimitations of the Study

As with any quantitative study, the usefulness and generalizability of the results is limited by the scope of the data collected for analysis. Given the limited population from which the sample data was drawn, these results may have limited value if applied to other adult learner populations without careful consideration. The nature of DOD organizations (i.e. non-profit, military orientation, a workforce of enlisted, civilian, officer, and contractor personnel), may make direct comparisons to commercial organizational CPE needs, values, and perceptions difficult. However, with that limitation stated, there is some probability that factors affecting learner understanding in the DOD FM environment are also present in other continuing professional education settings. The scope of this inquiry was limited to DOD FM professionals in order to obtain actionable results that could be applied to a particular CPE course that is undergoing review.

Significance of the Study

The results of this study are directly significant to governmental and commercial providers of DOD FM CPE. An appreciation of factors that may affect learner understanding within the context of this specific learning environment will allow providers to focus resources on those factors that provide the largest impact.

Literature Review

There are many theories on how people learn, but no single theory seems to account for the many facets of learning throughout and individual's life (Knowles, 1990). In fact, Hoberman, and Mailick (1994, p. 18) were more emphatic about the state of learning theories when they asserted that "The theories relating to learning, motivation for learning, learning styles, and transfer of learning are redundant and occasionally contradictory, with little empirical evidence to support any."

Lewin and Cartwright (1951) identified a five-element cycle of learning: abstraction, concrete implication, experience, observation-feedback, and reflection — leading back to the next level of abstraction. Around 1974 Dewey developed a repeating three-phase learning process model: experience, reflection, and practice (Hoberman et al., 1994). Then Houle (1980) identified three modes of learning: inquiry (process of creating new knowledge), instruction (disseminating established skills, knowledge, etc.), and performance (internalizing knowledge so that it becomes fundamental to the learner's work habits). Learning theory tries to address many aspects of the human condition; individual, group, and social psychology, knowledge creation, transfer, and retention, resource scarcity, and man's physical limitations. While there are many theories of

learning, they generally fall into one of the following categories: behaviorism, cognitivism, design-based, humanism, and constructivism. Behaviorism, made famous by B. F. Skinner (1953), asserts that people operate on a principle of “stimulus-response” and that all learning behavior is caused by external stimuli. The cognitivism paradigm is that learning is essentially information processing, and that learners are information processors. Design based research is a more recent learning theory, attempting to merge theory, empirical research, and practice to produce practical prescriptions to improve learning. Humanism is more of philosophy than a paradigm, asserting that learning is an active process, engaged in by people to fulfill their potential. While each of these paradigms has merit in explaining facets of andragogy, the constructivism perspectives may explain more observed phenomena.

Constructivism

Constructivism purports that learners build a subjective representation out of objective reality, linking new information to existing knowledge. In constructivist theory, Bruner (1966) proposes several assumptions:

- (1) learner is predisposed towards learning,
- (2) knowledge can be structured to facilitate learner understanding,
- (3) there exists more effective sequences in which to present material.

Knowledge transfer can be made more efficient by considering the introduction of new materials so that it builds on knowledge that the learner already knows, in a “spiral” development. The constructivist paradigm appears the most appropriate for modeling the adult learning environment experienced in DOD CPE, in that learners and instructors

both bring a wealth of professional experience to the classroom. Nowlen (1988) identifies three types of CPE, the update, competence and performance models. In the update model, professionals are “updated” on new knowledge in their field. The competency model of CPE attempts to explain what types of knowledge a professional must acquire in the context of what they need for actual practice. Chapter two of this study identified several new areas that should be included in a CPE program for DOD FM professionals to ensure future competence. These knowledge areas include the use of information technology, virtual team leadership, and quantitative analysis tools.

Finally, the performance model incorporates the “update” and “competence” models, but encompasses individual and group performance as well. At the organization that provided the data for this research, the faculty are not professional instructors, although they do attend a two-week, formal instructor training program. Instructors are recruited from the uniformed and civilian ranks of the profession (financial managers) and serve as instructors for a two or three year assignment. This environment is ideally suited to the “... awareness of the social construction of knowledge, with emphasis on discussion, collaboration, negotiation, and shared meanings” (Ernest, 1995, p. 485), and the view that “the role of the teacher may fruitfully be cast as a coordinator, facilitator, or resource advisor” (Gergen, 1995, p. 32). Criticism of constructivism is based mainly on the assumption that novice learners lack the underlying mental models and foundation knowledge necessary for constructivist methods to work (Kirschner, Sweller, & Clark, 2006).

While this argument has merit, constructivist would counter that working professionals, by definition, have the necessary background knowledge to facilitate

learning using constructivist ideology. Even within the constructivism paradigm, there is a plethora of views, including radical, social, physical, evolutionary, postmodern, social, information-processing, and cybernetic systems (Murphy, 1997). The following paragraphs provide brief descriptions for several, but not all, constructivist learning theories that may provide better explanations of observed behavior in CPE scenarios than theories based on other philosophical perspectives, and thus are more applicable to this research. These learning theories include, but are not limited to, adult learning theory, problem based learning, social development theory, and situated learning.

Adult Learning Theory

Most educational theories address the education of younger, inexperienced, usually more passive learners. The study of the education of children is often referred to as pedagogy. Andragogy, the theory of adult learning (ALT), suggests that adults are more assertive regarding the learning experience. Theories on adult learning suggests that adults need to know why they need particular knowledge (i.e. that the knowledge is relevant to their needs), need to be self-directed, will bring work-related experience, use a problem-centered approach to learning, and are motivated by extrinsic and intrinsic factors (M. Knowles, 1990). Accordingly, the first hypothesis follows:

H1A: A learner's perception of new knowledge relevance has a positive effect on learner understanding.

H1B: A learner's perception of control of the learning environment has a positive effect on learner understanding.

H1C: Higher levels of problem-based learning are associated with higher levels of learner understanding.

H1D: Higher levels of learner intrinsic motivation are associated with higher levels of learner understanding.

H1E: Higher levels of learner extrinsic motivation are associated with higher levels of learner understanding.

Problem Based Learning (PBL)

Learning occurs in small, interactive groups, with active discussion, using the combined knowledge and experience of the group (Barrows, 2002). A key element of PBL includes the presentation of unresolved, ill-structured problems. Barrows also recommends that the problem must be sufficiently complex to trigger learning, transparent enough to guide the learner toward a solution process, yet not so difficult as to be unsolvable, and if possible, a problem that the learner will encounter in life or career.

Other elements of PBL include learners assuming responsibility for their own learning; the instructor facilitates learning, guiding discussions and learning activities rather than lecturing to the learner. The role of the instructor becomes much more complex in problem based learning, requiring more preparation.

H2A: Learning using appropriate problems has a positive effect on learner understanding.

H2B: Higher levels of a student accepting responsibility for his or her own learning are associated with higher levels of learner understanding.

H2C: Higher levels of instructors involvement as a facilitator (as opposed to lecturer) are associated with higher levels of learner understanding.

Social Development Theory

Social Development Theory (SDT) has three components: The role of social interaction, the More Knowledgeable Other (MKO), and the Zone of Proximal Development (ZPD). Although the original context for this theory came from language learning in children, it has been extended into other areas of learning. Vygotsky (1978) proposed that instruction is more efficient when students receive appropriate guidance that is mediated by tools. An instructional tool is any instrument that organizes and provides information to the learner, including mentors, peers, printed materials, computers, etc. that become the de facto more knowledgeable other. By helping learners complete tasks near the upper end of their ZPD, the MKO helps the learner stretch their understanding into new areas. Or put another way, “The difference between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). An extremely simple example of this concept is a crossword puzzle that has the printed puzzle solution on a different page. The learner attempts to solve the puzzle independently, and upon reaching a point where their knowledge is insufficient, retrieves a word from the printed solution. At this point, the learner has advanced their knowledge thanks to the MKO, but can now return to the puzzle with this new information and again use their own knowledge to attempt to find the remaining puzzle’s solution. The learner has interacted with (glimpsed

at) the more knowledgeable other (the puzzle solution) at the upper edge of their zone of proximal development (when they were stuck). If the learner just copies the entire solution into the empty puzzle, the inference is that less learning has occurred. Too much interaction by the MKO can be harmful, but without this interaction, new learning would not have taken place. Hypotheses that can be derived from this theory are as follows:

H3A: Higher levels of interaction with the MKO has a positive effect on learner understanding.

H3B: Use of interaction tools has a positive effect on learner understanding.

Situated Learning

Situated learning (SL) is based on the theory that learning (understanding, knowledge transfer) is based on the activity, context and culture in which the learning takes place, in other words, the situation where the learning occurs (Lave & Wenger, 1991). In situated learning, “communities of practice,” social interaction, and collaboration are essential to the social construction of knowledge. It is in this aspect that SL is applicable to DOD FM CPE. Financial managers definitely make up a community of practice, and the need to collaborate on solving financial problems on a global scale requires collaboration. As FM personnel are promoted through the ranks, they move from the periphery to the center of the community, assuming the role of expert (Lave & Wenger, 1991). The hypothesis generated by this perspective is as follows:

H4: Learning in realistic situations has a positive effect on learner understanding.

Next, having developed separate hypotheses for DOD FM CPE student understanding from the aforementioned theories of learning, the hypotheses are

summarized in Table 16. To test these hypotheses against the available data, the next step is to create constructs and model the hypothetical relationship between the latent variables.

Table 16

Summary of Hypotheses

Hypotheses and Description
H1A: A learner's perception of new knowledge relevance has a positive effect on learner understanding.
H1B: A learner's perception of control of the learning environment has a positive effect on learner understanding.
H1C: Higher levels of problem-based learning are associated with higher levels of learner understanding.
H1D: Higher levels of learner intrinsic motivation are associated with higher levels of learner understanding.
H1E: Higher levels of learner extrinsic motivation are associated with higher levels of learner understanding.
H2A: Learning using appropriate problems has a positive effect on learner understanding.
H2B: Higher levels of student accepting responsibility for their own learning are associated with higher levels of learner understanding.
H2C: Higher levels of instructors acting as facilitator (as opposed to lecturer) are associated with higher levels of learner understanding.
H3A: Higher levels of interaction with the MKO has a positive effect on learner understanding.
H3B: Use of interaction tools has a positive effect on learner understanding.
H4: Learning in realistic situations has a positive effect on learner understanding.

Testing of the hypotheses used real world, learner provided end of course observations. The following section details the research methodology, including the research design and data collection methodology.

Methods

Research Design

The philosophical perspective of this research is a post positivist, quantitative, exploratory investigation, using archival research methods (Jenkins, 1985). To explain further, this inquiry is positivist in perspective by attempting to use rational scientific method to understand observed phenomenon. It is post positivist in that it acknowledges that learner behavior is to a degree non-deterministic and so variable that only limited generalities may be measured about any grouping of humans. This variability is compounded by the inability to carefully control real life situations that a researcher may need to observe to understand the phenomena. Within this context, a quantitative analysis of learner responses to end of course satisfaction data may provide insights on the relationship between factors affecting learner understanding within the short FM CPE program.

Data Collection

Data used for this research was obtained from 146 end of course (EOC) student surveys taken at the end of five short FM CPE courses. Three of the courses were delivered in residence, and two were delivered via mobile training to the learner's home base. This research is an analysis of the information obtained from the surveys. The parent command, an organization whose primary mission is the professional development of DOD military and civilian personnel, has an administrative section responsible for developing, distributing, and collecting EOC evaluations from learners attending many different CPE courses. Over the years, as information technology has advanced, the processes associated with obtaining EOC learner input have also evolved from paper-

based surveys to online databases. The data used for this research represents EOC surveys distributed and collected using a web based survey system.

Demographics

The learner demographics listed in Table 17 are taken from self-reported course enrollment data for the classes used for this research and indicate that of the learners who were enrolled in the class, approximately 56% were female. Overall, students were in their mid forties, and had an average of 17 years of government service. Additionally, a majority of learners enrolled in the course had at least an undergraduate degree and over 75% of the learner’s possess a master’s degree as indicated by the data in Table 18.

Table 17

Learner Gender and Age Demographics

Female	Male	Average Age	Average Time in Service
87	69	44.5	17.4

Table 18

Learner Previous Education Level by Count

Ph.D.	M.A./M.S.	B.A./B.S.	A.A./A.S.	High School
0	118	26	7	5

Measurement Instrument

The measurement instrument is a 32-question survey that collects quantitative and qualitative responses relating to learner satisfaction that is delivered on the last day of the course. The students are provided a web link and take the survey online, scoring questions on a four-point Likert scale with anchors ranging from strongly agree (1) to strongly disagree (4). In-residence classes use school provided laptops to complete the survey, and mobile class students are requested to complete the survey as soon as possible. The students are encouraged but are not required to complete the EOC survey. The indicators used from the EOC survey, their mean, associated standard deviation, skewness, and kurtosis are listed in Table 19.

Table 19

Indicator Analysis

Q	Indicator	N Valid	Missing	Mean	Std Dev	Var	Skew	Kurtosis
1	Resident faculty conducted professional and effective presentations.	146	0	1.23	0.48	0.23	2.42	7.61
2	Resident faculty demonstrated lesson/topic preparation.	146	0	1.18	0.44	0.19	2.84	11.10
3	Resident faculty demonstrated subject matter knowledge.	145	1	1.14	0.41	0.17	3.54	16.85
4	Resident faculty supplied clarification or directions as needed.	146	0	1.32	0.54	0.29	1.74	3.75

(table continues)

Table 19 (continued)

Q	Indicator	N Valid	Missing	Mean	Std Dev	Var	Skew	Kurtosis
5	Resident faculty supplied assistance and support as needed.	146	0	1.30	0.52	0.27	1.77	4.14
6	Resident faculty instruction covered the objectives/main points of each lesson.	145	1	1.23	0.47	0.22	2.33	7.54
7	Guest speakers conducted professional and effective presentations.	142	4	1.55	0.69	0.48	1.13	1.04
8	Guest speaker demonstrated lesson/topic preparation.	141	5	1.52	0.62	0.38	0.95	0.83
9	Guest speakers demonstrated subject matter knowledge.	141	5	1.39	0.57	0.33	1.38	2.22
10	Guest speaker instruction covered the objectives/main points of each lesson.	141	5	1.51	0.65	0.42	1.22	1.72
11	Essential handouts were available.	146	0	1.54	0.66	0.43	0.96	0.49
12	Handouts aided understanding of the materials presented.	146	0	1.49	0.61	0.38	0.85	-0.27
13	Textual materials were current.	141	5	1.47	0.55	0.31	0.64	-0.67
14	Textual materials were useful.	142	4	1.50	0.60	0.37	0.98	0.98
15	In its entirety, the course content was current and pertinent to FM.	143	3	1.34	0.54	0.29	1.62	3.27
16	Lectures given by resident faculty aided my understanding.	146	0	1.30	0.48	0.23	1.07	-0.36
17	Lectures given by guest speakers aided my understanding.	140	6	1.65	0.68	0.46	0.85	0.72

(table continues)

Table 19 (continued)

Q	Indicator	N Valid	Missing	Mean	Std Dev	Var	Skew	Kurtosis
18	Computer assisted models/exercises aided my understanding.	143	3	1.45	0.58	0.33	0.88	-0.22
19	Videotape/film presentations aided my understanding.	145	1	1.43	0.54	0.29	0.67	-0.73
20	Case studies and seminars aided my understanding.	146	0	1.25	0.45	0.20	1.42	0.65
21	Student speaking assignments aided my understanding.	146	0	1.40	0.52	0.27	0.72	-0.82
22	Outside writing assignments aided my understanding.	143	3	1.69	0.56	0.32	0.07	-0.62
23	Outside reading assignment aided my understanding.	128	18	1.68	0.60	0.36	0.27	-0.62
24	Question and answer sessions aided my understanding.	144	2	1.44	0.55	0.30	0.73	-0.55
25	Quizzes complemented and reinforced the learning process.	116	30	1.96	0.83	0.69	0.83	0.50
26	Written examinations measured my comprehension of the material presented.	114	32	1.97	0.83	0.68	0.82	0.50
27	How would you rate the quality of non-faculty support?	138	8	1.41	0.51	0.26	0.56	-1.29
28	How would you rate the quality of the educational facilities?	138	8	1.46	0.57	0.32	0.75	-0.45
29	The effectiveness of instruction for this course is "excellent" or better.	144	2	1.36	0.59	0.34	1.61	2.64

(table continues)

Table 19 (continues)

Q	Indicator	N Valid	Missing	Mean	Std Dev	Var	Skew	Kurtosis
30	Overall, I believe this course is managed very effectively.	144	2	1.28	0.50	0.25	1.47	1.22
31	This course is a highly valuable experience in my professional development.	145	1	1.36	0.59	0.34	1.62	2.68
32	This course accomplished its mission in an “excellent” or better manner.	146	0	1.35	0.55	0.30	1.27	0.66

There were 157 students initially enrolled in the five classes; 156 graduated and 146 submitted EOC surveys via the Internet for a response rate of 93.6%, which is similar to the historical response rate of 92% for the DFM&CS EOC surveys. A sample size of 100 to 200 is considered a medium sized sample and may provide reliable statistical results (Kline, 2005). The Partial Least Squares (PLS) procedure to analyze possible relationships between the indicators is appropriate because of PLS’s ability to “model latent constructs under conditions of non-normality and small to medium sample sizes” (Chin, Marcolin, & Newsted, 2003, p. 25).

Kline (2005) provides a rule of thumb concerning skew and kurtosis. Skew index values above 3.0 may be described as extremely skewed, and kurtosis index values above 10.0 may suggest a problem, while kurtosis index values above 20.0 may indicate a serious problem. Using these criteria, Q3 – “Resident faculty demonstrated subject matter knowledge” with a skew index of 3.54 and is leptokurtic with a kurtosis index value of 16.85 was not used in the final measurement model. As discussed earlier, the faculty providing CPE at the government FM CPE organization are subject matter experts, so it

is not overly surprising that learner's evaluation of the faculty's knowledge would be positively skewed with 89% strongly agreeing with the statement.

Data Analysis

Research Results

The first step of the analysis involved performing a factor analysis with all 32 indicators, using Principal Component Analysis (PCA), and a Varimax rotation with Kaiser Normalization. This analysis resulted in the extraction of seven components. A Scree Criterion test using a Scree Plot depicted in Figure 1 indicates approximately seven components, which are also listed in Table 20.

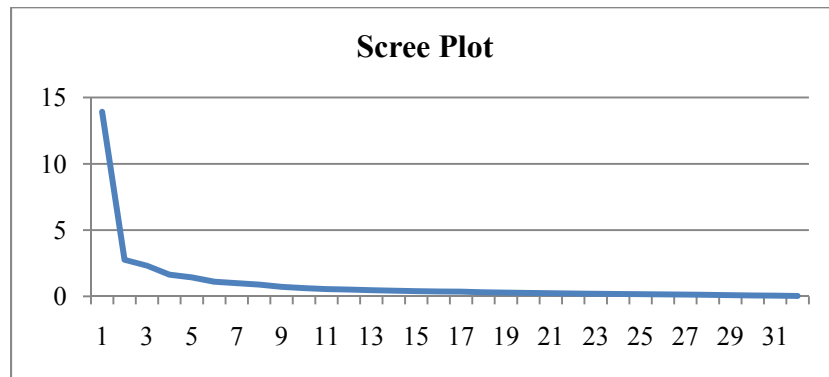


Figure 1. Scree Plot of Component Analysis

Table 20

Rotated Component Matrix

Indicator	Component						
	1	2	3	4	5	6	7
Q15. In its entirety, the course content was current and pertinent to FM and comptrollership.	.688		.195	.307			.117
Q20. Case studies and seminars aided my understanding.	.685	.115	.256	.208	.144	.158	
Q31. I consider this course a highly valuable experience in my professional development.	.676	.185	.328	.238	.216		.115
Q29. I would rate the effectiveness of instruction for this course as “excellent” or better.	.659	.195	.337	.342		.103	.239
Q32. I believe this course accomplished its mission in an “excellent” or better manner.	.653	.321	.387	.194	.164		.215
Q30. Overall, I believe this course is managed very effectively.	.563	.341	.237	.295			.362
Q24. Question and answer sessions aided my understanding.	.558	.207		.426	.307	.120	
Q21. Student speaking assignments aided my understanding.	.502	.130	.221		.450	.131	.289
Q16. Lectures given by resident faculty aided my understanding.	.477	.287	.195	.410	.251		.180
Q8. Guest speaker demonstrated lesson/topic preparation.	.146	.898	.169				
Q10. Guest speaker instruction covered the objectives/main points of each lesson.	.209	.879	.196	.114			
Q9. Guest speakers demonstrated subject matter knowledge.	.163	.853	.228				
Q7. Guest speakers conducted professional and effective presentations.		.822	.146		.153	.110	.178
Q17. Lectures given by guest speakers aided my understanding.	.193	.729		.137	.347		.141
Q3. Resident faculty demonstrated subject matter knowledge.	.163	.118	.863	.103	.139		
Q2. Resident faculty demonstrated lesson/topic preparation.	.215	.152	.825	.120	.140		
Q1. Resident faculty conducted professional and effective presentations.	.340	.122	.817		.165		
Q6. Resident faculty instruction covered the objectives/main points of each lesson.	.239	.275	.770	.229	.109		
Q4. Resident faculty supplied clarification or directions as needed.	.151	.310	.567	.417			.138
Q5. Resident faculty supplied assistance and support as needed.	.169	.280	.556	.434			
Q11. Essential handouts were available.	.253		.219	.793	.110	.134	

(table continues)

Table 20 (continued)

Indicator	Component						
	1	2	3	4	5	6	7
Q12. Handouts aided understanding of the materials presented.	.271		.252	.778	.152	.147	
Q13. Textual materials were current.	.363	.114		.720	.287		.121
Q14. Textual materials were useful.	.269		.203	.697	.327		.131
Q22. Outside writing assignments aided my understanding.		.199		.230	.767	.181	
Q23. Outside reading assignment aided my understanding.			.189	.332	.696	.184	.112
Q19. Videotape/film presentations aided my understanding.	.475	.124	.183	.133	.538	.177	.160
Q18. Computer assisted models/exercises aided my understanding.	.504	.183	.263	.124	.533		.110
Q25. Quizzes complemented and reinforced the learning process.	.148	.135		.122	.190	.935	
Q26. Written examinations measured my comprehension of the material presented.	.125	.148		.148	.208	.928	
Q28. How would you rate the quality of the educational facilities?	.198				.131		.875
Q27. How would you rate the quality of non-faculty support?	.265			.193	.177	.104	.808

Using the indicator loadings identified in the rotated component matrix, atheoretical model incorporating the components extracted was created. Essentially, learner understanding is directly related to the other components. This model is depicted in Figure 2. A measurement model based on Figure 2 was evaluated using SmartPLS 2.0 (Ringle, Wende, & Will, 2005) and the results are listed in Table 20. Nunnally (1978) recommends that instruments used in basic research have a reliability of approximately 0.70 or better. Using Cronbach's Alpha as a measure of reliability, the construct validity for all of the model elements meet this threshold for exploratory research. Convergent validity is examined by reviewing indicator loadings (greater than 0.70), construct reliabilities (greater than 0.80), and the average variance extracted (AVE greater than

0.50) (Fornell & Larcker, 1981). All measures meet minimum standards to demonstrate convergent validity. The components are listed in Table 21 with their associated quality criteria. Factor loadings of less than 0.1 were not reported.

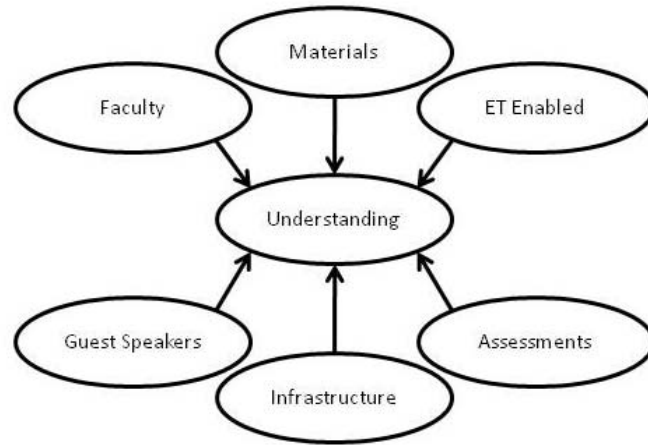


Figure 2. Component Relationship Model

Table 21

Component and Reliability Measures

Component	AVE	Composite Reliability	R Square	Cronbach's Alpha
Assessments	0.982	0.991		0.981
ET Enabled	0.636	0.875		0.812
Faculty	0.707	0.923		0.896
Guest Speakers	0.795	0.951		0.935
Infrastructure	0.850	0.919		0.825
Materials	0.783	0.935		0.908
Understanding	0.622	0.936	0.742	0.923

Next, as depicted in Table 22, an analysis of the discriminate validity was conducted to test correlations between and within each construct. Using the test that the square root of the construct AVE should be greater than the correlation between that construct and any other construct (Fornell & Larcker, 1981), a review of Table 22 indicates that all constructs also meet acceptable discriminate validity criteria minimums. Figure 3 illustrates the path and indicator loadings of the structural model. Finally, the information provided in Table 23 and the structural model is collated in Table 24 to facilitate evaluation of the learning theory hypotheses developed earlier in this chapter.

Table 22

Latent Variable Correlations and AVE

Component	AS	ETE	FAC	GS	INF	MAT	UND
Assessments (AS)	0.991						
ET Enabled (ETE)	0.459	0.798					
Faculty (FAC)	0.255	0.540	0.841				
Guest Speakers (GS)	0.303	0.452	0.509	0.892			
Infrastructure (INF)	0.253	0.458	0.318	0.277	0.922		
Materials (MAT)	0.345	0.615	0.571	0.353	0.395	0.885	
Understanding (UND)	0.368	0.711	0.695	0.537	0.541	0.716	0.789

Table 23

Structural Model Component Evaluation

Component	LV Index Values	Path Coefficients	Total Effects	Inner Model T Statistic
Assessments	1.965	0.000	0.001	0.016
ET Enabled Events	1.555	0.099	0.233	2.526
Faculty	1.246	0.174	0.271	1.836
Guest Speakers	1.517	0.072	0.137	1.704
Infrastructure	1.433	0.051	0.194	2.790
Materials	1.499	0.128	0.293	3.377
Understanding	1.337	n/a	n/a	n/a

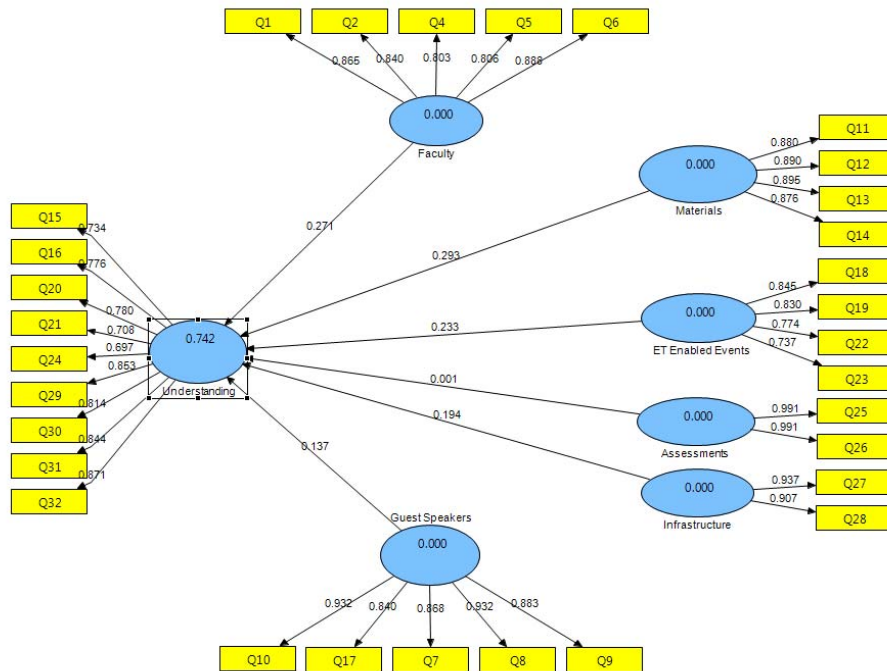


Figure 3. PLS Structural Model

Table 24

Path Coefficients, Measure Loadings, and t Values

Measures	Loading	<i>t</i> value
UND: Understanding ($R^2 = 0.742$, Cronbach's $\alpha = 0.923$, LV Index = 1.337)		
Q15. In its entirety, course content was current and pertinent ...	0.734	14.35
Q16. Lectures given by faculty aided my understanding.	0.776	15.13
Q20. Case studies and seminars aided my understanding.	0.780	14.15
Q21. Student speaking assignments aided my understanding.	0.708	11.65
Q24. Question and answer sessions aided my understanding.	0.697	13.33
Q29. Instruction effectiveness of this course is "excellent" ...	0.853	25.84
Q30. Overall, this course is managed very effectively.	0.814	18.02
Q31. This course is a highly valuable experience in my ...	0.844	20.13
Q32. This course accomplished its mission in an "excellent" ...	0.871	33.32
GS: Guest Speaker ($\beta = 0.072$, <i>t</i> value = 1.704, Total Effect = 0.137)		
Q07. Guest speakers conducted professional presentations.	0.868	21.96
Q08. Guest speaker demonstrated lesson/topic preparation.	0.932	40.09
Q09. Guest speakers demonstrated subject matter knowledge.	0.883	30.93
Q10. Guest speaker instruction covered the objectives.	0.932	42.21
Q17. Guest speakers lectures aided my understanding.	0.840	19.78
FAC: Faculty ($\beta = 0.174$, <i>t</i> value = 1.836, Total Effect = 0.271)		
Q01. Resident faculty conducted professional presentations.	0.865	16.40
Q02. Resident faculty demonstrated lesson/topic preparation.	0.840	11.99
Q04. Resident faculty supplied clarification as needed.	0.803	10.35

(table continues)

Table 24 (continued)

Measures	Loading	<i>t</i> value
Q05. Resident faculty supplied assistance as needed.	0.806	10.73
Q06. Resident faculty instruction covered the objectives.	0.888	19.95
MAT: Materials ($\beta = 0.128$, t value = 3.377, Total Effect = 0.293)		
Q11. Essential handouts were available.	0.880	26.93
Q12. Handouts aided understanding of the materials.	0.890	34.45
Q13. Textual materials were current.	0.895	34.93
Q14. Textual materials were useful.	0.876	26.13
ET: ET Enabled Events ($\beta = 0.099$, t value = 2.526, Total Effect = 0.233)		
Q18. Computer assisted models/exercises aided understanding.	0.845	33.12
Q19. Videotape/film presentations aided my understanding.	0.830	24.96
Q22. Outside writing assignments aided my understanding.	0.774	18.04
Q23. Outside reading assignment aided my understanding.	0.737	11.71
AS: Assessments ($\beta = 0.000$, t value = 0.016, Total Effect = 0.001)		
Q25. Quizzes reinforced the learning process.	0.991	207.33
Q26. Written examinations measured comprehension ...	0.991	200.72
INF: Infrastructure ($\beta = 0.051$, t value = 2.790, Total Effect = 0.194)		
Q27. How would you rate the quality of non-faculty support?	0.937	65.82
Q28. How would you rate the quality of the educational facilities?	0.907	29.34

Note: Some measures paraphrased to retain readability.

Discussion

The hypotheses, the paths between the items, and the latent construct are examined using the structural model. The theoretical paths among the latent variables and

the measurement paths were useful in identifying significant effects and the R^2 for the latent variable “Understanding” was 0.742, which means that nearly three quarters of the variance observed in “Understanding” can be explained by the model. Next, the significance of each hypothesized relationship in the model by each path are examined using the standardized path coefficients. Additionally, the variance explained (R^2) and total effects are listed in Table 21. A summary of the hypotheses test results is listed in Table 25.

Table 25

Summary of Hypotheses Test Results

Hypotheses and Description	Tested by Path	Results
H1A: Learner’s perception of new knowledge relevance has a positive effect on learner understanding.	MAT=>UND	Supported
H1B: Learner’s perception of control of the learning environment has a positive effect on learner understanding.		Unable to test this hypothesis with this data set.
H1C: Higher levels of problem-based learning are associated with higher levels of learner understanding.	ET => UND	Supported
H1D: Higher levels of learner intrinsic motivation are associated with higher levels of learner understanding.		Unable to test this hypothesis with this data set.
H1E: Higher levels of learner extrinsic motivation are associated with higher levels of learner understanding.		Unable to test this hypothesis with this data set.
H2A: Learning using appropriate problems has a positive effect on learner understanding.	MAT => UND ET => UND	Supported
H2B: Higher levels of student accepting responsibility for their own learning are associated with higher levels of learner understanding.		Unable to test this hypothesis with this data set.

(table continues)

Table 25 (continued)

Hypotheses and Description	Tested by Path	Results
H2C: Higher levels of instructors acting as facilitator (as opposed to lecturer) are associated with higher levels of learner understanding.	FAC => UND	Supported
	GS => UND	
H3A: Higher levels of interaction with the MKO has a positive effect on learner understanding.	FAC => UND	Supported
	ET => UND	
H3B: Use of interaction tools has a positive effect on learner understanding.	ET => UND	Supported
H4: Learning in realistic situations has a positive effect on learner understanding.	INF => UND	Partially Supported

Hypothesis 1A proposes that a learner's perception of new knowledge relevance has a positive effect on learner understanding. In the model, learner understanding is predicted by the availability, currency, and usefulness of materials (MAT) ($\beta = 0.128$, t value = 3.377, Total Effect = 0.293), thus Hypothesis 1A is supported at the $\alpha = 0.05$ level. This result provides empirical evidence to support the concept that having textual materials available (either electronic or hard copy) is still an important part of increasing student learning. Having useful textual materials available allows the learner to review, reflect, and consider at their convenience the information that has been provided, increasing the effectiveness of the knowledge transferred. The assumption required is that "useful" material is also "relevant" material. This finding is consistent with previous research and the constructivist philosophy of learning (McKeown, Beck, Sinatra, & Loxterman, 1992).

The learner's perception of control of the learning environment is an important element in all constructivists' theories of learning and forms the basis of hypothesis 1B.

Unfortunately, data to test the contribution of learner control to understanding is not available in the data used for this analysis. A recommendation to modify the EOC survey with questions relating to learner control will be provided to the DFM&CS Director.

Hypothesis 1C proposes that higher levels of problem-based learning are associated with higher levels of learner understanding. In the model, understanding is predicted by education technology enabled events (ET) ($\beta = 0.099$, t value = 2.526, Total Effect = 0.233), supporting hypothesis 1C at the $\alpha = 0.05$ level. In the in-residence short FM CPE program, education technologies are used to provide complex problems to the students, and receive learner responses. Education technology is used to deliver problems to the learner by displaying presentations, distributing materials to the learners, collecting writing assignments, providing feedback, and other collaboration type tasks. However, during mobile short FM CPE course classes, a lack of connectivity requires a modification to course delivery methods. With more data, it may be possible to detect significant differences in learning understanding based on the mobile class modifications. There has been interest at the government operated FM CPE school in developing a “virtual classroom” for the delivery of the short FM CPE course. This finding provides support for that concept in that learners, connected to the Internet, and that can access multimedia files, contribute written assignments, read assigned materials, and interact with computer supported collaborative learning models, simulations, and exercises, may have significantly higher understanding of the course material.

Hypothesis 1D, “Higher levels of learner intrinsic motivation are associated with higher levels of learner understanding,” and hypothesis 1E, “Higher levels of learner extrinsic motivation are associated with higher levels of learner understanding,” are not

testable with the data used for this research. Motivation, both intrinsic and extrinsic, has been shown by previous research to have a positive effect on learner understanding. However, the measurement instrument used for this analysis did not directly collect data concerning learner motivation. The unique environment of the DOD requires that personnel attend many different types of training programs throughout their career. Many learners are assigned to attend government organized FM CPE courses by their supervisors as part of the professional development, thus learner motivation is not a factor in learner attendance in some courses, like the short FM CPE program. The phrase “I was voluntold [*sic*] to be here,” is not a rare remark heard from students during the opening session of the course. Never the less, most of the students appear to be motivated and display enthusiasm throughout the course. A recommendation to add questions to the EOC survey concerning learner motivation will be made to the government operated FM CPE school, but for the purposes of this research, Hypotheses 1D and 1E are un-testable with existing data from the EOC Survey.

Hypothesis 2A, that learning using appropriate problems has a positive effect on learner understanding, is similar to hypothesis 1C. Where hypothesis 1C tested the validity of availability of problems to learner understanding, hypothesis 2A proposes that problems that are more relevant to the learner are related to higher levels of learner understanding. Higher levels of learner understanding are predicted by appropriate materials (MAT) ($\beta = 0.128$, t value = 3.377, Total Effect = 0.293) and by education technology enabled events (ET) ($\beta = 0.099$, t value = 2.526, Total Effect = 0.233) supporting Hypothesis 2A at the $\alpha = 0.05$ level. It is difficult to separate the problem for the context in which the learner receives the problem. Financial management

professionals routinely work on problems that arrive on their desk via email. They then access several types of information systems to acquire information, initiate actions, provide recommendations. Since some of problems presented to the learners attending the short FM CPE course arrive in a similar fashion, the use of ET is part of the problem set. In the short FM CPE course, learners are exposed to increasingly difficult case studies requiring them to work collaboratively to provide decision support to senior personnel. Using a combination of textual materials, writing assignments, and additional readings, the learners understanding of decision-making processes is built on as suggested by constructivist learning theories. These problems have to be challenging to the professional financial managers that constitute the learner population, but not so complex as to defy solution in the time allowed. Maintaining appropriate case studies for effective FM CPE programs may take up a considerable amount of the time, and requires creativity, collaboration, and training of the faculty to keep the problems “fresh” and useful. This result confirms the relationship between appropriate problems and learner understanding predicted by constructivist learning theory.

The next hypothesis to be tested, hypothesis 2B proposes that higher levels of student accepting responsibility for their own learning are associated with higher levels of learner understanding. Data to test Hypothesis 2B was not contained within this data set and questions that may have measured student’s perception of the amount of responsibility they have over their learning are not part of the EOC Survey. As this is an important concept in regards to the constructivist theories of learning, a recommendation to modify the EOC Survey will be made to the government operated FM CPE school to

include this and other measures that explore the student's perception of their responsibility in the knowledge transfer process associated with CPE programs.

Hypothesis 2C, "Higher levels of instructors acting as facilitator (as opposed to lecturer) are associated with higher levels of learner understanding," is tested next. In its current configuration, the short FM CPE course is presented in both a traditional format (lectures from faculty in an auditorium) and in a constructivist format (case studies, learner collaboration in seminar, student presentations, etc.). There is a significant faculty effect (FAC) ($\beta = 0.174$, t value = 1.836, $df = 145$, $\alpha = 0.05$, Total Effect = 0.271) predicted higher levels of learner understanding, supporting hypothesis 2C at the $\alpha = 0.10$ level. This finding suggests that learner understanding may be affected by faculty facilitation of the learning process. Several of the indicators (Q4 and Q5) directly measure the learner's perception of faculty facilitation (supplied clarification and assistance) which relates to Vygotsky's Zone of Proximal Distance (ZPD), significantly relating faculty facilitation to knowledge transfer. The ZPD can be described as having four stages (Tharp & Gallimore, 1988). Stage 1 is when assistance is provided by the "more capable other (instructor, computer, peer, etc.)" almost exclusively, eventually progressing to Stage 2 of the ZPD when the assistance in learning comes from the learner's own self. The challenge for curriculum designers will be to retain the ability of faculty to effectively guide learners from Stage 1 to Stage 2 when not in the geographic vicinity of the learner. This requires an appreciation of when to "step in" to assist the learner and when to let them "struggle" within their learning task, as the learner may vacillate between any of the stages as they undertake the learning task. Learner "signals" to the more knowledgeable other that the learner needs assistance may be subtle and if

not acted on promptly, may leave the learner frustrated enough to abandon the learning task. This requirement to understand at which stage of the ZPD the learner is operating in underscores the need for the instructor to be a subject matter expert. Without deep and profound knowledge of the learning task, the instructor may not recognize when to assist the learner and when to be patient (Tharp & Gallimore, 1988). Vygotsky frequently used metaphors to enrich his own writing, many that reflected his interest in movement (John-Steiner, 2007). In a similar vein, the author of this study uses a short story and a diagram (see Figure 4) to explain the facilitation process that is has been successful with adult learners attending an extended FM CPE program. The metaphor is similar to, “This CPE course is a forest of knowledge and we are at point A. I could give you the shortest route (the brown path) to the other edge of the forest (point B), but in the end of the journey, you would have learned very little. Instead, explore the forest together, collaborating on the way forward. If you get too far from the path, I will be there to point you back in the right direction. It is in these excursions from the direct path (the green line) that you will learn the most and the knowledge you acquire through collaboration (the shaded areas) is what you will take with you when you leave the forest.”

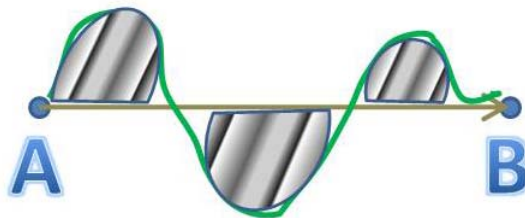


Figure 4. The ZPD Forest Metaphor

The next two hypotheses to examine are similar yet unique. Hypothesis 3A proposes that higher levels of interaction with the more knowledgeable other (MKO) has a positive effect on learner understanding. Hypothesis 3B proposes that the use of interaction tools has a positive effect on learner understanding. In one sense, the MKO is another human who assists the learner, but in recent research, the MKO can be interpreted to be the IT artifact as well. Understanding is predicted by the guest speaker effect (GS) ($\beta = 0.072$, t value = 1.704, Total Effect = 0.137); the faculty effect (FAC) ($\beta = 0.174$, t value = 1.836, Total Effect = 0.271); and the education technology enabled events (ET) ($\beta = 0.099$, t value = 2.526, Total Effect = 0.233). Together and separately, these three paths provide support to Hypothesis 3A at the $\alpha = 0.10$ level. Interaction with the MKO occurs in multiple scenarios within the current delivery method of the short FM CPE course. Guest Speaker interaction within the short FM CPE course is limited, so it is not surprising that the effect of GS on UND is small. The faculty effect (FAC) is more pronounced than GS or EF and indeed reflects the discussion regarding hypothesis 2C. Within the delivery of the short FM CPE course, the faculty is highly involved with the learners in both the in-residence and mobile iterations of the course. In fact, it was observed by the faculty that there was a greater opportunity for faculty involvement with learners during mobile training as the deployed faculty was not as preoccupied with administrative duties not directly tied to course delivery. As a result, guidance was provided to the in-residence faculty to ensure availability to learners during the in-residence course as well. Previous research extending Vygotsky's Social Development Theory has concluded that the MKO (teacher, parent, peer, etc.) is usually anyone who has greater understanding or ability than the learner as it relates to the learning task, but

that it could also be educational technologies (ET) that allow the “scaffolding” of concepts to encourage learner development (Reiser, 2002). Within the short FM CPE course, the current use of ET allows the learner to concentrate on relevant material by providing access to references and presentations, automated calculation tools for analyzing alternatives, and presentation graphics to facilitate learner presentations, which current research considers part of the task of the MKO. However, a more sophisticated use of ET is being developed that will interact with the learner to enhance the knowledge scaffolding which takes place. This knowledge scaffolding is a key element of constructivist learning theory. Using a similar argument, hypothesis 3B is also supported at the $\alpha = 0.10$ level by ET (ET) ($\beta = 0.099$, t value = 2.526, Total Effect = 0.233). In the short FM CPE course, the students use the provided IT to collaborate on case studies by solving problems, developing alternatives, evaluation and presentation of recommendations. The use of IT qualifies as an interaction tool, supporting the constructivist concept that the use of interaction tools leads to higher levels of learner understanding. This primary use of IT for interaction may be enhanced in future versions of the short FM CPE course when learners are geographically separated and use IT exclusively for interaction.

Hypothesis 4 proposes that learning in realistic situations has a positive effect on learner understanding. By using infrastructure (INF) ($\beta = 0.051$, t value = 2.790, Total Effect = 0.194) as a proxy to measure the effect of the situation where learning takes place on learner understanding, hypothesis 4 is supported at the $\alpha = 0.05$ level, the effect is not very strong. The collaboration environment of the schoolhouse as compared to collaboration environment in the “real world” may be realistic. Students attending the

short FM CPE course usually work in an office environment (cubicles), but usually collaborate in small conference rooms, or online. This is similar to the schoolhouse environment (seminar rooms equate to small conference rooms). Time pressures exist in both venues, as well as a demanding “boss” requesting decision support. In case of the short FM CPE course, the “boss” is one of the instructors, providing increased tension for the learner. However, specific questions to ascertain the fidelity between the learning environment and the learner’s working environment were not included in the EOC Survey; thus, better measures are needed to test hypothesis generated by Situated Learning Theory.

The final factor extracted, Assessments (AS) ($\beta = 0.000$, t value = 0.016, Total Effect = 0.001) is not significant. This is not a surprising result. In the short FM CPE course, students do not complete a written examination, or take formal quizzes. Faculty asks probing questions throughout the course, both during lectures and while the learners are collaborating in seminar. However, these questions are asked rhetorically, to prompt learner action, or to gain the learner’s attention. This lack of formal assessment has been identified as a shortcoming of the short FM CPE course, and action has been taken to use an audience response system (ARS) to provide the learners with feedback regarding their understanding of the material being discussed. In addition, learner responses using the ARS can also act as a signal to the faculty to intervene or allow the learners to continue to work within Stage 2 of the ZPD. Future research could revisit this analysis to see if the addition of assessment methods using an ARS change learner perceptions.

Conclusion

The results of the analysis of the short FM CPE end of course survey data have provided empirical evidence to support initiatives being considered at the government operated FM CPE school. In addition, a viable model for predicting the effect of several factors that may affect learner understanding has been identified. Government FM CPE course directors can use this research to make curriculum and course delivery modifications that may improve learner understanding, while using training resources more effectively.

The short FM CPE course that emphasizes rational decision making was developed, unintentionally, using constructivist methods. However, given the nature of the student population, the learning environment, and the abilities of the faculty that created the course, it was a logical outcome. Now that this research has identified the theoretical foundation for the course, the current faculty can incorporate constructivist ideology as they look for areas to enhance the course and prepare for delivery of the short FM CPE course via virtual learning environments.

Three specific findings merit special mention. First, is that the learner's social involvement with other learners and the faculty is critical to achieve higher levels of learner understanding. Peer learning, in the presence of a MKO, is a key ingredient of a successful CPE program. Secondly, learner control of their learning is important. Although the data set used for this study did not have any measures to assess this quality of the short FM CPE course, it was apparent from the review of constructivist research. The current configuration of the how the short FM CPE course is delivered does not allow sufficient learner control of the knowledge transfer process. Within the auditorium,

learners march lockstep through a presentation with the instructor, which is not how adults prefer to learn according to much of the available research. The team collaboration in the seminar is more conducive to learner of understanding. Third, the importance of appropriate case studies and problems cannot be stressed enough. The quality of the problem presented to the learner directly affects the level of understanding and new knowledge acquired by the learner. Emphasis should be placed on identifying numerous problems with real world implications for the learner. The following paragraphs discuss limitations of this study, recommendations based on this research, and suggestions for future research.

Limitations and Implications

As with all research that uses observational data, the generalizability of the results are a limitation, as it is difficult to obtain sufficient information about cause and effect. It is likely that there may be other explanatory variables that were not available in the data set used for this analysis that help explain the variation in learner understanding. This limitation is visible in the model created for this analysis, in that all models likely omit some aspect of reality (Shugan, 2002). Secondly, the identification of the unobserved latent variables (Understanding, Guest Speaker Effect, Faculty Effect, Materials, Education Technology Enabled Events, Assessments, and Infrastructure) were based on the researchers interpretation of the indicator variables and knowledge of the environment from which the data was generated. This in depth knowledge may have contributed to an analysis bias that another researcher would not duplicate. However, the

implications of this research is still valuable to practitioners, students, and organizations involved in providing CPE to DOD FM personnel.

The major implication of the limitations discussed in the preceding paragraph is that the model identified in this study may not contain critical factors affecting learner understanding. However, as this exploratory study has developed a sound theoretical basis upon which to build a better instrument to measure learner understanding.

Recommendations

Based on this study of EOC Survey data, several recommendations can be made that may have a positive effect on learner understanding for students attending the short FM CPE course, and for improving the measurement instrument. First, provide at a minimum a “Pre Course Quiz” and “Post Course Quiz” to provide the learner with feedback on the understanding of the course material. This also would provide the faculty with an objective measure of course effectiveness per the Kirkpatrick Model. Second, establish a methodology to associate an individual’s EOC Survey responses with Post Course Quiz results. Being able to provide an objective measure of learner success with that learner’s perception of factors that affected their level of understanding would be invaluable. Third, review and if necessary reword ambiguous and confusing EOC survey questions to ensure student understanding. Multiple interpretations, confounding questions, and undirected measures can at a minimum skew learner’s survey responses, and in some cases may cause them to not to provide any data. Fourth, use a Likert Seven Point Scale for EOC surveys, for methodological reasons. A four point scale is more ordinal than interval and can lead to normality, skew, and kurtosis issues which can affect

effective analysis. Finally, use available ET to provide more interactive exercises that the learner can use to explore at their convenience, greatly the opportunity to transfer knowledge and enhance understanding of the course material. The final section contains some suggestions for future research that extends this study and investigates other questions not covered in this analysis.

Future Research

Future research includes using additional data sets to confirm relationships and moderating effects observed in this research. Identification of additional factors that may contribute to learner understanding within DOD FM CPE may provide program managers with useful information as they modify curriculum and course delivery methods to leverage emerging ETs.

The analysis conducted for this research focused on the short FM CPE course that is delivered both in residence and at remote locations. Future research could contrast the model created for this study to other courses available at the government organization that provide professional civilian education, especially, the extended FM CPE program. Currently, the extended FM CPE program is only offered in residence. For example, it would be interesting to compare the results for the assessment latent variable (AS) from data generated by learners attending the four-week course who take a pre-test, a mid-course examination, and a final examination to the results reported in this study. The perception on how the examinations affected learners attending extended FM CPE programs understanding may be markedly different from that of learners attending shorter FM CPE courses. Another interesting difference to explore is the effect of guest

speakers on learner understanding. While guest speaker involvement with the learners attending a short FM CPE course may be limited (usually just a motivational speech on the front end of the course, and perhaps a congratulatory speech at the conclusion), the guest speaker is normally a high-ranking official or a senior member from the learner's chain of command. Unsurprisingly, the faculty effect (FAC) is twice that of the guest speaker effect (GS) for the short FM CPE program. It would be interesting to contrast the effect of guest speakers on learner understanding for students attending the extended FM CPE program. Learners attending the extended FM CPE program have much more interaction with guest speakers, to include introductions, question and answer sessions, and often share a meal. A suggestion for future research is then to analyze the relationship between GS and UND with extended FM CPE program EOC Survey data. Understanding the possible impact of a blended learning environment on factors identified in this study in, which allows learner more control over their knowledge acquisition using ET, yet retains the social interaction available in residence may help course directors make better use of scarce education resources. In addition, a better understanding of factors affecting learner understanding in the extended FM CPE program may provide additional information on how to leverage computer supported collaborative learning (CSCL) technologies in the short FM CPE course.

Future research should also investigate factors affecting the intrinsic and extrinsic motivation of DOD FM personnel regarding lifelong learning. It is critical that members of the DOD financial management workforce be as knowledgeable and informed as possible to enable them to make the best resource allocation decisions possible. A better

understanding of what motivates professionals to learn would be useful to CPE program providers.

CHAPTER V. EDUCATIONAL TECHNOLOGY IMPACT ON THE PROFESSIONAL NETWORKING ASPECT OF DEPARTMENT OF DEFENSE FINANCIAL MANAGER CONTINUING PROFESSIONAL EDUCATION PROGRAMS

Abstract

Economic factors in the emerging global economy may require organizations to leverage innovative educational technologies to decrease traditional continuing professional education (CPE) program cost. The costs of CPE include infrastructure (brick and mortar classrooms, conference centers, etc.), travel (instructor and/or student), and opportunity cost (time away from other productive work). One side benefit of existing CPE models is an opportunity for professional networking. Even though the value of professional networking is difficult to ascertain, the perception is that long-term professional relationships provide economic benefits for both the individual and organizations. Using a Monte Carlo simulation with real world CPE cost data, this research develops and discusses various economic models to evaluate cost versus benefit alternatives from an organizational perspective.

Introduction

As the Information Age continues, the impact of information technology (IT) on customer services and product delivery has been unmistakable. Banking, shopping, and learning behaviors have evolved as new capabilities emerged. These new behaviors, for the most part, coexist with existing behaviors, allowing institutions to explore innovative delivery of services and products. For example, before automated teller machines and the introduction of direct deposit, bank customers spent hours on Friday afternoons depositing their paychecks and getting cash. As a result, there was lost productivity because of transaction inefficiencies accepted as a cost of business until feasible alternatives became available. However, lines at banks still exist. Some customers are unable or unwilling to adapt to the new technologies for everyday needs, others may need a product or service not readily available online, and they are willing to pay the higher transaction cost in terms of loss productivity. Regardless, traditional behaviors and emerging behaviors that take advantage of IT innovations coexist.

In a similar manner, how Department of Defense (DOD) Financial Managers (FM personnel) acquire Continuing Professional Education (CPE) is changing. As the transaction cost of sending personnel to in-residence training at a central location continues to escalate, feasible alternatives that incorporate educational technologies (ET) are starting to emerge.

Theories relevant to adult education continue to evolve, but draw from the research of Knowles, Vygotsky, and others who postulated that learners need to be involved in the planning and evaluation of their instruction, learn through experience and social interaction, are most interested in topics that are relevant to their careers or

personal life, and that are oriented to real world problems (Knowles, Holton, & Swanson, 2005; Vygotsky, 1978). Specifically, in this article, we examine the possible relationship between educational technologies, andragogy, and professional networking.

Computer supported collaborative learning (CSCL) technologies may reduce the requirement for geographically collocating the instructor and student in a physical environment and subsequently, the associated infrastructure and travel cost. In addition, the opportunity cost (attending training instead of contributing to the organization's mission) to attend CPE events will decrease, that may allow more personnel to acquire CPE. As the population that normally attending CPE events are working professionals, we will refer to the individual as an adult learner, or simply "learner." Similarly, those providing CPE may have a variety of labels, but for simplicity, we will use the term "instructor."

Table 26 lists some factors to consider when considering the impact of ET on DOD FM CPE program social networking. While this list may not be complete, it identifies that there are many combinations of CPE program delivery to consider when analyzing possible relationships between the primary actors. For example, in a traditional setting for CPE, the learner travels to a schoolhouse where the instructor provides instruction. A more recent scenario involves the instructor teaching from home while the learner learns from home. In some scenarios, often referred to as a blended environment, multiple course delivery methods may exist simultaneously. Each of these alternatives may have positive and negative aspects. The focus of this study is to develop a model for understanding the possible affect of ET on the social networking of DOD FM personnel attending CPE programs.

Table 26

Factors Impacting CPE Social Networking

Factor	Possible Answers			
Who (travels)?	Instructor	Learner	Both	Neither
What (type of training)?	Technical	Professional	Both	
When (does instruction occur)?	Synchronous	Asynchronous	Both	
Where (does instruction occur)?	Classroom	Work	Home	Multiple
How (does instruction occur)?	Internet	Computer	Paper	Multiple
Why (who benefits from CPE)?	Self	Organization	Both	

Motivation for Research

There is discussion within the DOD FM community on how to best provide continuing education to the DOD FM workforce. The changing nature of the workforce, evolving ET capabilities, and resource scarcity require that CPE Program Managers think critically about how to provide needed educational opportunities to as many personnel as possible. One of the perceived benefits of attendance at an in-residence education program has been the opportunity to network with other FM personnel from across DOD. A concern has been raised that shifting to educational programs delivered through computer supported collaborative learning (CSCL) methods (e.g. virtual classrooms) may affect the social interaction that takes place in traditional venues. This social interaction can sometimes provide the foundation for career (or life) long friendships that can provide organizational value. Based on this concern, a value versus cost model oriented to the potential value and cost of social networks of several course delivery alternatives may provide CPE program providers a basis for making resource decisions. The terms

“value” and “cost” as applied to social networking are ambiguous at best. As it pertains to this research, “value” is the potential value of a personal relationship to an individual in terms of possible opportunities (jobs, investments, etc.) and “cost” refers to the total relative amount of resources required to provide that social networking opportunity through equivalent CPE programs. This “cost” may be paid for by the student, by an organization, or by a federal or state entity. This research, unless otherwise noted, does not make a distinction based on who actually pays for CPE program. Obviously, DOD FM personnel may have the opportunity to network through other venues (church, community groups, and professional organizations to name a few), but those opportunities for networking are beyond the scope of this analysis. Those other opportunities for social networking still exist even if CPE programs are delivered through “virtual classrooms.”

Literature Review

Lewin (1952, p. 169) stated that, “There’s nothing more practical than a good theory.” However, developing sound theories of human behavior, including theories about how humans learn, organizations manage knowledge, or how telecommunications technology can enable human social interaction, is difficult. Social theory to explain the concepts of professions and continuing professional education is sorely lacking (Tobias, 2003). No two people are identical concerning their behavior; even individuals are inconsistent over time, their behavior can change because of interaction with other inconsistent individuals, or their behavior can change because of the research process. Further, many of the concepts needed to understand human behavior like knowledge,

intelligence, anxiety, and motivation are artificial constructs and thus are not directly observable (Best, 1981). While quantitative research needs to be grounded in a theoretical body of knowledge, the role of theory in qualitative research is less clear (Creswell, 1994). Creswell describes theory as an interrelated set of constructs, which specify the relationship among variables. In quantitative research, the theory must come first (Creswell, 1994). However, in qualitative research, theory may follow observation (Wolcott, 2001). With these differences in mind, the following paragraphs will review selected research concerning the value of social networks to the individual and the organization. For all of the advances in information technologies, we are still social animals and social networks are part of our existence.

Previous research has observed the basic value of traditional social networks to life and career. For example, Berkman and Syme (1979) found that people without social and community ties were more likely to die than people with greater social networks during a nine year follow up period, and networking is the most effective method of finding a job (DuBrin, 2005). Another example is the numerous methods for obtaining leadership training. These methods include conferences, seminars, residential courses, general coursework, developmental assignments, coaching initiatives, distance learning, lectures, mentoring, workshops, on-the-job training, etc. (Damp, 2008). However, information technology (IT) facilitates a social network not bounded by geography or time, permitting extensive collaboration and greater levels of organizational learning. Liebeskind, Oliver, Zucker, and Brewer (1996) reported on successful biotechnology firms whose scientist were actively networking with researchers at other firms and universities to share scientific knowledge. A decade later, the new model of social

networking and collaboration enabled by IT was found to contribute to greater knowledge sharing (Hsu, Ju, Yen, & Chang, 2007) and participative management systems similar to those first postulated by Likert (1961). Socially networked “linking pins” (persons in more than one work group) can share knowledge through multiple organizations, improving the opportunity for more highly effective organizations like the DOD.

At this point, it may be helpful to define what the term “educational program” means. Dewey, who greatly influenced the American educational experience, saw learning as an integrated, lifelong process and not separated by isolated events (like CPE courses) (Hoberman et al., 1994). In an article entitled “John Dewey: A Voice That Still Speaks to Us,” written for the journal *Philosophy, Psychology, and Methods of Teaching*, David Halliburton lists issues identified by Dewey regarding public education duties and responsibilities. This list (see Table 27 for additional details) includes Participation, Environment, Service, Experience, Community, Activity, Communication, Character, Equilibrium and Integration, Higher Education, The Democratic Ideal, and Diversity (Barr & Tagg, 2000). Although the objectives listed in Table 27 may seem ambitious for a CPE program, the Defense Financial Manager Course strives to achieve many of these items, through an academically rigorous, intensive, four-week course that challenges learners to grow as leaders in their profession and community.

Table 27

Dewey's Pedagogic Decree Issues

Issue	Brief Description
Activity	Education begins with action and is hands on, interactive, and face to face with the learner
Character	Learner characteristics: efficiency, judgment, and responsiveness
Communication	Education requires effective communications
Community	Education encourages community cooperation
Democracy	Education provides the social knowledge and skills to enable democracy
Diversity	Education should embrace diversity, and the freedom of thought and inquiry
Environment	Education must work within the learner's environment, their milieu
Equilibrium and Integration	The ability to continually adjust and adapt to changes in the environment, so that it becomes a stable, but dynamic part, of the educational process
Experience	Experience is essential to learning, providing social continuity to learning that occurs throughout one's life
Higher Education	Bringing all education and learning into one integrated whole, there is no lower or higher education, just education
Participation	Education is a social function, a requirement of members of a society
Service	Education civic matters enables service to the learner's society

In researching the value of social networks to the individual Burt (1997) stated that “Social capital is a quality created between people, whereas human capital is a quality of individuals. Investments that create social capital are different in fundamental ways from the investments that create human capital.” Other research has shown a positive relationship between high levels of social networking and higher levels of resource exchange between intra organization units (Tsai & Ghoshal, 1998) and value to the organization created by social networks (Nahapiet & Ghoshal, 1998). This situation is similar to the situation for DOD FM personnel. While everyone works for DOD, each individual may have service (Army, Navy, Marine Corps, Air Force, Defense Financial Accounting Service, or other DOD Agency), major command, and unit affiliations. Social networks between all of these strata may have value to effectively moving resources around the larger organization. Abundant research into how IT has lowered the transaction cost of communications, knowledge management, and other organizational needs exists (Davenport & Short, 2003; Grover, Teng, & Fiedler, 2003; Subramani, 2004) with descriptions of new systems that facilitate enhanced information sharing, communication, and collaboration (Icasati-Johanson & Fleck, 2003). Thus, to summarize previous research on social networks:

1. Social networks may create value for the individual.
2. Social networks may create value for organization.
3. Information technologies usually lower the transaction cost of establishing and maintaining social networks.
4. Effective social networks lead to higher levels of collaboration.
5. Higher levels of collaboration result in better decision making.

6. Better decisions optimize the use of organization resources.
7. Effective resource use leads to higher levels of organizational success.

To paraphrase the argument, use of IT lowers the cost of social networks that may contribute to better collaboration, decision-making, and resource allocation resulting in higher levels of organizational success. However, the assumption is that the IT enabled social networks are as “valuable” as social networks created via traditional means. To explore this relationship, a Monte Carlo simulation of possible outcomes was conducted using real world cost data, learner perceptions of knowledge transfer, and evaluations of the value of classes that provide opportunities to establish and maintain social networks within the framework of the extended FM CPE program.

Methodology

Three commercial providers of online Financial Management and Accounting CPE were selected based on similar course offerings and availability of comparable data. Some commercial providers of CPE offer member discounts, volume discounts, and subscription services that reduce the cost per credit hour. To keep comparisons meaningful, similar courses without any discounts were compared. Two providers of onsite Decision Support training were identified, and four providers of in residence training. The term “in residence” needs clarification. Providers of CPE will conduct one, two, or three day seminars at cities across the United States, with open enrollment, meaning, anyone can attend, as long as they pay the course fee. These seminars are often in major population areas, which can minimize travel cost for students. To compare the

cost of different modes of course instruction, travel cost were kept separate, but are accounted for.

Data Collection

The data used for this analysis came from a variety of sources. Providers of online FM CPE post the course cost, the number of CPE credit hours, and other information (length of course in days, schedule for upcoming courses, detailed course description, etc.) Three online providers of FM CPE were chosen that appeared representative of a majority of online providers based on the listed number and variety of courses offered that would be of possible interest to DOD FM personnel, comparable course information, information availability that would allow comparison. Next, two providers of onsite FM related training with cost data available were selected. Many of the “in residence” providers of FM CPE training will tailor a course and provide onsite instruction, however, to do so requires the provider to formulate a customized price quote for the potential customer, thus data from additional providers was not immediately available. For consistency, several assumptions were made. First, all students that attend in-residence training travel via commercial airlines to the training location. While this is not a true statement, (some students drive so that they have personal transportation at the training location, or the training location is geographically close to the student). Second, the policy on authorizing rental varies dramatically by command, so the assumption is that no student is paying for a rental car. Third, transportation from the airport to the training location is provided via a free shuttle or base taxi (no cost to the student or their command). Finally, based on data retrieved from multiple sources, average round trip travel cost equals approximately \$520.

Model Development

Figure 5 represents a generic case where for a specific curriculum, additional resources spent (cost) provides increasing professional network value. In Case 1, there is a positive relationship between the amount of resources spent on sending personnel to CPE courses, and the expected value of the professional networks that are created and or maintained. This is a rational model and that may model the perception of most personnel attending FM CPE programs. For a given CPE event (a short course, and extended course, or attendance at a training conference), an individual will be able to add some amount of professional networking value to their portfolio of professional networks. Thus, in this model, there is a positive correlation between attendance at traditional CPE events and professional network value.

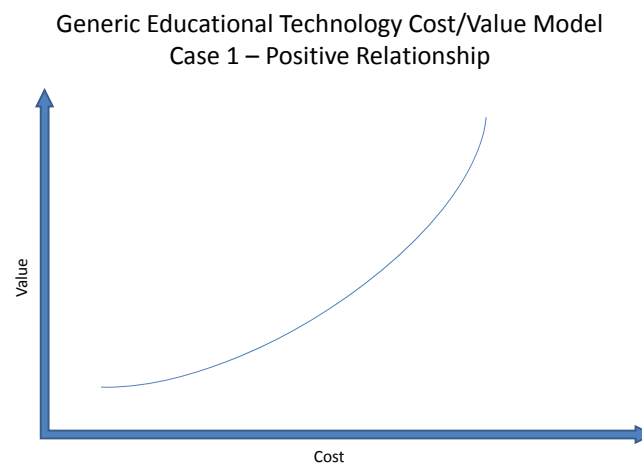


Figure 5. Increasing Cost with Increasing Value

Figures 6 through 9 provide further refinement to the generic Value/Cost Model that cover four general cases of increasing / decreasing cost and value. Through the analysis of relevant data, the intent of this research is to establish guides on which model

describes various curriculum delivery method curves, and relative cost (the amount of resources to devote). Figure 6 represents a case where additional cost initially results in increased social network value, but becomes asymptotic at some point (i.e. for any additional resources spent, no significant additional professional network value is received). Figure 7 represents a generic case where additional resources used do not provide any significant increase in professional network value, and Figure 8 represents a case where additional resources actually results in less professional network value.

Figure 6 may be a little more realistic than Figure 5 in that as a career progresses, there may be little additional value obtained from attending additional CPE events. To take Case 2 to extremes, consider an individual who only attends CPE events. While this individual may indeed have an impressive professional network, they are never at work to extract any value from that professional network that would benefit the organization that is paying for the individual to attend so many CPE events.

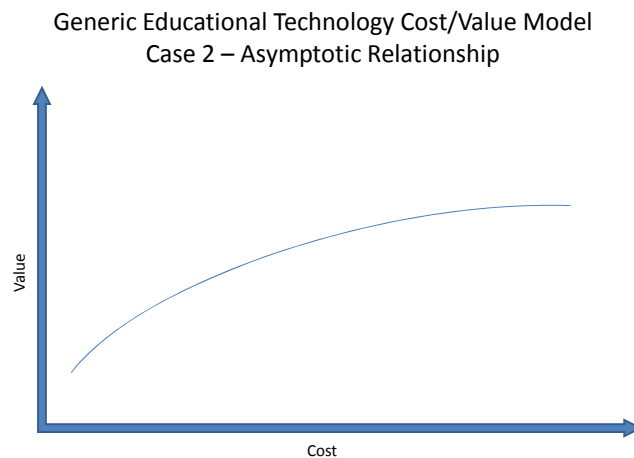


Figure 6. Increasing Cost with No Increasing Value

Case 3, which is provide in Figure 7 depicts a neutral relationship between resources spent on sending an individual to CPE events (costs) and the value the organization receives from that investment of resources. An individual who attends CPE events, but does not capitalize on the opportunity to create professional relationships, or creates professional relationships that are of no value to the sponsoring organization, may exemplify this relationship between cost and value in Case 3.

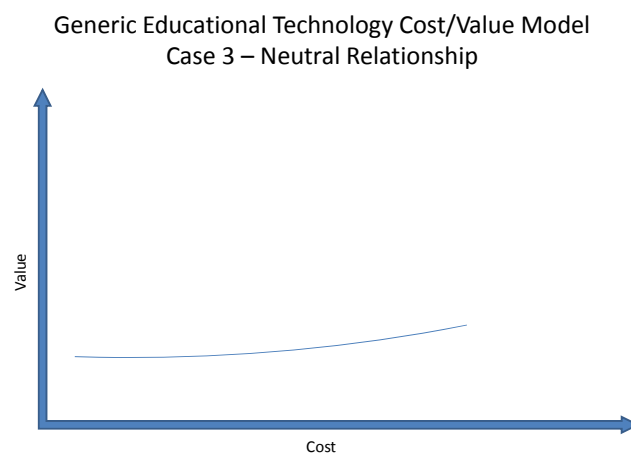


Figure 7. Increasing Resources Does Not Increase Value

Figure 8 depicts Case 4, where the value received by the organization decreases as the organization spends more resources on providing an individual with opportunities to attend CPE events and create professional networks. An example of Case 4 might happen if the individual attends the CPE event, establishes a professional relationship with an individual from a competing organization, and is offered a job, or provides valuable information to that individual. In this example, the sponsoring organization has lost something of value (the employee or the valuable information) and paid for the

opportunity. Obviously, not the primary reason that an organization would send personnel to attend a CPE program, but it probably does happen.

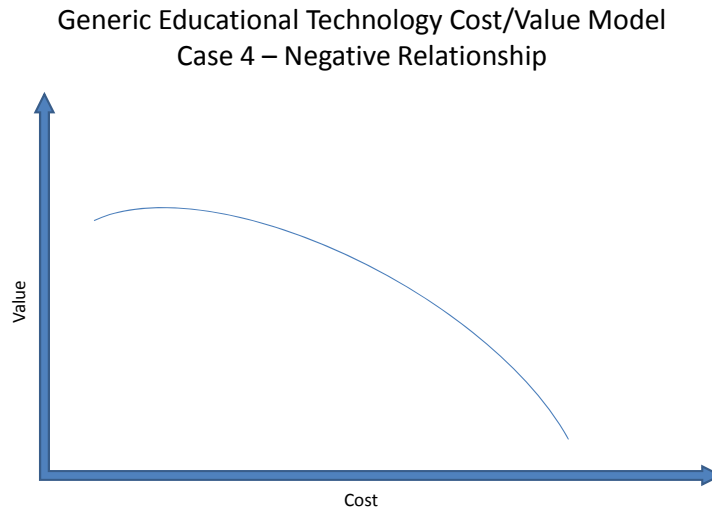


Figure 8. Increasing Cost Results in Less Value

Unfortunately, there may be no way for an organization to determine which of the cases mentioned above will happen for sending any particular employee to any particular CPE event. There are a range of probabilities for each scenario, and possibly other scenarios not discussed. However, for this analysis, it is assumed that only one of the four scenarios discussed (Case 1 through Case 4) can happen at any traditional CPE event for a particular individual. Thus, the combined probability that one of the four scenarios happens at a CPE event is 1.00 (or 100%). Given that organizations would not knowingly send individuals to CPE events for the sole purpose of creating professional networks (Case 1), and that they would not intentionally send individuals to CPE events that would produce negative value for the resources spent (Case 4), those scenarios should have

lower probabilities than Case 2 or Case 3. Case 2, which has decreasing marginal value for additional cost, may be the most prevalent scenario.

The other variable that we need to model is that of value, specifically, the value to the organization received from professional network created by the individual who attended a CPE event. It is difficult, if not impossible, to put a dollar amount on the value of a professional network. However, for this analysis, an assumption of high and low limits, with a normal distribution, may allow some relative comparisons. Using limits for these four cases, we may be able to model the value versus cost for professional networking. The following paragraphs will discuss relative limits for the model based on an analysis of real world data, and several assumptions that will allow a relative comparison of the cost and value of professional networking that occurs in conjunction with traditional CPE versus ET enabled CPE.

Analysis and Results

An ideal situation for professional networking would exist when there was a significant increase in the value received from the network with a minimum of resources. Such a scenario may be possible within the virtual environment, but questions still exist concerning the value of social networks to the individual and to the organization. Figure 9 provides a visual comparison of online versus in-residence courses, and Figure 10 provides the same data in a box plot format to emphasize the cost variance.

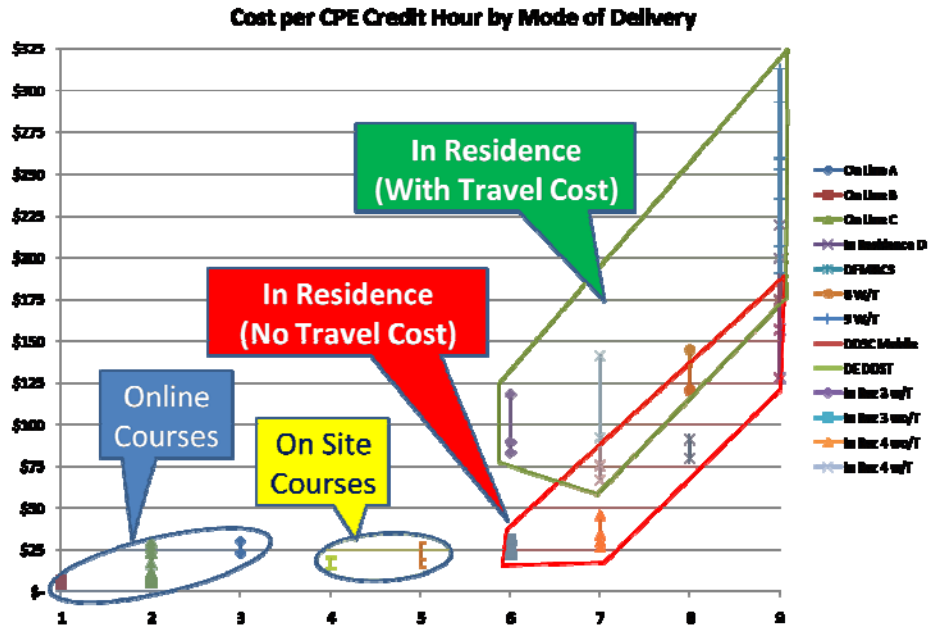


Figure 9. Cost Per Hour by Provider and Mode

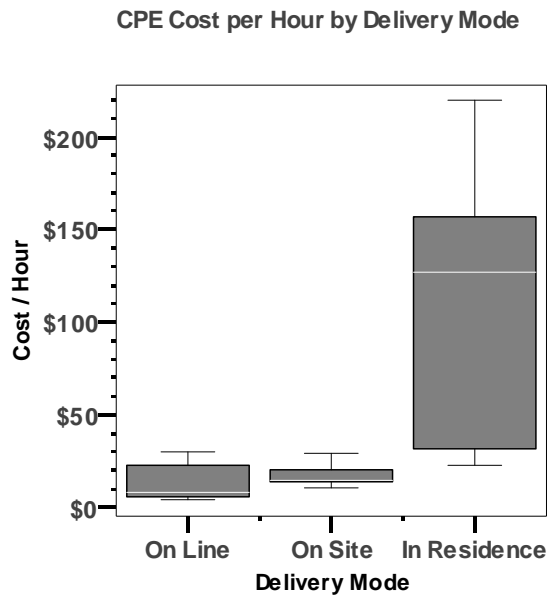


Figure 10. Cost per Hour Comparison by Course Delivery Mode

To obtain an estimate for the cost of in-residence training, individual cost were statistically summed together to provide a cost distribution. One of the major costs of attending a prolonged training program is lodging. A commonly held belief is that there is always space available for members of the military (uniformed and civilian) to reside on base. However, often students are housed off base in commercial facilities. Contracts with local vendors limit the expense, and a schedule of maximum allowable lodging rates per location is available. Using this data, the rates for 100 locations throughout the continental United States were sampled 10,000 times using a bootstrap method resulting in a fairly normal distribution with a mean of \$114.18 and a σ of \$3.42 as illustrated in Figure 11.

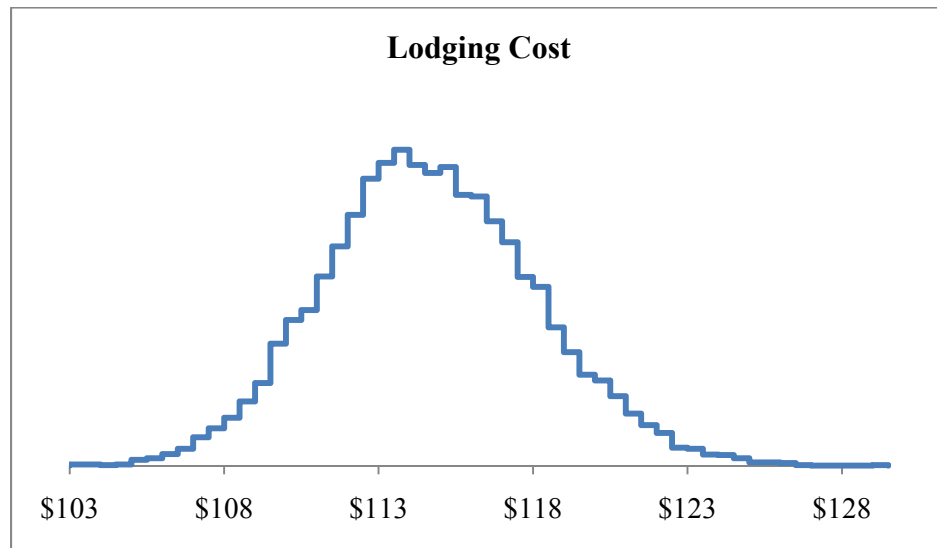


Figure 11. Lodging Cost

A similar procedure was used to obtain a distribution of the meal and incidental expenses (M&EI) allowed at the same selected locations. This distribution is presented in

Figure 12. On the first and last day of trip, DOD personnel receive 75% of the allotted M&IE. The M&IE distribution was also sampled 10,000 times resulting in a mean of \$52.88 and σ of \$ 0.77.

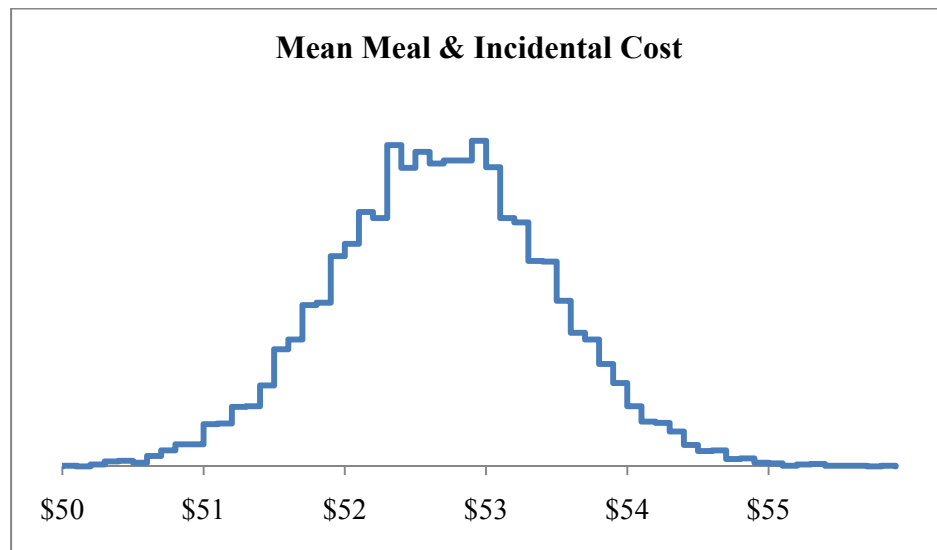


Figure 12. Meal and Incidental Cost

Next, the distribution of CPE cost per hour for 78 different courses of possible interest to DOD FM personnel available from vendors was determined using a similar method described in preceding paragraphs. The results are provided in Figure 13.

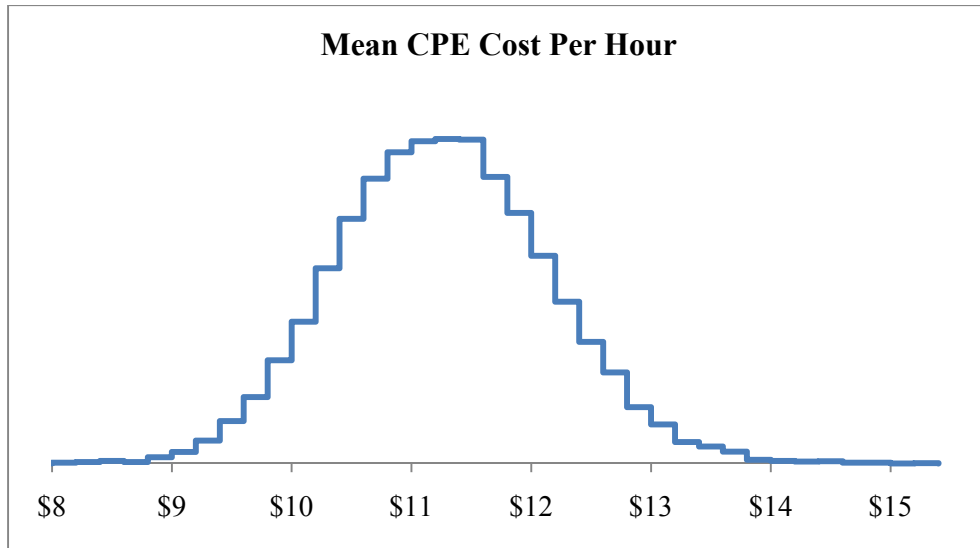


Figure 13. CPE Cost Per Hour

The mean for CPE Cost Per Hour was \$11.67 with a σ of \$0.88. The next factor to consider is the mean for the CPE credit hours per course, which was determined using a similar method outlined above and presented in Figure 14. The mean CPE credit hours per course for the 78 courses used for this analysis were 11.7 with a σ of 0.9 hours.

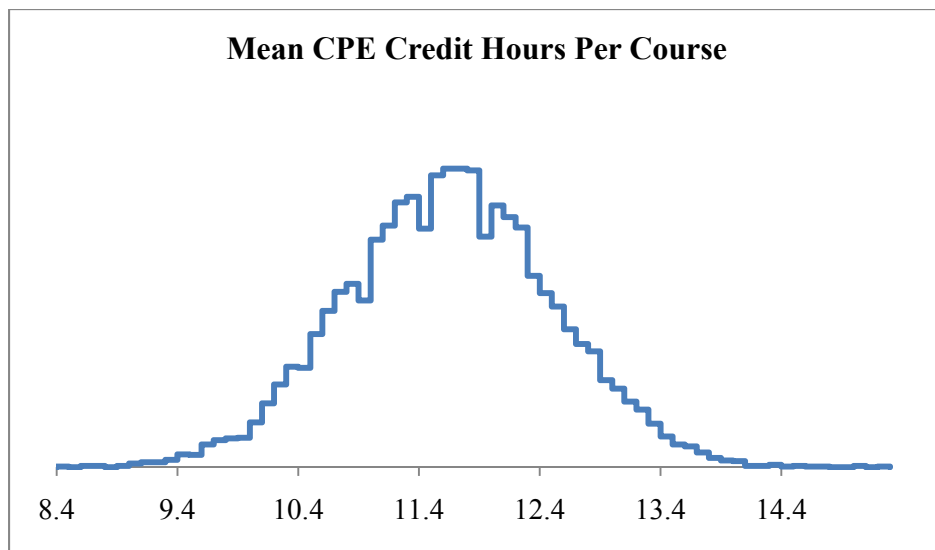


Figure 14. Mean CPE Credit Hours Per Course

Using the distributions obtained from an analysis of the factors identified, the following formulas were used to produce a Total Cost model that was run through a Monte Carlo simulation 10,000 times to produce a distribution of possible outcomes for a generic CPE trip:

- a) Length of Stay (LOS) in days = CPE Credits Per Course \div 8 (eight hours in a workday)
- b) Lodging Cost (LC) = Mean Lodging Cost * LOS
- c) Meals and Incidental Expenses (MIE) = Meals & Incidental Expenses * (LOS + 1.5)
- d) Roundtrip Airfare (RTA) = \$520
- e) Course Cost (CC) = CPE Credits Per Course * Mean Cost Per Credit Hour
- f) Total Cost = LC + MIE + RTA + CC

The results of the Monte Carlo simulation are presented in Figure 15 and Figure 16.

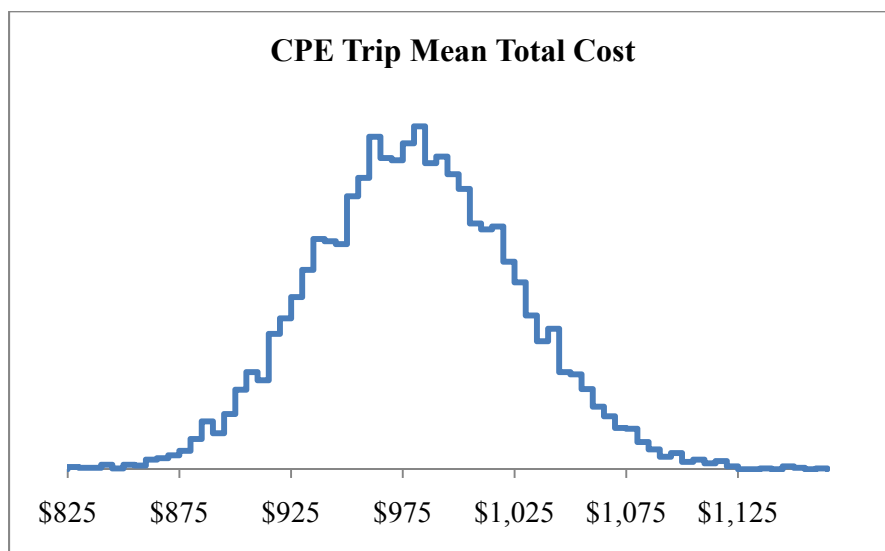


Figure 15. CPE Trip Mean Total Cost

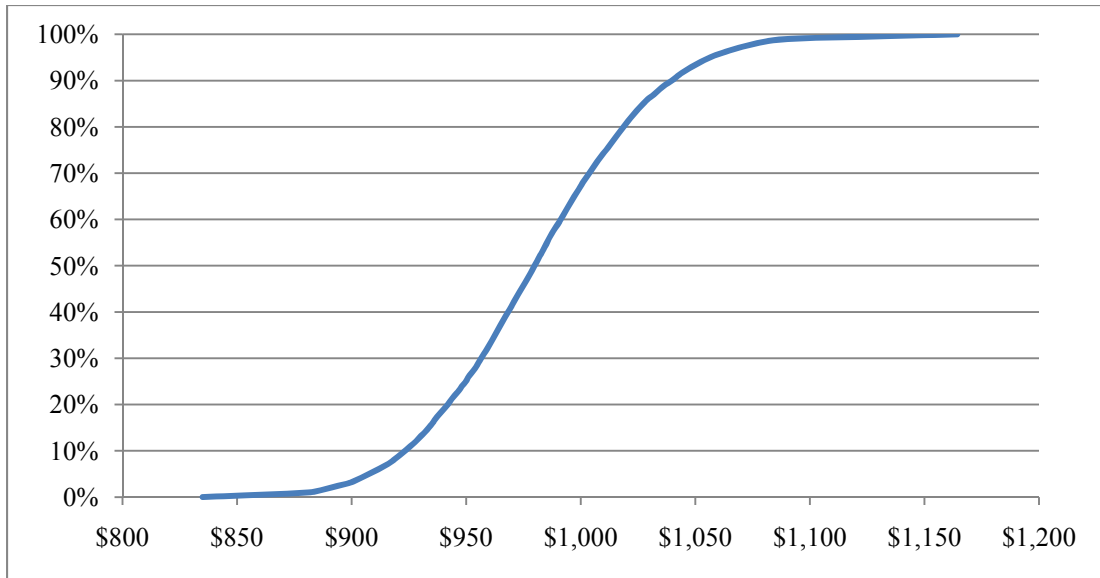


Figure 16. Total Cost by Percentile

Finally, using the limits outlined in the previous discussion, a Monte Carlo simulation was run 7,000 times to develop two costs versus value curves. A visual output that charts the outcome of those trails appears in Figure 17. The trials are in discrete groups because the number of expected additional CPE events was allowed to randomly vary from 0 to 20, but only as an integer, as partial events (in which the learner did not complete the CPE course) were not included in the analysis. Although a number of assumptions were made to develop the model used for the analysis, the relative distributions of the two outcomes are distinct. The traditional CPE Professional Networking Cost Versus Value curve is on the right of the chart (small diamonds), and ranges on the cost axis from \$30,000 to \$45,000 for a career's worth of CPE events. The value received from the resources expended ranged from \$6,000 to \$14,000 for each CPE event, and the number of events ranged from three to twenty. The educational technology enabled CPE events (the small squares) is located in the lower left hand corner of Figure

17, and ranges on the cost axis from \$12,000 to \$18,000 for a career's worth of CPE events.

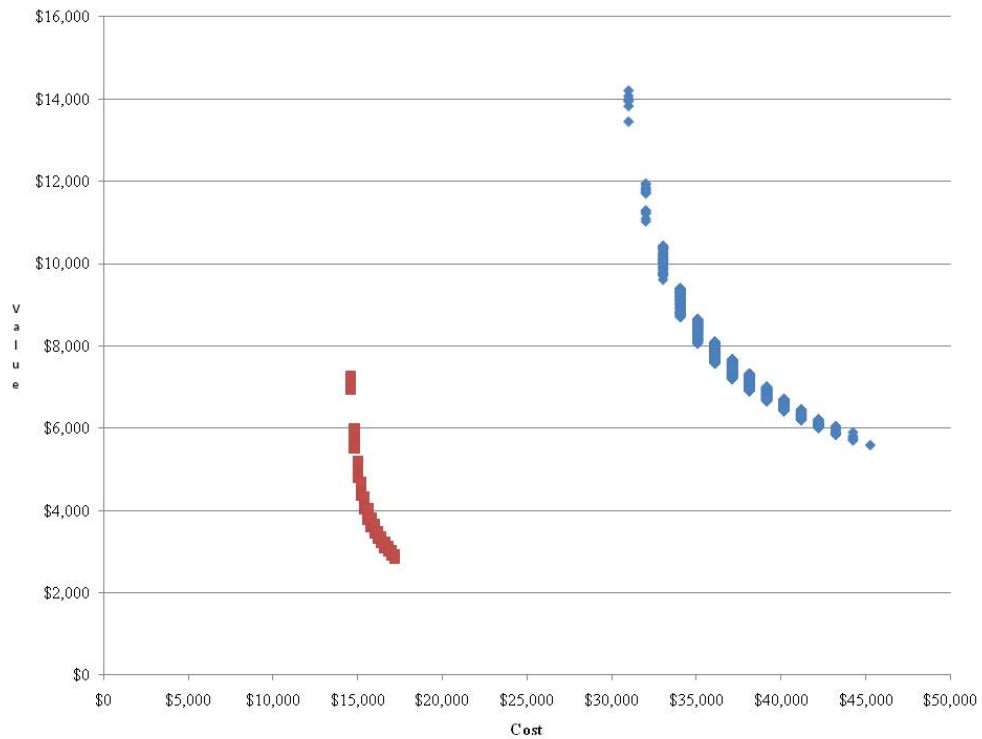


Figure 17. Comparison of Traditional and ET Enabled Cost Versus Value

Using the assumption that the value received for each of the four cases discussed earlier, is one half as valuable as for traditional CPE events, and holding all other variables constant, a more vertical curve with less variance is developed. If the value of the ET enabled CPE events is allowed to approach the value of traditional CPE event, then the difference between the two modes of CPE delivery are even more evident.

Discussion

In developing a model to examine an economic situation, it is important to understand that the model is always going to be imperfect. Economic theories are often

wrong, economic models are imperfect, and over simplify complex problems (North, 1990). Admittedly, the model presented for understanding the cost for attending some type of in-residence CPE is simplified. For example, it does not account for the productivity loss while the learner is traveling to the training site. Looking at Figure 16, we can see that at the 80% level the associated travel and course cost for attending an average civilian CPE course (12 CPE credits or about two days long) is approximately \$1,019. By comparison, using data to determine the cost of producing the extended FM CPE program (the cost charged to a non-DOD student is \$9,746 in FY08 dollars) and similar trip cost data for 31-days, results in a resource cost of approximately \$15,445 for a typical same service student. By extrapolating the typical CPE trip to an equivalent four week class results in a total cost of \$12,508, nearly \$2,500 less expensive than the cost of producing and attending the extended FM CPE program for same service students. It appears that a premium above market cost is being paid for being able to attend the extended FM CPE program in residence. However, is additional value received for the premium paid? While comparative data is not available, a majority of students (98.7%) indicated on an extended FM CPE program end of course survey (EOC) that they strongly agreed with the statement, “this course is a valuable experience in my professional development.” Of the 83 responses to the EOC Survey (a 100% response rate) in the last 6 months, 65 respondents provided qualitative comments to support their answer. Ten percent of the responses directly commented on the value of the networking opportunity, and three other responses referred to the opportunity to “interact” with fellow students. For example, comments like “Excellent networking opportunity!”, “Great networking. Excellent information,” and “Good interaction among peers,”

suggests that the learners do appreciate the opportunity to network professionally. Having established, at least at a qualitative level that the networking opportunity at the extended FM CPE program is valuable to DOD FM personnel, how valuable is it in organizational terms? Table 28 lists the results of a comparison of four scenarios. In scenario one, with traditionally delivered CPE, new personnel attend an eight week initial training session during the first year of their career. An additional four-week training session at the six-year point, and then another extended FM CPE program at around the 14-year mark follow this. Some students may also attend a short FM CPE program around the 16-year mark. Over a twenty-year career, the net present value (NPV) of those opportunities would be approximately \$56,000. Currently, the services cannot afford to send all financial managers to all of the in-residence CPE opportunities that are available. A great deal of training occurs on the job (OJT), through existing distance learning (dL), and computer based training (CBT) sources. From an organizational perspective if the value of the professional network that is created and maintained provides at least \$56,000 of value for the organization over a 20-year period, then the organization has broken even. If the perceived value to the organization exceeds \$56,000 threshold, then the organization has profited from the investment of resources. The right most column of Table 28 depicts a distance-learning scenario, where the learner has the opportunity to participate in four weeks of training every two years over a twenty-year career. Using the same assumptions listed earlier, the NPV cost to the organization is only \$36,000. Thus enhancing the opportunity for the organization to profit from the same amount of investment, if the value of professional networks is created by face-to-face interaction and through online social opportunities are equivalent. Given the assumptions and limits used for this

analysis, the cost versus value curve for ET enabled CPE events most closely approximates the relationship in Figure 18.

Table 28

Comparative Organizational CPE Cost

Year	Traditional	Blended Learning	Traditional All Virtual	Alternate Leverage ET
1	(\$30,370)	(\$25,191)	(\$19,492)	(\$25,191)
2				
3				(\$2,437)
4				
5				(\$2,437)
6	(\$15,445)	(\$12,856)	(\$9,746)	
7				(\$2,437)
8				
9				(\$2,437)
10				
11				(\$2,437)
12				
13				(\$2,437)
14	(\$15,445)	(\$12,856)	(\$9,746)	
15				(\$2,437)
16	(\$5,546)	(\$4,251)	(\$2,437)	
17				(\$2,437)
18				
19				(\$2,437)
20				
NPV	(\$51,978)	(\$43,184)	(\$33,097)	(\$35,658)

More FM professional may be able to attend virtual courses and establish meaningful professional networks than are able to attend traditional in-residence CPE. However, there may be generational, technology self-efficacy and other related issues associated with professional networking in virtual environments.

Generic Educational Technology Cost/Value Model
Case 5 – Vertical Relationship

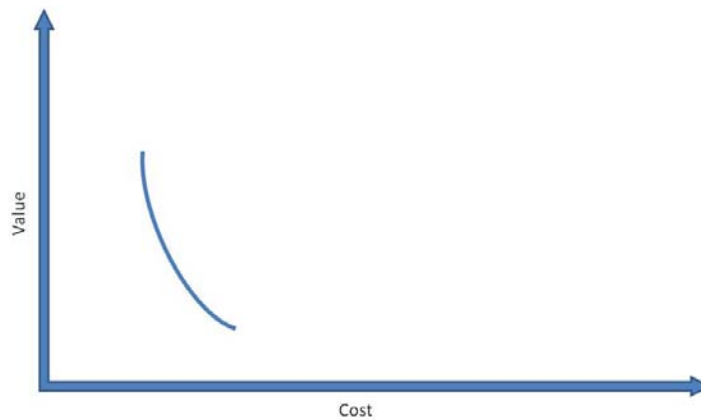


Figure 18. Value to Cost Vertical Relationship

Conclusion

Certainly, the assumptions and formulas used to arrive at this value are open to debate, and the values presented are only relative and not absolute. The primary purpose of this analysis then is to initiate a discussion among CPE program providers concerning the cost and value of CPE to the organization, both in knowledge transferred to the user, and in the professional network created. The primary goals of DOD IT transformation and the integration of educational technologies into CPE programs are to align IT resources to support the national security strategy. IT is not an end unto itself, rather how can IT better support the mission of the organization, which in the case of the DOD is national defense. However, there is research and anecdotal reports indicating that some of the existing CBT is insufficient to the training and education needs of the services. For example, a Navy Inspector General report discussed in a recent Navy Times article indicated that Sailors that receive initial training via CBT take twice as long to long to be

certified for assigned duties, have fewer teamwork skills, and apparently do not absorb existing computer training as assumed for the youngest members of the Information Age entering the workforce. The preferred relationship between CPE program cost the value of professional networking is similar to the relationship depicted in Figure 17, and could be facilitated by increased use of existing online social networking capabilities, but only if those virtual relationships are as valuable as traditional created and maintained relationships. A better understanding of the tradeoffs in cost and benefits will allow decision makers in FM CPE to make better resource allocation decisions.

Recommendations Regarding CPE Social Networking

Program Managers must improve the effectiveness of their courses. To do so will require continuously improving access to clear and accurate information, so that leaders and managers throughout the organization can make informed, rational decisions. To obtain this critical business information, improved use and understanding of the value of social networks to the individual and to the organization is required.

Continuing education for DOD personnel is available in a variety of venues, located on military bases throughout the world, and online. However, just a few primary locations provide a majority of the faculty and facilities dedicated to DOD FM CPE. Each school is separate and somewhat service centric because, due to the method of allocating resources within DOD, organizations must have an executive agent, that acts as umbrella organization (higher headquarters) through which resources are dispersed. These schools, working collaboratively could establish a single “virtual classroom”

environment that could provide the basics of FM CPE, and provide a DOD level opportunity to network.

Future Research

While substantive cost data was available, the value of social networks created and maintained by attendance at DOD FM CPE was subjectively evaluated, necessitating a qualitative approach that provided relative measures for comparison. Additional cost and value models from other sectors of DOD and the commercial world could validate or challenge the model presented in this study. Future research should review the assumptions made and provide additional data for improving the model. Also, a better understanding of the organizational value of professional networks within the context of the DOD FM environment may facilitate building useful virtual environments that mimic conditions occurring in traditional CPE.

CHAPTER VI. CONCLUSIONS

The effort to improve CPE for DOD FM personnel is ongoing. Change is usually costly in terms of resources and time; however, there is little choice if DOD is to remain competitive globally and continue to provide effective and efficient allocation of scarce resources to provide for national security. Change in educational programs is difficult to make due to many factors, most of them relating to management inertia.

Chapter 2, which provided an overarching literature review for this dissertation, introduced five trends and three issues affecting CPE identified by Cervero. Based on the results of this research, an examination of those trends and potential answers to the issues raised by Cervero are covered in the next two sections.

Trends Affecting DOD FM CPE

Trend 1 — The workplace is the most prominent provider of CPE. This statement is supported with DOD FM as evidenced by the numerous CPE programs reported in Chapter 3. Additionally, the investment of the services in providing training and networking opportunities to at least some of its personnel supports this trend. As Educational Technologies (ETs) mature and the marginal cost of providing training to more individuals decreases, more personnel will be provided with the opportunity to experience a wide range of training venues.

Trend 2 — Increasingly universities, professional associations, and for-profit organizations are offering CPE via distance learning. Although the services may not be on the cutting edge of this phenomena, they should quickly adopt successful educational program models. The author of this article is aware of a least one advanced educational technology demonstration effort that has been approved and funded. However, due to the unique nature of DOD, some CPE programs will still need to be created and maintained internally, at a premium.

Trend 3 — CPE program providers are collaborating, especially between universities and the workplace. This research did not identify more than a few connections between DOD FM workplace providers of FM CPE and universities (e.g. the Syracuse University / Army FM relationship). However, that was not the focus of this investigation but could be an area of interest for future research.

Trend 4 — CPE has become corporatized. In the sense that obtaining CPE has become a milestone for advancement, this trend is supported by the results of Chapter 3. Even though in the hierarchical environment of the DOD, almost all endeavors reflect a strong degree of corporatization, the alternative scenario, where individuals were responsible for identifying and acquiring needed CPE, reflects the situation before the 1967 MEDOD study. Thus, the corporatization trend of DOD FM CPE is nearly 42 years old.

Trend 5 — CPE is being used to regulate the professions. This trend is also supported by this research, especially Chapter 3 that identified how certifications (CDFM, CPA, CPM, etc.) are being encouraged to help personnel acquire needed expertise and promotion potential.

However, Chapter 2 also identified that the DOD FM career field may be undergoing a significant change in gender and age demographics. As the Information Age continues, educational technologies will definitely impact how DOD FM CPE is delivered, with intended and unintended consequences.

Chapter 3 made comparisons between existing DOD FM CPE program curricula. The knowledge, skills, and abilities specified by the armed services career models were examined to highlight gaps in the curricula, and recommendations were made to close those gaps.

Chapter 4 identified factors affecting learner understanding. The factors identified in this research may change overtime as the demographics of the intended professional group changes, and with that change, a variety of learning styles, technology efficacy issues, and time constraints. This underlines the need for CPE program managers to offer a variety of delivery methods that can be tailored to individual needs.

Finally, Chapter 5 examined the relative amount of resources that organizations currently invest in providing social networking opportunities. In the past twenty years, advancements in information technology (IT) have forced existing business models to evolve or die. Adaptations of the music, publishing, television, banking, and investment industries come readily to mind. The merger of IT and educational theories has created new opportunities as educational technologies (ET) are developed and deployed throughout our educational systems. In the world of continuing professional education (CPE), advancements in ET will challenge the existing educational business model, requiring both suppliers and customers of CPE to rethink traditional concepts. For example, in the last two years, firms and organizations providing CPE courses for

certified public accountants (CPAs) have responded to customer request for convenience by transitioning from CD distribution of course materials to providing web-based products almost exclusively to customers (Alexander, 2008). While some costs may not change (e.g. cost for keeping instructors and course designers up to date on changes in curriculum material, course delivery options, educational technology use, subject matter expert review and contribution to the curriculum, etc), other cost associated with traditional delivery of CPE may not be necessary. This research indicates that an investment in social networking opportunities will coexist with emerging virtual social networking capabilities for the near future.

Suggestions for Future Research

Even though the leading edge of the “Baby Boomer” generation has reached retirement age, this demographic still constitutes a large percentage of the current DOD workforce. As this knowledge group retires from DOD organizations, the hope is that they are replaced with information age “natives” that can more easily adopt innovative information technologies to accomplish their duties. Future research on how to leverage this information technology efficacy to improve CPE programs remains a fertile area for future research. For example, what CPE knowledge areas will be impacted as the organizational culture, organizational hierarchies, and organizational behaviors change because of IT advances and information flow becomes more transparent? What skills will be needed to effectively use knowledge management and decision support systems? For example, how does one effectively supervise or lead “virtual” teams to support financial management tasks?

Another area for investigation highlighted by this research is the apparent lack of an overall strategic DOD plan for FM CPE. Oscillations between centralized and decentralized planning and execution of FM CPE through DOD results in redundancy in certain knowledge areas, and gaps in others. As the DOD budget grew throughout the 1960's, 1970's and 1980's there were many personnel needing many different types of CPE. However, as we approach the year 2010, there are fewer FM professionals needing much more tailored CPE, and they have less time to acquire that knowledge, and less resources to pay for it. It is imperative that a strategic plan FM CPE that spans the needs of DOD be implemented. Relevant research that can address this void and identify how universities can contribute to this educational need is needed immediately.

Finally, as IT continues to improve, we can expect greater processing power, bandwidth, and storage to be available to each individual's workspace. With the advent of Web 2.0, the expected increases of media richness will undoubtedly allow for opportunities for virtual classrooms, which may require a fundamental review of how CPE is delivered to the professionals of tomorrow. Table 29 lists several factors to consider.

Table 29

Comparison of CPE Orientation

Factor	Teaching Oriented	Learning Oriented
Curriculum Focus	Faculty driven	Learner driven
Knowledge Transfer	Disciplined-defined	Problem based
Teaching Method	Benefits Faculty	Benefits Learner
Stakeholders	Faculty, Career field	Faculty, Learners, Organizations

Further research into how organizations are planning for and incorporating technology advances into their CPE programs to achieve organizational objectives may help CPE program directors optimize their curricula to provide effective courses.

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APPENDIX A – EDUCATIONAL AND INFORMATION SYSTEM JOURNALS
RANKED BY IMPACT

Journal Title	ISSN	Impact Factor	2007 Cites	Article “Hits”
Management Information Systems Quarterly	0276-7783	5.826	4,329	8
Journal of Engineering Education	1069-4730	3.000	638	6
Academy of Management Learning & Ed.	1537-260X	2.796	338	5
Information Systems Research	1047-7047	2.682	2,146	5
Review of Education Research	0034-6543	2.600	1,760	148
American Educational Research Journal	0002-8312	1.930	1,501	40
Journal of Management Information Systems	0742-1222	1.867	1,861	1
Information & Management	0378-7206	1.631	1,833	16
Journal of Information Technology	0268-3962	1.605	477	1
Computers & Education	0360-1315	1.602	773	8†
Journal of the Learning Sciences	1050-8406	1.571	567	20
Information Systems Journal	1350-1917	1.531	380	1
Information Processing & Management	0306-4573	1.500	1,441	12
J. American Society for Inform. Sci. & Tech.	1532-2882	1.436	3,026	10
J. of Computer-Mediated Communication	1083-6101	1.232	501	1
Learning and Instruction	0959-4752	1.029	795	67
Information Research	1368-1613	1.027	291	2
American Journal of Education	0195-6744	0.837	286	1
Government Information Quarterly	0740-624X	0.810	189	9
Decision Sciences J. of Innovative Education	1540-4595	*	*	1

† Search results of 790 refined using the term “continuing professional education”

* Not listed in the 2005, 2006, or 2007 Journal Citation Reports