ABSTRACT

Beata K. Peterson. FACTORS INFLUENCING APPROACHES TO LIFELONG E-LEARNING AMONG POSTSECONDARY EDUCATION FACULTY AND PROFESSIONAL INSTRUCTIONAL DESIGNERS. (Under the direction of Dr. Michael Poock) Department of Educational Leadership, April, 2010.

The purpose of this quantitative study was to examine the factors influencing approaches to e-learning of faculty, who directly instruct others, and instructional designers professionals, who work with adult learners indirectly. This study of over 300 postsecondary educators and their approaches to online learning was based on interdisciplinary theories pivoting around a three-tier conceptual definition of human learning proposed by Peter Jarvis in 2006. Concepts of the self-directed learner, the lifelong learning process, and the transformation of learners framed the scope of this research within a matrix of adult learning and cognitive theories.

Descriptive and inferential statistical analyses of thirty null hypotheses were used to investigate deep and surface approaches to e-learning and adult learners' perceptions of functionality and quality of online professional development courses. Factors analyzed in relation to the learning approaches included course specific elements: orientation, use of models and templates, audio visual channeling, collaboration, assessments, and perceptions related to technology and function of professional development e-courses. Findings indicate that education professionals engage deep approaches to e-learning. Both the length of their professional experience and sheer number of online courses taken matter, as motivations, vary between individual learners and professional groups. This study should contribute to better understanding of learning in electronic environments and help practitioners and future researchers use e-learning factors to advance professional development offerings and their application.

FACTORS INFLUENCING APPROACHES TO LIFELONG E-LEARNING AMONG POSTSECONDARY EDUCATION FACULTY AND PROFESSIONAL INSTRUCTIONAL DESIGNERS

A Dissertation

Presented To

The Faculty of the Department of Educational Leadership

East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

by

Beata K. Peterson

April, 2010

FACTORS INFLUENCING APPROACHES TO LIFELONG E-LEARNING

AMONG POSTSECONDARY EDUCATION FACULTY AND

PROFESSIONAL INSTRUCTIONAL DESIGNERS

by

Beata K. Peterson

APPROVED BY:

CHAIR OF DISSERTATION:_____

Michael Poock

COMMITTEE MEMBER:_____

Crystal Chambers

COMMITTEE MEMBER:_____

Sherry Southard

COMMITTEE MEMBER:_____

Marjorie Ringler

INTERIM CHAIR OF THE DEPARTMENT OF EDUCATIONAL LEADERSHIP:

_____

William Rouse, Jr.

ACTING DEAN OF THE GRADUATE SCHOOL:

_____

Paul Gemperline

ACKNOWLEDGEMENTS

To my family, friends, and colleagues who patiently waited, ever so loving, thoughtful, and kind. Thank you for believing, listening, and commiserating. Being there for me made all the difference.

To the East Carolina University Department of Educational Leadership, faculty, and in particular, to my committee members whose experience, wisdom, and generous attention are truly appreciated. Dr. Michael Poock, my chair and advisor whose inestimable support directed my work, Dr. Crystal Chambers, my methodologist who convinced this English major that statistics is cool after all, and Dr. Marjorie Ringler who encouraged my interdisciplinary research. Dr. Sherri Southard, expert technical communicator from the English Department and a friend, who mentored my entire ECU graduate work. Thank you all for helping me find the language of success; I am a better teacher and lifelong learner because of your counsel and example.

This study would not be possible without help from Susan Burton, the director of the Society for Technical Communication, her staff, especially Tom Gorski, and fellow technical communicators who shared their thoughts about this topic in numerous e-mails. I would like to thank several coworkers and friends, especially Joseph White for looking over the drafts on extremely short notice, and the staff and administrators at ECU for help and support they provide to off campus students.

My sincere thanks to everyone!

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CHAPTER 1: INTRODUCTION

Technology changes the workplace, education, and personal lives of generations – it changes people, their attitudes, and their habits (Berge, 2001; Evans, Kirby, & Fabrigar, 2003; Richardson & Newby, 2006). Learning and professional development of faculty in higher education institutions appear to be no exception. As Purdue (2003) noted, "The constant and ever-quickening pace of change in the world today dictates that practicing professionals engage in a process of lifelong learning" (p. 615). For Jarvis (2001, 2007), the change is brought about by economic factors, as modern education and individual learning have advanced beyond Dewey's more institutionalized experience of traditional education and become means of economic survival.

This study used descriptive and inferential statistical techniques to examine factors involved in the learning process that is taking place in the online environment when postsecondary faculty and instructional designers self-manage their own professional development. Learning with the purpose of acquiring information to increase knowledge and improve one's job performance was investigated. Most explicitly, the personal learning that may not be mandated by periodical licensing, requirements of a degree program or enforced by the employer was observed. This study examined the individual learning process and provided an insight into the approaches, motivations and strategies, and perceptions that faculty and instructional designers have while learning online based on the customized version of the Learning Process Questionnaire developed by Kember, Biggs, and Leung (2004). Faculty — those who deliver and design instruction at a distance — and instructional designers — those who do not have direct contact with students, but create online learning materials — were the population in this study.

Background of the Study

In 2007, Allen and Seaman indicated that growth rate for online learning in U.S. postsecondary education is over nine times higher than for the traditional classes, and that as of the fall semester of 2006, about twenty percent of college students have taken at least one online course. Consistently, as the authors note, enrollment in at least one online course per semester grew by ten percent. In 2009, the trend continued with 17% growth rate of online enrollments (Allen & Seaman, 2010). According to the U.S. Department of Education (O'Donnell, 2006), 28% of adults continuing education beyond college indicated that they use computers and the internet and 47% indicated use of other audio and video materials. Researchers try to understand these trends; hence, there is no shortage of literature on nearly any aspect of e-learning. However, consistent terminology, comprehensive models and theories of online learning are yet to be presented (Jarvis, 2006, 2007; Schommer-Aikins, 2004).

Today's learners scroll computer screens using electronic interfaces, browsers or applications, on an array of wireless devices, personal computers, live broadband simulcast projectors, or reality simulators. E-learning, supplies content and format variety in postsecondary distance learning and professional knowledge management (Chute, 2003; Jarvis, 2007). It appears to be governed by different rules than job-related continuing education, which by contrast is rooted in classical pedagogy centering on the teacher and the physical experience of classroom learning. As Latchem and Hanna (2001) observed, today the certitude of the traditional learning and knowledge acquisition are relinquished; therefore, "bold leadership is needed to chart the way" (p. 53).

Some faculty and instructional designers are at the forefront of e-learning, incorporating the newest tools and methods, by assuming responsibility for their professional currency, and

managing the approaches they take in online learning to remain employable. Enterprising leadership, at many organizational levels, is expected from lifelong self-directed learners, professionals who maintain a repertoire of skills needed to create e-learning environments for others (Rubens & Southard, 2005; Schepens, Aelterman, & Van Keer, 2007). Therefore, some educators and instructional designers may learn from a variety of online course materials in order to keep abreast of new developments in their areas of specialization or the technology. Additionally, certain self-directed adult e-learners may employ complex learning strategies with a possible intention to transfer obtained information into applications suitable for their workplace, their own instruction. Purdue (2003) defines such learners as "knowledge workers" (p. 617).

Recent studies inquiring about approaches to e-learning have indicated that more attention should be devoted to the learning processes among diverse adult learners (Garrison & Cleveland-Innes, 2005; Richardson & Newby, 2006). A group of learners accustomed to evaluative introspective, sensitive to the learning process issues (Garrison, Andrews, & Mangnusson, 1995; Lao, 2002), and versed in articulating such reflection (Schön, 1983) in their everyday tasks offered a promising population for this study. The study of professionals who are motivated to learn, have the ability to critically analyze the learning process, and reflect on the technology-mediated learning process provided practical implications for online course designers, instructors, and program administrators in the postsecondary academic and professional education.

Moreover, data on the beliefs or perceptions that learners have about e-learning and possible deterrents appear excluded from most analyses of approaches to e-learning and relegated to applied or discipline specific studies. Consequently, mere observations of how

learners interact with electronic environments through usability tests appear insufficient, as such expensive tests render product-specific results and typically fail to explain the multidimensionality of the process for different learners in dissimilar settings and personal learning situations (Jarvis, 2006). Likewise, looking though a prism of one traditional theory may allow limited insight into the learning process, as in case of exam preparations when learners emphasize memorization, postpone understanding and integrating of the material (Kember et al., 2004). In order to identify the most relevant aspects of e-learning, such complex and multidimensional phenomenon was approached by analyzing a specific group of learners' who are self-directing their learning in electronic environments with the help of a matrix of established theories.

Lifelong Learning - Theoretical Matrix

Faculty and instructional designers' approaches to learning in this study were interpreted using a matrix of theories pivoting around a three-tier conceptual foundation of learning proposed by Jarvis (2006, 2007, 2008): the learner (whole person), the learning process (lifelong and self-directed), and the experience of learning (allowing transformation of self). This conceptual frame is depicted in Figure 1. The learner – the person who learns – is immersed in the context of both social interactions and personal experiences of learning that transform the learner in the sense that deep learning did for Biggs (1987) and with Kember et al. (2004). The three-tier conceptual model of learning is viewed as recursive and concurrent, with several ongoing learning processes that may be in different degrees of completion (Jarvis, 2006). In that sense, learning progress may depend on learners' estimates of its scope, perceptions of its functionality towards their personal goals, and other factors that stipulate learners' overall approach to the electronically delivered content.

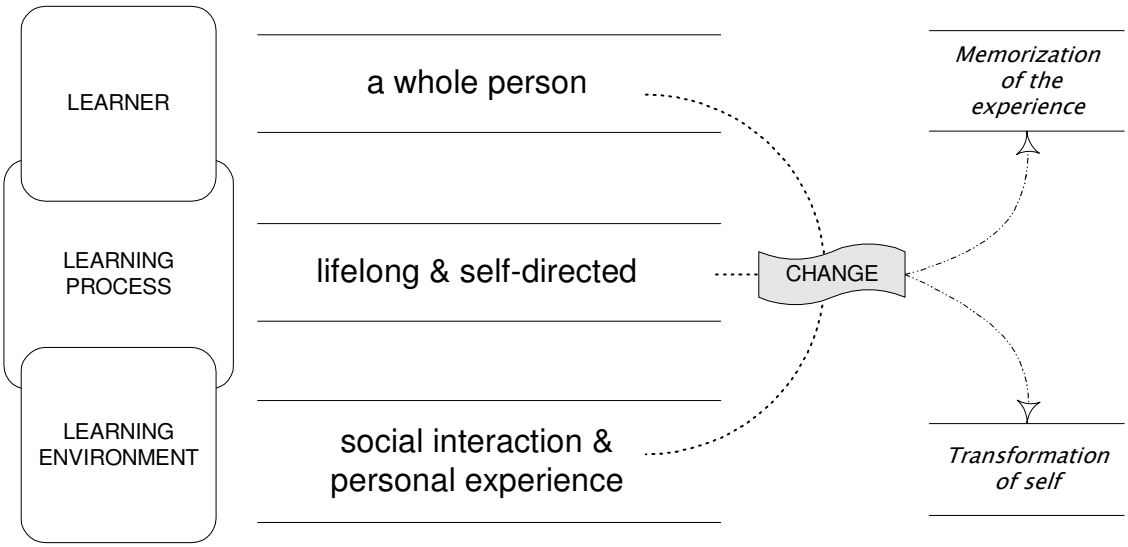

Figure 1. Conceptual framework for this study based on Jarvis (2006, 2007).

Learning, a lifelong activity that encompasses the learner, the learning process, and the learner's environment in this study was based on the interdisciplinary conceptual framework proposed by Jarvis in 2006 and expanded in 2007 and 2008. Selected adult learning and cognitive theories contextualized the framework within current research and the e-learning environment. Specifically, multidimensional approaches to learning that incorporate deep and surface approaches (Biggs, 1987; Biggs, Kember, & Leung, 2001; Kember et al., 2004), experiential adult learning (Entwistle, 1991; Entwistle & Entwistle, 1997; Entwistle & McCune, 2004), and self-directed or self-regulated learning (Pilling-Cormick & Garrison, 2007) were in focus. Additionally, aspects of cognitive theories related to cognitive load theory (van Merriënboer & Sweller, 2005), meaningful understanding of multimedia (Mayer & Moreno, 1999, 2003), cognitive engagement in online learning identified by Richardson and Newby (2006), and deterrents to self-directed learning (Guglielmino et al., 2005; Purdue, 2003) became relevant.

Furthermore, as illustrated in Figure 2, some learners have a tendency to obtain the needed knowledge in episodes (Shreiber & Berge, 1998), as if in sessions, and tend to incorporate both their initial perceptions of the learning situation as well as the subsequent changes of these preconceptions after the acquisition of online material actually takes place. A meaningful learning episode indicates a thorough understanding of material under study, called *deep learning* (Kember et al., 2004), and mental organization of that information into a coherent experience that leads to transformation or change in attitudes, beliefs, or goals. That deep learning denotes incorporation of new material into an existing knowledge base and storing the information in the long term-memory (Dillon & Greene, 2003; Kember et al., 2004). Such learning is not a mere mnemonic, or *surface learning* (Kember et al., 2004) that is mainly

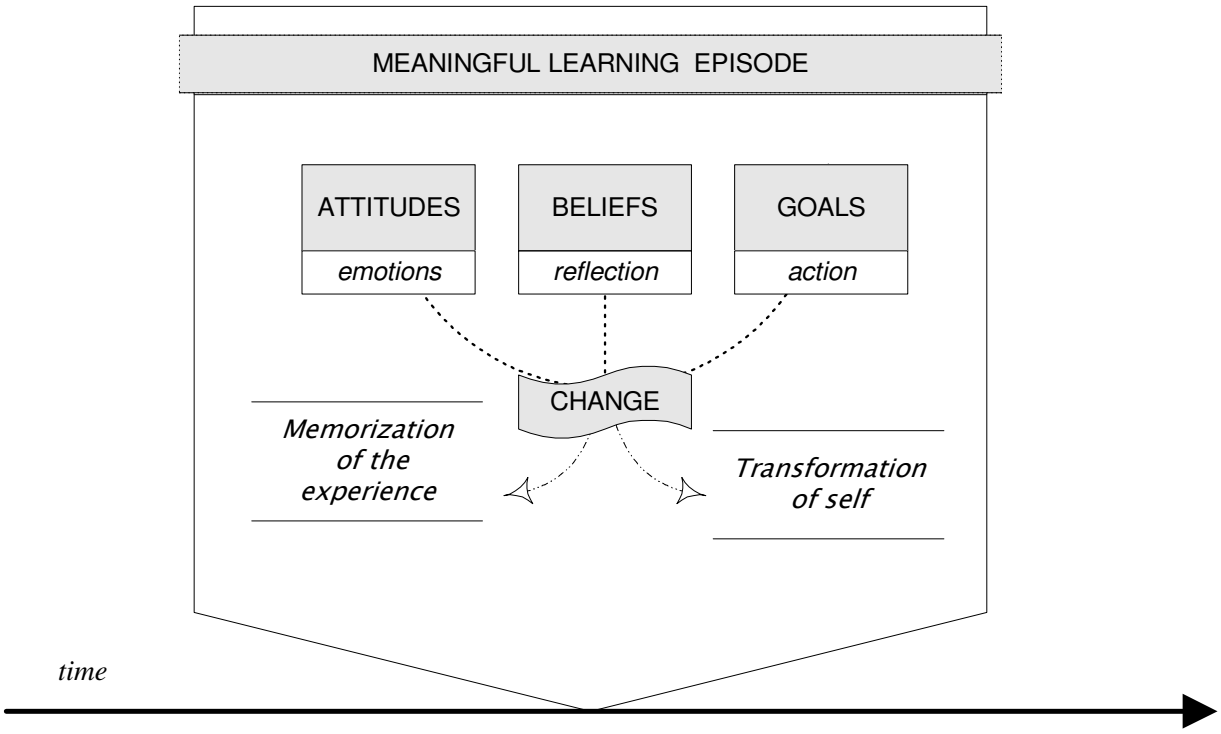

Figure 2. Conceptual assumptions about learning based on Jarvis (2006) and Schreiber and Berge (1998).

focused on accumulating information for quick retrieval, but it is an engagement of emotions, reflections, and actions bringing about comprehension and ability to operationalize the material under study into new contexts (Jarvis, 2006). Schepens et al. (2007) stress a relevant dimension to deep learning for student teachers, namely that such learning consists of meaningful interactions that build knowledge, shape beliefs, and foster analysis of the teaching and learning situations. Transformation of the learner is not deferred in time, as in case of surface learning, and results in evolution of self, the person who learns (Jarvis, 2007; Kember et al., 2004).

Moreover, e-learning may be subject to learners' ability to understand and apply material delivered electronically as well as their learning approaches (Kember et al., 2004). Several components within the approaches to learning comprise deep (D) and surface (S) approaches. In this study, deep approaches to learning were comprised of two main components of motives (DM) and strategy (DS). Additionally, several specific factors related to the online course delivery that affect learning included its structural components and overall perceived functionality of e-learning as detailed in Chapter 3, Table 2.

Problem Statement

Although a lot is known about discrete aspects of the learning process, it is unclear how professionals engage in e-learning and what factors determine their approaches to online learning. In absence of a comprehensive and universally accepted theory of human learning (Jarvis, 2006), findings from many dispersed studies analyzing overlapping and contradicting phenomena dominate what appears to be an unlimited supply of publications on e-learning. Therefore, provided with the most current, comprehensive, and inclusive conceptual framework, the following overarching research questions were posed in this study:

1. What approach to learning do faculty and instructional designers favor when engaging in these online professional development activities?
2. What is the perceived functionality of course components in online professional development materials?

By meticulous analysis of two fundamental factors - deep and surface approaches to learning - and by accounting for online specific context affecting these approaches, both faculty and instructional designers could gain useful information about learners' motives, strategies, and the role of perceptions about the courses and their functionality.

Significance of the Study

There have been only rare publications based on studies of deep and surface approaches to online learning along with motivational and strategic aspects of this process (Garrison & Cleveland-Innes, 2005; Richardson & Newby, 2006). Therefore, this study may be useful to verify that the findings from many dispersed studies analyzing the key factors related to approaches to e-learning are relevant within one of the most comprehensive theoretical frameworks (Jarvis, 2006, 2007) presented to date. According to Dillon and Greene (2003), future research in distributive learning theories should anchor on recognition and adjustments to the learning approaches. Cognitive theorists who focus on online learning (Garrison & Cleveland-Innes, 2005; Richardson & Newby, 2006) urge more research to help understand different aspects of e-learning and investigate both strategies and motives inherent in complex online environments. This study may contribute to that understanding by systematic evaluation of data provided by participants who facilitate e-learning professionally.

Additionally, an analysis of faculty's approaches to learning may assist these professionals and their institutions in better understanding of learners' expectations from online

education, deliberate implementation of deep and surface learning choices, incorporation of alternative material presentation techniques, and creation of future courses that promote functional and best possible e-learning. Understanding of the complex tasks and actions learners take in electronically mediated learning situations may be used: by individual learners to manage their lifelong career related learning needs; by faculty, designers, and administrators to construct better courses and programs for their students; and by leaders who manage today's learning opportunities for professional development and chart the future for their institutions.

Overview of Methodology

Purpose of the Study

The purpose of this study was to examine factors influencing the approaches to e-learning of faculty, who directly instruct others in both educational and business settings, and instructional design professionals who work with adult learners indirectly. Faculty and instructional designers appear to have clearly identified approaches, motivations, and strategies in their own professional development activities. Moreover, focus on technology-mediated learning episodes may offer further insight into the learning process from a critical perspective of professional educators and supply answers to the following overarching research questions:

1. What approach to learning do faculty and instructional designers favor when engaging in online professional development activities?
2. What is the perceived functionality of course components in these online professional development materials?

By careful selection of the population and exacting the aspects of the learning process, attention was focused on a slice of a very complex process and achieving better understanding of factors influencing e-learning.

Sample

The target population for this study consisted of postsecondary college faculty and instructional designers who create online courses, from both two and four-year institutions, working full-time and part-time in colleges and institutions located within the continental United States. According to Frankel and Wallen (2003) purposeful sample is used when the researcher knowingly selects participants based on the predetermined set of characteristics. This study was conducted among a purposive sample of about 2,500 members of the Society for Technical Communication (STC), engaging in online learning themselves, and constructing learning environments for their own students. Using STC to populate the study was suitable, since this organization is the largest technical communication association in the world and recruits both postsecondary students and established professionals from diverse areas of expertise in academia, business, and industry.

A purposive sample of STC members was invited to participate in the online survey; however, only pre-qualified respondents to the survey were selected for analysis, namely those who had at least one year of professional experience in teaching online, or creating e-learning materials, and resided within the United States. Some of STC's members may have limited professional development experience, or might not consider themselves educators and could self-sort from participation in this study. Therefore, in the first section of the survey, volunteer participants were asked about geographical location of their employment [Q2] and both online teaching or course design experience in years [Q4] to insure accurate description of the population. These questions helped obtain reliable and qualifying responses further data analysis.

Instrument

A customized online survey consisting of four sections (A-D) was used. Section A contained questions soliciting demographic and professional details about the respondents and section B helped to determine their own experience in conducting and taking online courses. Survey section C consisted of, an adapted with permission, *The Revised Learning Process Questionnaire* (Kember et al., 2004) measuring on a Likert's scale participants' deep and surface approaches to learning inclusive of strategies and motives. The reliability of the instrument, Cronbach alpha values of 0.82 for deep and 0.71 for surface approaches to learning, is documented by the authors of the original questionnaire (Kember et al., 2004) and verified by confirmative factor analysis to control for Type I and Type II errors, as detailed in Chapter 3, Table 4.

The survey was modified to contain concepts consistent with e-learning environment with permission from Dr. David Kember (see Appendix A) and preserved the hierarchical factor structure of the original questionnaire (personal correspondence, April 21, 2006). Modifications were limited to wording of the questions in order to replace traditional classroom connotations with environment neutral or more online learning specific terms, yet without distorting the integrity of the questions. For example: "studying" was replaced with "learning online", "different classes" with "different courses" more common in online environments, or "examinations" to "online assessments". Additionally, section D was added to elicit perceptions of functionality of online learning that consistently reemerge in the research literature, but have not been included in *The Revised Learning Process Questionnaire* (Kember et al., 2004). In particular, respondents were asked to agree or disagree with a set of nine statements related to quality and functionality of online materials (see Appendix B, Section D).

Variables

The independent variables in this study consisted of the deep and surface approaches to e-learning, when faculty and instructional designers engage in self-directed, online learning activities. Since learning depends on cognitive, socio-cultural, and historical contexts (Jarvis, 2006, 2007, 2008; Schepens et al., 2007) and e-learning is possible only through the use of technology, the perceptions learners have about this particular environment appear crucial (Richardson & Newby, 2006). Motivations, strategies, and deterrents to learning that arise could provide a more comprehensive understanding of deep and surface approaches to e-learning and were analyzed as dependent variables. Additionally, an inquiry into some general perceptions on functionality of online learning, also dependent variables, were afforded in attempt to identify further, online learning-specific, factors related to deep and surface approaches.

Limitations and Research Boundaries

The primary limitation of this study stemmed from its focus on a group of learners, faculty and instructional designers, from one professional organization. However diverse this group of participants may appear to be, could have limited the study to only a certain section of the postsecondary educators involved in instruction and design of online learning — those who are affiliated with universities, colleges, and other professional organizations with STC chapters or actively recruiting members — and may disproportionately represented the population of online educators. Hence, specific demographic data and professional experience information was gathered to optimize applicability of the results for generalizations to a larger population.

Furthermore, the purpose of the study pivoted on the relevance of factors like years of online experience or preference for electronically mediated professional development. Although research suggests that a strong link exists between the deep learning and both motivation and

strategy to apply recently acquired knowledge into practice, the actual skills or competencies obtained from e-learning activities were not considered as relevant. This study was not measuring tacit knowledge, as such, and further generalizations that tend to assess the effectiveness of faculty or instructional designers' professional development from online sources were not possible.

Moreover, the study was based on self-reporting and self-perception of individual learning habits. While the target population has educational background and predisposition to critical analysis, one cannot make an unequivocal assumption that self-reflection is the most reliable evaluation method. Therefore, given this study's focus and design, the actual objective transfer of skills or knowledge acquired from e-learning professional development activities was not possible to analyze.

It should be noted that in this process of obtaining data from participants via internet, some participants might not have been accounted for due to technical problems with e-mail list currency, e-mail system security screening, and other unforeseen technical difficulties. Several measures to reach the intended number of participants, secure the data collection and storage, and meticulously analyze each response were undertaken (see Appendix A).

Definitions of Key Terms

Achieving learning strategy – denotes approach, goal-orientation, and measurable knowledge gain that could be translated into one's work (instruction). Kember et al. (2004) replaced achieving learning concepts from earlier version of the questionnaire with strategies and motives and streamlined the data analysis allowing for further generalizations. According to Dillon and Greene (2003), achieving strategy has been present in both deep and surface learning

approaches and has shown its usefulness to determine the successful, environment-dependent learning.

Approaches to learning – appear to comprise both goals as in Locke and Latham (1990, 2006) and beliefs analyzed in research by Bråten and Strømsø (2004, 2005), as well as Schommer (1998).

Course – refers to a variety of information and materials grouped in an intentionally structured learning unit, corresponding to traditional postsecondary instructional materials used in classes, or training; course materials in online learning environment.

Deep learning – denotes a method of incorporating new material in relation to the existing knowledge (Dillon & Greene, 2003) and involves incorporation of the information into one's long term-memories (Kember et al., 2004).

E-learning – is introduced in this study when distance, web or internet based, and electronically mediated learning component is discussed in the source literature. Definitions of both online education and distance education are consistent throughout the literature in one aspect: the fact that the learning and the students are physically absent from the traditional classroom during a class or an entire program, but remain engaged within a transactional distance (Moore, 1993). In this sense, precursors of distance and online education can be traced in time to the correspondence courses that flourished in the United States in the 1840s when Sir Isaac Pitman taught shorthand by mail (Williams, 2003). Moore (2005) noted that blended learning in American high schools and open universities throughout the world integrated a variety of learning models in the 1970s. Technology for delivery of course materials to a student has advanced into hypertext and other digital formats. Internet based programs belong to a subset of technology mediated learning delivery system, typically designated by an 'e-', and

numerous researchers reflect on the advancements and change (Alessi &Trollip, 1991; Berge, Muilenburg, & Haneghan, 2002; Brown, 2000; Chute, 2003; Cunningham, 1990; Schreiber & Berge, 1998; Selfe & Hawisher, 2002; Visser, 1997). Related terms include hypermedia learning and online interactivity.

Faculty – are identified as part-time and full-time postsecondary, college, and university instructors engaged in online teaching; educators who have direct contact with students.

Higher education organizations – include postsecondary, two-year and four-year, colleges or universities within continental United States.

Hypermedia learning – learning online; indicates that both cognitive and motivational factors influence knowledge gain after learning from online materials takes place (Cortese, 2005; Mayer & Moreno, 1999, 2003): see also online interactivity.

Incidental learning - occurs throughout the individual's life and is considered to be latent and preconscious, and as such could be considered part of the more complex perspectives on learning, especially purposeful learning (Jarvis, 2006).

Instructors (and Faculty above) – identify facilitators of the learning process in direct contact with students.

Instructional designers – identify professionals from diverse disciplines who create educational materials used by commercial and educational institutions; technical communication majors who coordinate content editors and programmers in order to provide their customers with deliverables suited for a predefined educational purpose. Typically, instructional designers do not have direct contact with learners and may be generalists without course specific subject-matter expertise.

Knowledge workers – denote individuals who earn a living by critically analyzing available information for relevance, and value and apply it creativity in order to construct new knowledge. In a rapidly changing and open information society, knowledge workers have to identify and solve problems quickly, if they are to keep abreast of change and remain competitive in their jobs (Sloman & Webster, 2005). As a result, the most useful training delivery system would be distributed rather than centralized, allowing for learner self-management, and use of technology-based training delivery systems (Purdue, 2003, p. 617).

Learner activities – indicate "what the learner does in studying" and the learning process, "the act of engaging with the material" (Toohey, 1999, p. 17). Learning is understood in this study as the goal oriented, self-directed, individual behavior of acquiring knowledge, subdivided into deep and surface approaches along with achieving learning inclusive of strategy and motive (Biggs, 1993; Garrison et al., 1995; Jarvis, 2006; Kember et al., 2004; Marton & Säljö, 1976a).

Learning process – rooted in the systems' research methodology, involves "tracking data for each individual learner, his or her prior knowledge, achievement of learning objectives, and … construction of new knowledge" (Saba, 2003, p. 18). Additionally, it echoes John Dewey's psychological, and now more cognitive and social, experiences of self-directed learning (Garrison, 2003, 2006; Jarvis, 2006) of what actually happens when learners work with course materials. Scholars see learning as purposeful activity similar to an instinct (Pinker, 1994), an urge to acquire knowledge or nourishment that is "intrinsic to human life" and tends to perpetuate a lifetime as an "unfinished project" (Jarvis, 2006, p. 200).

Online interactivity – is defined as both physical activity of the user and cognitive event characterized by a complex process of obtaining information from online sources (Jarvis, 2006; Mayer & Moreno, 2003). Andrisani, Gall, Gillete, and Steward (2001) hypothesized that

interactivity depends on the metaphors used in each presentation system that encourages interaction; therefore, in some instances, interaction may deter learning or actual application in one's work (instruction).

Professional development – relates to self-directed learning activities presupposing personal growth and acquisition of information or knowledge in the area of professional engagements that may be mandated or regulated by the employers. Such development depends on learners' ability to understand and apply learned material into the workplace tasks and activities. Literature commonly identifies professional development based on who mandates or sponsors such training.

Purposeful learning – comprises goal-oriented and strategy driven pursuit of knowledge, which changes the individual through acquisition of "skills knowledge, attitudes, beliefs, and appreciation of the senses" (Jarvis, 2006, p. 25). It is not incidental in this sense.

Self-directed learning – denotes taking responsibility for one's learning (Arnesen & Hiemstra, 1999), is autonomous (Moore, 1972; 1973; 1980), depends on intentionality of the learning process, as defined by Tough (1979) and the environment, inclusive of personal awareness, social contexts and instructional factors (Garrison, 2003; Jarvis, 2006; Pilling-Cormick & Garrison, 2007).

Surface learning – involves strategy that is independent from prior knowledge (Dillon & Greene, 2003) and allows learners to accumulate information without immediate contextualizing or understanding it (Kember et al., 2004).

Transactional distance - denotes a pattern of communication that leaves the individual learners in charge of the learning processes depending on their ability to control the learning environment, as defined by Moore (1993). Saba (2003) noted that telecourses and internet

technologies did not manage to diminish the value of Moore's definition of the relationship between the learner and the instructor or the instructional material, although he acknowledges the dichotomy, or variability of this underlying concept, depending on the degree of autonomy and the framework of the courses.

Usable Knowledge – defined as educators' ability to know how to promote learning, teach, and help students learn by Lagemann (2002). This knowledge has to be pertinent to the learning situation and its acquisition may depend on the learners' perceptions of the functionality of the courses facilitating that knowledge. It also denotes practical knowledge – term more widely used in overseas research (Schepens et al., 2007).

Hypotheses

The principal objective of this study was to determine prevalence of deep and surface learning among faculty and instructional designers taking online professional development courses that may be influenced by several different factors related to e-learning.

Ho1 - There is no significant difference between faculty members and instructional designers in their deep approach to e-learning.

Ho2 - There is no significant difference between faculty members and instructional designers in their surface approach to e-learning.

Ho3 - There is no significant difference between faculty members and instructional designers in their respective deep motive to undertake e-learning.

Ho4 - There is no significant difference between faculty members and instructional designers in their respective deep strategy to undertake e-learning.

Ho5 - There is no significant difference between faculty members and instructional designers in their respective surface motive to undertake e-learning.

Ho6 - There is no significant difference between faculty members and instructional designers in their surface strategy to undertake e-learning.

Ho7 - There is no significant difference between faculty members and instructional designers in their intrinsic interest to undertake e-learning.

Ho8 - There is no significant difference between faculty members and instructional designers in their commitment to work.

Ho9 - There is no significant difference between faculty members and instructional designers in relating ideas.

Ho10 - There is no significant difference between faculty members and instructional designers in their understanding of e-learning courses.

Ho11 - There is no significant difference between faculty members and instructional designers in their fear of failure in e-learning environment.

Ho12 - There is no significant difference between faculty members and instructional designers in their aim for qualification.

Ho13 - There is no significant difference between faculty members and instructional designers in their tendency to minimize the scope of study in e-learning.

Ho14 - There is no significant difference between faculty members and instructional designers in their strategy to memorize.

Ho15 - There is no statistical difference between the perceived need for orientation to an online course and the respective approaches to e-learning.

Ho16 - There is no statistical difference between the use of models and templates in online courses and the respective approaches to e-learning.

Ho17 - There is no statistical difference between the use of audio/visual channeling of the learned material in online courses and the respective approaches to e-learning.

Ho18 - There is no statistical difference between the use of online collaboration tools in the courses and the respective approaches to e-learning.

Ho19 - There is no statistical difference between the use of assessment tests in online courses and the respective approaches to e-learning.

Ho20 - There is no statistical difference between the perceived functionality of combined course features in online courses and the respective approaches to e-learning.

Ho21 - There is no statistical difference between the perceived frustrations with technology employed in online courses and the respective approaches to e-learning.

Ho22 - There is no statistical difference between the perceived need for practice and learning of relevant tools and skills in online courses and the respective approaches to e-learning.

Ho23 - There is no statistical difference between the perceived needs of the population regarding online courses and their approaches to e-learning.

Ho24 - There is no statistical difference between the perceived needs for mixed learning environment of the population and their approaches to e-learning.

Ho25 - There is no statistical difference between the years of professional experience and deep approaches to e-learning.

Ho26 - There is no statistical difference between the years of professional experience and surface approaches to e-learning.

Ho27 - There is no statistical difference between the years of experience in online teaching or designing courses and deep approaches to e-learning.

Ho28 - There is no statistical difference between the years of experience in online teaching or instructional designing and surface approaches to e-learning.

Ho29 - There is no statistical difference between the number of online courses taken and deep approaches to e-learning.

Ho30 - There is no statistical difference between the number of online courses taken and surface approaches to e-learning.

Conclusion

This introduction highlighted the purpose, hypotheses, population, significance, and possible limitations of this study against a broader theoretical and conceptual background. The next chapter devoted to the review of literature on which this study relied follows. Design and deployment of this study among faculty and course designers professionally engaged in online instruction and affiliated in The Society for Technical Communication (STC) is included in the subsequent chapter followed by presentation of results and discussion of the findings. References and the relevant documentation, the complete, customized version of *The Revised Learning Process Questionnaire* (Kember et al., 2004) and the three subsections of the main survey (A-D) end this document as Appendices.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter provides a review of literature related to motivations and strategies, approaches to technology-driven learning congruent with three-tier conceptual base proposed by Jarvis (2006) and across adult learning and cognitive theories. Relevant literature will be presented using the learner, the learning process, and the learning environment as the organizing principle for this chapter. The first part of the literature review will present key aspects of the general notion of lifelong learning and how researchers look at today's learners, the first element of the three-tier conceptual framework proposed by Jarvis (2006, 2007). Particular attention will be placed on the impact of technology, affective factors that shape adult learners' choices, and the support in advancing their careers through lifelong learning. The next part of this chapter will offer a look at the learning process, second element in the proposed conceptual framework. In particular on the selected adult theories, inclusive of approaches to learning, cognitive theories, especially cognitive load theory, and both the importance of structure in coursework as well as implications these theories and concepts have for further research. The following part of the review will provide insight into e-learning environment, the third element in the three-tier conceptual framework proposed by Jarvis (2006, 2007), the learning strategies, especially managing the information loads, experience of learning with possible deterrents, and flexibility in e-learning environments that self-directed professionals use to stay current in their fields. The last section of this literature review will focus on selected functional aspects of online learning. A short conclusion will close this chapter.

Approaches to Learning — Conceptual Framework: Definitions

Entwistle and McCune (2004) trace the beginning of studies associated with learning approaches to the development and refinement of research methods that occurred in the 1930s

and 1960s. As such, approaches to learning indicate a method, a way to begin a learning activity, and a strategy that involves a more general plan, inclusive of motivations combined into a scheme of action, or a study method. Although these researchers analyzed several study method inventories from USA, Europe, and Australia in an attempt to provide a coherent conceptual foundation for analysis of postsecondary learning, no comprehensive perspective emerged.

The very definition of the way we learn changes in almost every study, varies by decade, and appears to differ from one academic center to another (Entwistle & McCune, 2004; Jarvis, 2006; Purdue, 2003; Schommer-Aikins, 2004). Research of this complex and multidimensional area is bound to render conflicting and inconclusive results or encounter inconsistent and overlapping theories, as noted by Entwistle and McCune in 2004. Therefore, a theoretical framework based on recent writings by Jarvis (2006, 2007, 2008) constitutes a pivotal attempt at synthesizing what is germane to human learning based on his lifelong research and insight into multiple disciplines of education, psychology, sociology, and economics. This contemporary perspective escapes traditional and narrow considerations and offers a comprehensive look at something as universal as learning. Thus, lifelong learning is defined as:

> the combination of processes whereby the whole person experiences ... social situations, the perceived content of which is then transformed cognitively, emotively or practically ... and integrated into the individual person's biography resulting in a constantly changing (or more experienced) person (Jarvis, 2006, p. 134).

Based on this definition, two theories advance understanding of the approaches to learning most significantly: adult learning and cognitive load theories. Within the latter one, cognitive load theory appears particularly helpful in recognizing physical capacities of human

brain when acquisition of new information is undertaken, as a result, directly influencing learners' actions, and their perspectives on e-learning in particular. Additionally, several factors and phenomena related to instructional design of online courses drawn from adult learning theories underline choices made by learners in electronic environments (Guglielmino et al., 2005; Purdue, 2003; Rubens & Southard, 2005).

Two fundamental concepts of deep and surface approaches to learning were formulated by Marton and Säljö in 1976 and correspond loosely to what Jarvis (2006) has called non-reflective, thoughtful and reflective learning, combining dispersed research related to individual learning style, goal orientation, and motivation. Marton and Säljö (1976a) tackled the approaches and quality of learning using surveys after reading texts. Two main approaches to the learning experience emerged: one focused on quantity of remembered information and the other on discerning the main premise of the text with search for understanding the overall meaning of a piece. Such different approaches were studied by other researchers as well (Biggs, 1987, Entwistle, 1991; Ramsden, 1991)

In 2004, Kember et al. refined subcomponents of the deep and surface approaches into strategies and achieving motivations combining the mainstream research. Although the literature, generally, identifies such factors as possible deterrents and classifies them based on their origin, as organizational and personal (Purdue, 2003), the question still remains whether e-learning may be influenced by these and other factors. However, for the purpose of this study, a more descriptive division of the issues impinging upon the learners, the learning process, and the learning environment, as previously illustrated in Figure 2, should have helped navigate the most relevant aspects of related research literature.

Conceptual Framework: Factors

Any learner may be influenced by the environment in which the learning takes place. As if in a perpetual cycle, learners strive to achieve their goals and acquire knowledge (Jarvis, 2007). Their learning process is characterized by strategies and motivations to obtain their goals (Biggs, 1987; Kember et al., 2004). Deterrents to the learning process, either inherent in the course materials or learners' own perceptions of e-learning functionality, also weigh in and may determine both the approaches and the outcomes. In particular, two main groupings of factors related to e-learning — materials, or the e-courses, and the perceptions of their overall functionality- are of interest (see Appendix B, section D)

The conceptual framework for this study indicates that the person who learns (Jarvis, 2006) is more often a lifelong learner who has a specific way of engaging with online course materials; thus, the process of learning, in part, may be externally determined by environment related factors. This simplified model of learning is based on the definition of learning proposed by Jarvis in 2006 and expanded in 2007 and 2008. It also denotes that multiple learning episodes can co-occur at different stages of completion in a given time.

Jarvis (2006) indicated that the cause of learning lies in a desire to bring about harmony, a balance between the learning environment and the learning self. He called this ongoing process a disjuncture, where learners seek knowledge in "episodes" (p. 55) and noted that,

> ... it is what we "do" with our experience that lies at the heart of our understanding of learning. Our experience occurs at the intersection of the inner self and the outer world and so learning always occurs at this point of intersection…. In fact, the desire to overcome this sense of dissonance and to return to a state of harmony might be seen as a

> fundamental motivating force in learning, and the disjunctural state may be said to be one in which a need has to be satisfied (Jarvis, 2006, pp. 6-7).

Although researching such dynamic concepts may appear impossible, especially considering the changing nature of the technologically infused environment and individual development of the learner, by selective discussion of relevant theories, Jarvis indicated what is accepted and undisputed about human learning in theory, thus, pointed a way for future research.

In 2007, Jarvis added a more controversial sociological perspective on lifelong learning embedded in the advanced capitalist economy of the twenty-first century. As such, learning has two main functions for individual learners: to sustain them economically and to assist them to learn in a more general, humanistic sense – for the sake of knowing. Regardless of this broad sociopolitical outlook, lifelong learning for Jarvis in 2007 appears purposeful and deliberate, whether or not for professional or personal knowledge acquisition. By analyzing three different aspects related to human learning, the person-in-the-world, the learning process, and the transforming experience of learning by that person, Jarvis (2007) pointed that a relatively comprehensive understanding of learning could be achieved. The learner is always in the learning environment, by choice or incidentally, learning or revising what is known against what is new (see Figure 3).

Jarvis (2007) provides a selective analysis of what has been researched for decades by adult learning, cognitive, behavioral, constructivist, and other scholars. Pivoting the analysis on the three-tier definition of learning, he was able to both focus and disperse the issues under consideration and in a clear manner sort schools of thought, observable phenomena, and facts-of-life into one perspective, an attempt at a comprehensive theory of human learning. Similar to a set of frames on a filmstrip, learners progress through a succession of learning episodes. The

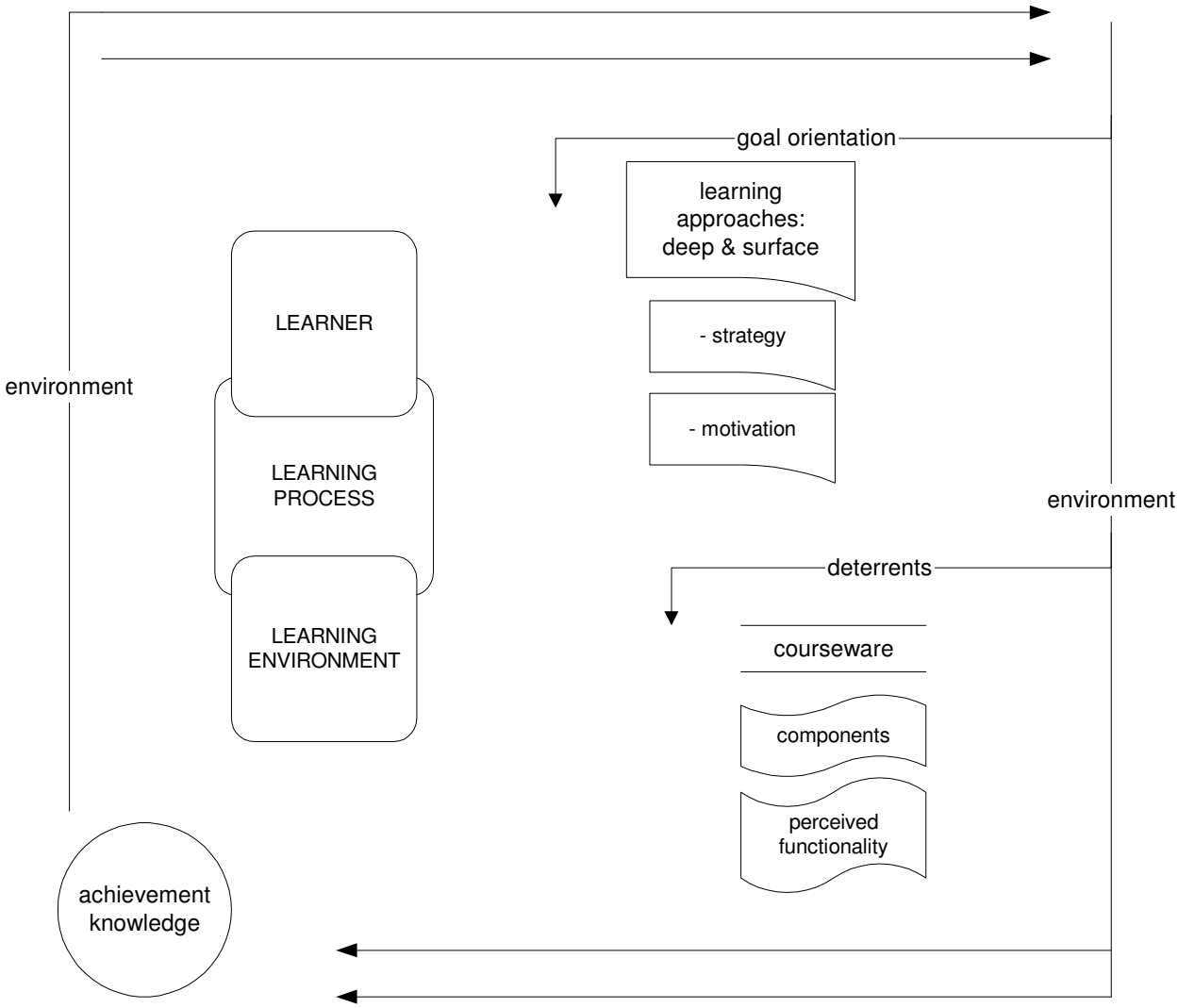

Figure 3. Simplified model of the learning process based on Jarvis (2006) and an overview of concepts and factors influencing e-learning in this study.

learner, a whole person who learns, gains environment dependent experience (Jarvis, 2006, 2007).

Section Summary

This introductory part of the literature review defined approaches to learning within the conceptual framework proposed by Jarvis (2006, 2007). Particular attention has been placed on the three key terms within the framework: the learner, the learning process, and the environment. The remaining sections will contextualize these terms within adult and cognitive learning theories and supply a comprehensive overview of relevant literature, starting with a look at the lifelong adult learners who seek professional development.

Lifelong E-Learning Professionals

In the 1980s, Knowles formulated a theoretical foundation of adult learning by describing characteristics of mature learners who reenter the educational system. Knowles (1975; 1984) suggested that adult learners need context driven tasks to remain interested and motivated in the material, thus, with minimum guidance and feedback on mistakes, such learners prefer to experience learning on their own. In 1981, Cross proposed a set of similar principles and expanded adult learner characteristics even further to incorporate individual and group related prospects and obstacles to learning. Today, learners are conceptualized as the focal point of the learning process (Jarvis, 2006, 2007; Ornstein & Hunkins, 2004; Purdue, 2003). Technology makes this transition evermore functional through a variety of cutting-edge devices enhancing the learning process (Sharama & Kitchens, 2004) while the workplace itself undergoes technology driven adaptations (Schepens et al., 2007).

Amid societal and technological changes, more program-based and learner-centered approaches to acquisition of knowledge and skills are available (Jarvis, 2006; Kember et al.,

2004). Adult learning today appears to be life-long, self-directed, and career-oriented (Garrison, 2003; Jarvis, 2007). According to the U.S. Department of Education (O'Donnell, 2006), 95% of adults participated in various formal work-related educational activities in 2004-2005 to improve their skills and knowledge (p. 13). Results also indicate that, at least 50% of the respondents reported to have participated in informal learning activities provided by nonprofit and community organizations, and about 32% of respondents indicated that within the last year they had used many forms of distance education to accomplish their learning objectives. About 70% of respondents were engaged in other informal learning activities that included computer and internet (28%), audio-visual materials (47%), and traditional publications (53%). This 2004-2005 study excluded full-time students, even if they were enrolled in credential programs, and had a 71.2% response rate in its Adult Education unit.

Thus, lifelong learning of professionals appears to evolve despite the strong traditional (or non learner-centered) models of the past (Jarvis, 2001; Schepens et al., 2007). Only recently, both workplace based learning and one facilitated by professional associations started to support "flexible performers" (Jarvis 2006, p. 153), as whole persons that self-direct their learning. As a result, job satisfaction, motivation, and efficiency increase and a new type of workforce emerges (Scott, 2003, Purdue, 2003), which Jarvis (2007) describes in terms of globalization and democratization.

As O'Donnell (2006) indicates, the digitalization of learning is irreversible and both learning and teaching are affected. For example, in 2006, all surveyed Title IV degree-granting institutions used technology to instruct education programs' students, 52% offered their programs at a distance, and 88% of them actually taught applying technology in the classrooms (Kleiner, Thomas, & Lewis, 2007). These institutions reported also that several factors (such as

lack of time, interest, insufficient training, or infrastructure deficiencies) impeded the implementation of technology driven learning and instructing. However, there was a difference between actual and perceived barriers. While 87% of institutions reported faculty's lack of time as the main barrier to implementation of new technologies, over half of them indicated that faculty's interest in technology integration was not an obstruction at all. The actual barriers that account for the difference in these results were not identified.

Technology and the Learners

Research literature offers contradicting and conflicting perspectives on the learners. Dillon and Greene (2003) indicated that the definition of learner and subsequent choice of the instrument to measure the learning process are behind the problems with utilization of the results from many studies and substantiate their clam with analysis of research related to learning styles. Many conflicting results, according to the authors, occur when variation of scores depends on interrelations of questions (inpasative scores with degree variance) and when studied populations are biased with respect to qualifications, affluence, or educational level. Instead, Dillon and Greene (2003) advise future researchers to focus on the learners and how to help them modify their approaches to learning instead of supplying an array of methods of instruction to oblige learners' preferences.

In her article about online continuing professional education, Purdue (2003) remarked that researchers appear to agree only on two premises related to technology mediated learning: inevitability of changes due to the technological advances and the subsequent changes to the learning habits. Professionals who want to stay competitive, keep abreast with innovations, and maintain high standards of their competencies have to self-direct their career oriented learning and augment the offerings provided by their institutions or licensing organizations, if only to

maintain currency and remain employable (Jarvis, 2001, 2007; Jones & Johnson-Yale, 2005). Purdue (2003) further indicated that technology of instruction is customizable to individual needs of these lifelong learners and permits direct and global interaction with both field experts and peers. Additionally, new generations of learners, those who grew up in the environment where interactive computing and online environments are the norm, start to enter the educational system. Purdue (2003) noted also that 88 million Americans have been growing up immersed in a technology driven world, expect interactivity, and take knowledge seeking beyond passive, media-like "broadcast mode" (p. 627). Some call this generation "digital natives" (Chen, 2005); others call them "the Net Generation" (Purdue, 2003).

In order to be effective, teachers now have to be able to apply basic technical skills of knowledge-based economy and distance education and foster these skills among their students, the "digitally native Net Generationers" (Dede, 1996; Jones & Johnson-Yale, 2005). Dede also noted that base knowledge is no longer limited to the use of the library decimal system or a telephone, but includes ways to narrow search results from search engines, or the ability to access e-mail. These base knowledge skills may be changing and expanding even further to include collaboration across virtual networks. Aptitude to use technology to communicate and interact becomes standard as millions of learners have already taken online courses, searched the internet, or used e-mail (Dede, 1996; Jones & Johnson-Yale, 2005; McNabb, 2005; Moore, 2003; Moore, 2006).

Problems with the technology or the people? The very few studies focused on engagement in online learning indicate that with technology driven change in instructional design and cognitive perseverance, the experience of learning should be more meaningful (Richardson & Newby, 2006). However, research related to both the effects of technology in

online education and the influence it has on the learners remains inconclusive and fragmented, offering mostly best practices and guides. Among successful implementations of e-learning that attempt to breach logistical and financial obstacles by transitioning to distributive, learner-centered, and collaborative programs is the United States military, one of the largest organizations requiring professional development of its workforce (Freeman, 2003; Westfall, 2003). However, some skeptics are not ready for the inevitable transition: "The digital wizardry now being installed in computers around the country was developed as the quintessential delivery system for sensations, not experience" (Rogers, 2005, p. 25). These critics see technology as a deterrent to the true experience of learning. Some professional educators embrace innovation and new technologies with a varying degree of compliance, considering both the "necessary evil" (Winogard, 2005). For Murray (2001), who studied full-time career programs faculty in 130 community colleges, professional development has to align with institutional goals along with supporting lifelong activities and connecting effective instruction with career advancement opportunities. Only then, learners could engage the newly acquired experience and pursue learning activities — provided they still have time to do so.

Other factors. In the 2006 article on *The Role of Students' Cognitive Engagement in Online Learning*, Richardson and Newby reported several factors influencing preferences for deep and surface learning strategies in online master's degree programs at a Midwestern university. This study was conducted with 121 volunteers who were enrolled full-time in either education or engineering programs and utilized the first iteration of Biggs's (1987) *Study Process Questionnaire*. Researchers obtained detailed demographic information that has been examined using *t*-tests and one-way analyses of variance to establish differences in learning strategies and motivations. Several of the identified factors indicated that having positive prior

experience with online learning inclined learners to adopt long-term studying strategies and self-management of further learning activities.

The possible weakness of this 2006 study, however, is the fact that the instrument used in that study was revised in 2004 to eliminate inherent flaws, but interestingly Richardson and Newby have not taken advantage of that refinement, nor have they exhausted theoretical findings of what has already been proposed and confirmed about learning to augment their analysis. As Kember et al. noted in 2004, achieving strategies are complex and may not produce reliable data, especially if the studied population is relatively uniform and alike, or situated in one program area and one university.

Additionally, research also suggests that affective parameters determine learning outcomes. Gal and Ginsburg (1994) concluded that learners who have negative attitudes towards statistics will not develop skills that could help them implement statistical knowledge outside the classroom. In that study, researchers examined non-cognitive factors responsible for students' success in learning (as reported in research literature to date) and analyzed the instruments assessing attitudes and measuring beliefs about one domain of knowledge — statistics. Several other studies from a variety of disciplines acknowledge that in addition to content driven deterrents, learners' attitudes toward technology and instructional design flaws in the courses are relevant to the learning process itself (Guglielmino et al., 2005). Other researchers concur. Purdue (2003) pointed out that methodology and structure of online content are most often listed as deterrents to learning among those who engage in the continuing professional development activities and do not belong to "the Net Generation of those born after 1980" (p. 622).

Epistemological variables typically analyzed by educational psychologists influence how adults learn according to researchers who add beliefs, motives, and strategic approaches to the

concept of self-regulated learning (Bråten & Strømsø, 2004, 2005; Schommer, 1990, 1993). Schommer (1990), for example, examined many epistemological aspects of the learning process and pointed out that learners' beliefs about the speed of learning determine scores on their assessment tests. Initial experiments conducted by her were based on reading comprehension tasks involving over 170 freshmen students and related to general characteristics of the learners. However, more recent studies indicated that beliefs about learning are more prevalent and precede goal-orientation strategies, and therefore, factor into the concept of approaches to learning (Schommer-Aikins, 2004). Similar results from longitudinal studies on perception of the learning speed indicated that beliefs predetermine the overall learning goals and influence strategies students opt for while learning (Bråten & Strømsø, 2004). These researchers also found that academic context and future uses of the subject matter tends to influence learners' activities and strategies, as well as the overall approach to learning (Bråten & Strømsø, 2005).

MacNeal (2000) indicated that both deep and surface learning and achieving factors are related to the sets of learners' beliefs, motivations, and attitudes towards the speed of accomplishing a comprehension task utilizing hypertext. This researcher concluded her study using Schommer's original inventory as well and confirmed the relation between students' perception of the learning speed and the assessment scores. Interestingly, beliefs also correlated further with students' GPA scores. Along with cognitive learning theorists, other researchers agree with the findings stemming from work by Schommer in the 1990s and those who investigated epistemological aspects of the learning process that has direct bearing on the learners' choices (Bråten & Olaussen, 2005; Fazio, 1989; Jarvis, 2006; Roskos-Ewoldson & Fazio, 1992; van Orvalle & Siebler, 2005; Zhang, 2002). Furthermore, epistemological beliefs about learning started to be treated separately from beliefs about acquiring knowledge

(Schommer-Aikins, 2004) indicating that when learners mature, an ongoing transformation of the learner occurs (Jarvis, 2006, 2007).

Schommer-Aikins (2004) called for more coordinated research approach and argued for researchers to use more complex, systemic models as basis for their analyses. Research normatively should reflect the complexity of the subject matter and researchers were urged to work as diverse teams. The goal of this espousal was to mend the dispersion of single model theories and to start explorations beyond one field of study or methodological approach. Studies of underlying models of individual belief systems in relation to learning should also reflect the dynamic nature of the learning process and learners' pursuit of balance that Jarvis (2006) tackled almost metaphorically as disjuncture, the learners' fundamental motivation to know. However, extremely scarce evidence of such systemic endeavors could be found as researchers continue to build models attempting to address multifaceted learning processes independently and avoid mixed research methods. Perhaps future technology could allow for more uniform efforts assisted by analytical power of a supercomputer or an artificial intelligence system.

Addressing the complexities. As new models of online education emerge, understanding of the multidimensional character of learning is more thorough, and paths for technology rich engagements are made even into virtual reality, or simulations of real environments (Jarvis, 2006; Moore, 2003). Successful implementation of innovative technologies into professional development may add the experiential dimensions to learning and satisfy the harshest critics. McLellan and McLellan (2004) pointed to existing and future applications for engaging perceptualization of learning ranging from virtual reality based education of surgeons, or simulation of flight in aircraft pilots' training, to applications in special education.

However, expansion and improvement of electronic equipment becomes only part of the concerns for the stakeholders vested in lifelong education, since attitudes and convenient habits may prevent faculty or instructional designers from participating in a variety of opportunities. Being comfortable with technology and online delivery of education becomes a route to a learning society (term used by researchers in United Kingdom) or learning communities (term used by American scholars), areas of collaboration between professionals in the not so distant future (Garrison, 2007; Jarvis, 2006).

Management of the e-learning choices and an equal pace of development in pedagogy, technology, and workplace applications appear to be crucial (Jarvis, 2007; Schommer, 1998; Walker, 2003), especially if manifested as self-planned learning (Tough, 1979), guided self-regulated strategies (Pintrich, 2000), and achievement goal-orientation (Midgley et al., 1998). Warner and Christie (2002) defined such self-management as proficiency associated with self-directed learning; therefore, the change and the choices it permeates prevail for a lifetime (Evans et al., 2003; Jarvis, 2007). Rather than resisting change, faculty members are reflexively motivated to develop their skills to keep a pace with students. One of the more recent studies in this area, conducted by Kelly in 2005, also indicated that faculty members desire more technology driven instruction paired with stronger institutional support for their professional development.

Supporting the Lifelong Learners through Professional Development

Systemic professional development appears to align teaching professionals with the current developments in their fields of expertise and with innovations and overall expansion of technology (Brown, 2000; Jonassen, 1996; Purdue, 2003). The scalability of the material used in online learning as well as understanding of the habits, limitations, and styles of interaction with

the course content may determine the functionality of online course materials for individuals and the sponsoring organizations. Thus, using e-learning courses offers feasible solutions (Brown, 2000) to sustaining motivation and establishing long-term learning goals (Jonassen, 2006). Successful online instruction appears to have users' expectations and needs in consistent and continuous focus. Thus, designing and deploying online content becomes a creative and ongoing process based on the relationship building between course developer, administrator, teacher and the student (Dunlap, Sobel, & Sands, 2007; Walker 2003). Yet, a consistency is built between learners' personal expectations and approaches to learning, while the technology that delivers it is in constant flux (Richardson & Newby, 2006).

Evolving workplace. Additionally, administrators and organizers of professional development activities typically take into account diversity of their faculty, namely, various needs of their new or more experienced professionals. These leaders also implement continuous processes that evolve and incorporate changes as the technology or new research emerges (Holloway, 2003; Latchem & Hanna, 2001; Murray, 2001). Technology driven education appears to be much more than a hindrance since it offers cost effective, reliable, scalable, and efficient method of learning (Jones & Johnson-Yale, 2005; Oblinger & Rush, 2003; Purdue, 2003; Sharama & Kitchens, 2004). The internet may have opened access to lifelong learning activities for faculty in the learner-centered and technology-driven culture, opened new paths for professionals to self-direct their careers on a more individualized scale.

However, Poock (2001) notes that some postsecondary institutions may be unable to adequately assess the needs for any, traditional or online, professional development among adult learners and proposes a three step plan to include workplace skills and lifelong learning techniques. Moreover, five critical competencies of: communication, leadership, teaching and

instruction, professional adaptability, and self-awareness were identified based on both qualitative and quantitative study conducted among a diverse population of students and faculty (Poock, 2001). Overall, research in online continuing professional development appears dominated by either industry or specific academic domain studies of the respective workforce: healthcare, law, education, and several business professions. Dispersed results help understand certain aspects of e-learning, but they do not form any comprehensive outlook.

Lifelong learning. In the conclusion to his second volume on lifelong learning, Jarvis (2007) saw personal learning, one not mandated by employers or economic necessity, as both hope and future for humanity. Thus, investigating personal learning motivations and strategies of professionals offers a viable insight into the complex responsibilities and choices today's learners are making in online environment, as these responsibilities appear to predetermine the approach, experience, and outcome of the learning progress. As Jarvis (2006) suggested, history teaches current generations about the importance of lifelong learning, both professional development and personal learning. Leadership in educational institutions may not stem solely from organized professional development activities; however, it could originate from individuals' lifelong learning habits, their approaches to personal and vocational learning, and determination to direct their own careers and lives. For Jarvis (2006, 2007) comprehensive theory of human learning starts with that learner.

Traditionally professional development falls under human resources management. Its origin dates back to Dooley's "Training within Industry" report published in 1945 and according to Swanson and Holton (2001) many theorists and practitioners of the industrial age contributed to the research and science behind continuing and workplace education. However, the transfer of skills and learning through "deliberate imitation of examples provided by one who had achieved

mastery of a particular skill" (Swanson & Holton, 2001, p. 29) has been essential to human development from the earliest recorded times. Many principles of today's adult learning and subsequently professional development appear to have originated in antiquity and premodern philosophies. In both professional settings, faculty and instructional designers may rely on complex personal and professional development learning experiences to enhance their courses and make the distinction between personal and other types of learning less relevant (Jarvis, 2007).

Numerous components to a successful long-term vocational program integrate all stakeholders. Kutner and Tibbetts (1997) suggested that planning the programs minding personal interests and fostering lifelong learning are essential. Many authors have linked professional development of faculty with successful teaching and learning strategies of their students and have referred to them as measurable outcomes; thus, there appears to be a direct relationship between innovative, professionally creative faculty, and the students' success rates (Entwistle & Tait, 1990, 1995; Marton & Pang, 2006; Sydow, 2000). In case of instructional designers, the interaction with course users is limited and based only on the anticipated needs or channeled through help sections inbuilt into the courseware (Purdue, 2003). Research in that area of professional development is sparse. Nevertheless, professionals who engage themselves in peer exchanges of techniques, solutions, and materials bring about changes and improvements to their workplace and become more efficient and successful in retaining students (Lanthan, Camblin, & Steger, 2000; Sydow, 2000). Similar relationship may be true for well-designed online courses and instructional designers.

As illustrated in Figure 4, both institutional professional development efforts and personal learning appear to converge, as indicated in the following overview of key concepts related to

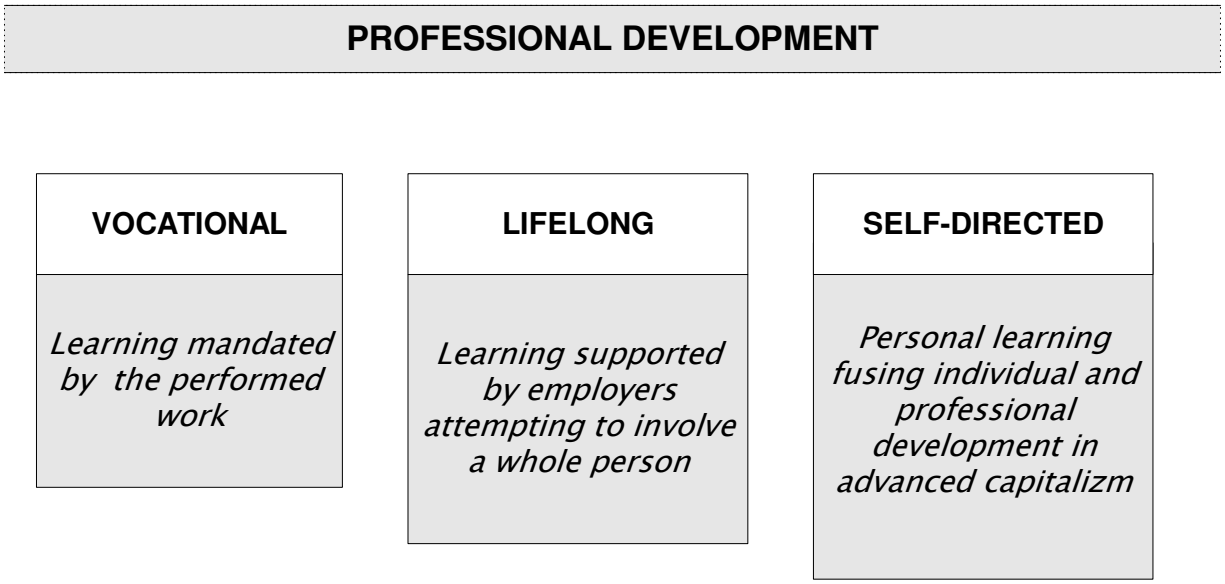

Figure 4. Professional development concepts based on Jarvis (2001, 2006, 2007).

professional development and career related learning in Figure 4. Today's professional development may denote learning mandated by the employer and based on the vocation. According to Jarvis (2001, 2006, 2007), lifelong learning tends to be supported by modern organizations that sustain their employees' professional and personal advancement of knowledge through lifelong learning. In some instances, support for learning results from more advanced economic philosophy permeating western civilizations.

The most commonly identified types of professional development — vocational, lifelong, and self-directed — may exist concurrently in any organization. Jarvis (2001, 2006) indicates that although still in use, vocational learning preceded both the lifelong learning and self-directed professional development. Vocational training is the most traditional of the three, while the other two reflect transitional learning styles and preferences (Jarvis, 2007).

Section Summary

This part of the literature review described how researchers perceive today's learners, the first element of the three-tier conceptual framework proposed by Jarvis (2006, 2007, 2008). Particular attention has been placed on the impact of technology, affective factors that shape adult learners' choices, and the support while advancing their careers. Focus on lifelong learning professional appears to offer a way to comprehend dispersed studies and inconclusive results. The following section will focus on the process of learning within different fields of research.

The Learning Process

Although practiced for centuries all over the world, self-directed learning (personal or professional) as a branch of research is traceable to ancient Greeks (Arnesen & Hiemstra, 1999). In modern times, Houle (1961) and Tough (1979) laid the foundation for self-directed learning research and allowed it to take the central stage among adult learning theories. In 1961, Houle

published *The Inquiring Mind* and by 1979 Tough reaffirmed in his work that self-learning constitutes the impetus behind adult learning. He also defined the learning episode as a unit of learning. The concept of learning episode helps to understand and track the learning processes in adult self-directed learners. As previously illustrated in Figure 1, goal-seeking acts and intentions became important motivational factors behind the learning process.

In 1983, Keller indicated that the learning process is inherently inclusive of goals, intentions, and motivations. In 1994, Rogers and Freidberg brought attention to the value of controlling and self-directing that allows adult learners to customize the learning experience and draw on self-evaluation to gauge progress and success of the undertaken studies. Adult learning research also indicated that to succeed adult learners have to be open to change and, therefore, flexible (Jarvis, 2006, 2007; Rogers & Freidberg, 1994). Michael Poock's overview of theoretical foundations for these developments can be found in Love and Guthrie (1999).

Approaches and the Learning Process

Two Scandinavian researchers, Marton and Säljö (1976a, 1976b) observed distinct approaches to learning, while analyzing learners studying textual information, and initiated research into deep and surface learning. The very concept of approaches to learning proposed in the mid 1970s denotes the strategy learners employ while interacting with the content of the course material. Such interaction and a pursuit of personal understanding (Enwistle, 2001), as in case of deep approach, and the strategy aimed at rather mechanic memorization of the material in order to succeed during assessment concluding a learning session, as in case of surface approach, result in increased knowledge, extraction of relevant meaning, and possibly subsequent interpretation of the newly acquired information. Entwistle and Ramsden (1983), as well as Biggs (1985, 1987, 1993), augmented that research with achieving approach and combined these

two cognitive strategies with self-managing aspect of learning, namely, organization of the learning process (Biggs et al., 2001).

These findings indicated that learners who are engaging in deep-achieving learning processes appear more successful regardless of the studied discipline. More recently, Jarvis combined theoretical foundations from Tough (1979) to Entwistle and Ramsden (1983) into transformative functions of learning originating in both incidental (and non-reflective) and thoughtful (and reflective) learning (Jarvis, 2006, 2007); however, without the detail that Biggs et al. provided over the last decades.

A positive outcome of the learning process may indicate increased knowledge base, construction of new knowledge, and its subsequent use. Based on numerous surveys and thorough interviews, in the 1970s, Pask and other researchers observed that consistent learning styles, or as later referred to by Enwistle (2001), processes of comprehension and operationalization of learning, are employed by learners on their own, regardless of the course material design. Pask (1976) and his colleagues pursued experiments that made inquiries into the complexities of everyday learning seem more realistic, although mainly within the information processing format. One of such experiments offered students freedom to choose the best strategy to learn a given batch of material. As a result, approaches to learning appeared to depend on the individual's personal habits, the environment that the learning took place in, and the method or design of the course materials (Pask & Scott, 1972). Ultimately, Pask's legacy lead to development of the conversation theory based cybernetic models of learning and instructional design (Scott, Shurville, Maclean, & Cong, 2007).

Garrison et al. (1995) noted in the study of both teachers and their students that courses ought to be designed in such way that the presentation of the material and the assessment of the

learning outcomes align with the learning approach. Using Biggs's original tool, *Study Process Questionnaire* from 1987, these researchers utilized mixed methods to examine the teaching objectives and desired instructional outcomes in relation to students' approaches to learning. Analyses of the individual learning styles that followed from these assumptions directed mainstream interests into personal dimensions of learning (Jarvis, 2006).

Converging Research

According to Lonka, Olkinoura and Mäkinen (2004), American and non-American tradition of research eventually integrated into models of information processing that included goal orientation and motivation (Lonka et al., 2004; Pintrich, 2000). At the same time, while self-directed learning and autonomous lifelong learning were gaining momentum, developments in the cognitive theories allowed researchers to look more closely at the learning process itself. In 1998, Sweller, van Merrienboer, and Paas concluded that terms already established by cognitive theories, like generalization and transfer, are useful for identifying learning approaches or strategies. Across five-level scales of rehearsal, elaboration, organization, meta-cognition, and critical thinking, information processing was proposed (van Merriënboer & Sweller, 2005). Jarvis (2006), however, specified that human learning entails more than computer-like information processing and noted in the cognitive traditions of research that lerener's personality and uniqueness – the self – in the form of emotional intelligence (proposed by Goleman in 1996) could be incorporated into the analysis of lifelong learning.

Thus, depending on the environmental factors and personal epistemologies of learners participating in the research studies through the 1980s and 1990s, understanding of the complexities inherent in the learning process resulted in the addition of constructivist philosophies, cognitive functionality, and anchoring the learning process in its outcome —

knowledge (Lonka et al., 2004; Winne & Butler, 1995). Motivation, an important element in the learning process, started to be analyzed in several important manifestations: goal-orientation (DeShon & Gilespie, 2005) epistemological values and beliefs (Eccles & Wigfield, 2002; Schommer-Aikins, 2004), and meta-cognitive aspects of learning (Entwistle & Entwistle, 1997).

Researchers started to look at pre-learning, attitudes that learners bring into the learning situation, as well. These perspectives offered a more thorough insight into the learning process (Bråten & Olausen, 1998, 2005; Bråten & Strømsø, 2004, 2005; Guglielmino et al., 2005; Mounfield, 2005; Schommer, 1990; Shommer-Aikins, 2004) and the contexts where it takes place (Entwiste & Ramsden, 1983; Entwiste, McCune, & Walker, 2001). From here, Jarvis (2006, 2007) could define lifelong learning as an engagement of "a whole person – body . . . and mind (knowledge, skills, attitudes, values, emotions, beliefs, and senses)" for a lifetime of learning (p. 134).

Related factors - experiential learning. Personalization of the learning experience and inclusion of the learners' needs provided foundation for distributive learning models and numerous pragmatic studies offering insight into the perceived learning and construction of knowledge, as indicated by Granger and Bowman (2003). From here, growing interest in electronic collaborative environments encouraged researchers to seek new inventories that are not centered on the individual learners' processes, but observe collaborating groups joined by virtual communities and constructing new knowledge from collaborative learning endeavors (Entwistle & Entwistle, 2003; Garrison, 2006, 2007). Most recently, Jarvis (2007) has suggested analyzing such engagements through the social context of globalizing societies.

Conversely, research of the learning processes became so complex that subdividing it into several orientations – situational or course-specific - was inevitable for Lonka et al. (2004). As

they analyzed instruments and methodologies used in a variety of studies, scrutinizing the learning process meticulously, it became apparent that an overlap of the research areas and utter inconsistency of terms could be alleviated only when available technical computing capacity could allow for tabulation and cross-referencing of all results from the studies in this area into some meaningful end. Other researchers also remarked on the inconsistencies of terminology and results (Entwistle & McCune, 2004; Hannafin et al., 2003). Still, studies kept appearing and researchers have not stopped identifying and exploring the multidimensionality of the process even further.

Related factors - course features. From goal-setting among these dispersed studies, constrains and confounding phenomena that could be grouped into instructional design, assessment or feedback, and task or goal orientation appear as the most helpful ones for this inquiry. Additionally, direct precursors of this study have indicated yet another area of interest, the cognitive engagement in online learning environment, and suggested that learners with more online experience engaged deep learning approaches more often in comparison to those with less online learning experience (Cortese, 2005; Richardson & Newby, 2006). At this point, however, a more detailed review of literature related to selected course features and overall perceptions of e-learning is postponed because a closer look at the fundamentals of the learning process based on cognitive theories appears in order.

Learning Process through the Cognitive Lens

Approaches to learning and the learning process interest many cognitive researchers. Winn (2004) concluded that cognitive theories are more prevalent in applied research like educational technology or instructional design. Moreover, some cognitive theorists (e.g. Sweller et al., 1998) suggest that human ability to learn in unfamiliar environments is diminished and "in

effect, cognitive factors optimize the unique ways individuals process knowledge to optimize personal relevance and meaning, while learning factors amplify the ways individuals are expected to know or understand content, concepts, and skills" (Hannafin et al., 2003, p. 264).

Cognitive theories demonstrated a limited capacity of human short-term memory and that information, which the human brain parses during the learning process, becomes subdivided into discrete and automated elements, as if chunks of information. The more elementary or recent the information, the higher the cognitive activity required to process that input data. The more automated (or previously assimilated) the information, the less demand will be on the brain. As a result, cognitive load limits information processing in a given time (Tovinen & Sweller, 1999). This theory implies that meaningful learning leading to deep understanding of the material and mental construction of coherent cognitive structure allows the material to be memorized and used as an automated chunk of information for another learning session, congruent with what Jarvis (2007) included in his lifelong learning concept.

Foundations. In 1956, Miller investigated cognitive factors and indicated that about seven new or unfamiliar elements, in the form of novel and unorganized information, could be maintained in the working memory of a human brain. Notably, only up to four of such unfamiliar elements can be actively manipulated at a given time. Unless some form of repetition or rehearsal is performed within 20 seconds from reception of the information, that new material is not going to be retained or stored in the long-term memory. However, according to van Merriënboer and Sweller (2005), there appears to be no such restriction on information retrieval. Therefore, long-term memory has an important role in generalizing and transforming the already memorized information into meaningful chunks or "cognitive schemata that vary in their degree of complexity and automation" (Merriënboer & Sweller, 2005, p. 148). Limiting changes to the

long-term memory banks appears to help maintain the established matrices of stored information and pathways enabling efficient recall of memories (Sweller et al., 1998; van Merriënboer & Sweller, 2005).

Thus, if organization of a particular online activity is not available, such as course orientation, an example, or a model, the learner appears to organize the information at will and tests the effectiveness of that organization for relevant storage and future application. In an online environment, learners may be requesting feedback or consulting help files in addition to using cause material. Anecdotal evidence indicates that the beginning of a class generates some confusion and frustration among students manifested by increased demand for feedback or frequent activity in support sections of e-courses.

Van Merriënboer and Sweller (2005) established that the degree of such cognitive testing is directly proportional to the automation of the information, or combining it with the existing information for rapid and continuous retrieval. Therefore, operationalization, in this sense, is related to knowledge building using appropriate learning techniques, strategies or styles that allow learners to store ready-to-use and automated schemata in the long-term memory. Difficulty in learning, according to the authors, lies in the complexity of interactions between the chunks of information stored, or element interactivity, while the learners learn new material. These limitations on human learning capacity may influence the approaches learners take and perceptions they form about e-learning. However, there appears to be a natural solution to this limitation. The processes involving memorizing can be optimized, according to van Merriënboer and Sweller (2005) and other cognitive load theorists, through audio and visual channels; thus, substantially increasing the amount of information that can be transferred to the long-term memory and increasing learners' aptitude to acquire new information for future use.

Cognitive loads. Two types of cognitive loads, the amount of new information that the learner can acquire at a given time through different channels, are identified as intrinsic and extraneous information (van Merriënboer & Sweller, 2005). It is important to perceive information itself as textual, audio, and visual and note that any combination of these incorporated into the learning unit of an online course lessens cognitive load. Both the visual memory and auditory working memory are partially independent and allow for reducing that load. Learners can focus on their goals and make the learning process more relevant, increase the volume of information to acquire, and subsequently transfer the knowledge from the course for its intended application. According to Eccles (2005), several other important findings related to the motivation, goal orientation, and achievement confirmed the position of the approaches to learning in the epistemological framework, mentioned earlier, and combined the development of learning and task motivation, yet again emphasizing the shift to the learner-centered theoretical frameworks in modern education. Jarvis (2007) described lifelong learning in similar terms and in relation to adult learners.

Related theories. Cognitive Style theory researchers like Graff (2003) pointed out that efficiency in learning is the most relevant determiner for learner's approach to learning and two distinctive ontological styles of learning may be identified among online learners, wholist-analyst and verbalizer-imager. These styles correspond to Pask's concepts of wholist and serialist, two main learning styles from 1976. Furthermore, cognitive styles appear instrumental to inquiries about cognitive and multimedia learning as verified by both observations and experiments dominating literature in the late 1990s.

Graff (2003) observed fifty undergraduate honor students, who majored in psychology and participated in the study for academic credit. Students were not familiar with that learning

or testing environment, and had to be offered support and encouragement in some activities. Nevertheless, three tests that were administered allowed the students to react to verbal and graphic stimuli and reveal their cognitive style, identify their attitudes towards computers, and complete internet search and retrieval of certain information. Correlations between the test results showed no relationship between attitudes towards computers and results on the assessment tests. However, a relationship between bimodal, both the imager and verbalizer, cognitive style, attitudes, and test performance has been found. These two statistical analyses were performed using significantly correlated and reliable instruments ($r = 70$ for the Cognitive Style test and $r = 84$ for the Computer Attitude test).

Mayer and Moreno conducted similar experiments in 1999 confirming earlier principles of modality and both spatial and temporal contiguity, the two most important aspects of cognitive perspective on the learning process. Contemporary instructional design of both printed and online materials appears to capitalize on variations of these two standards, especially for low literacy and novice audiences (McVay Lynch, 2002). It is important to note that spatial contiguity indicates the physical proximity of the text and visuals as the most suitable organization of the material facilitating learning.

Experiments conducted on groups of inexperienced students randomly assigned to the treatment group by Mayer and Moreno (1999) showed that, if pictures and text are placed in close proximity, about "75% more useful solutions on problem solving transfer questions" (p. 381) were generated than in groups that worked with text and pictures placed on separate pages. These researchers used ANOVA variance analyses to examine scores for each of the three test groups and conducted Newman-Kleus tests for all instances of notable effect ($\alpha = 0.5$). Both

researchers also concluded that individual differences between students could yield slightly different results provided learners had more experience in multimedia learning.

Additionally, temporal contiguity indicates that simultaneous narrative and visual presentations offer the most efficient way to learn. In this case, further experiments conducted by Mayer and Moreno (1999) related to split-attention contiguity allowed them to conclude that sequencing words and pictures deters learners from their tasks as well as needlessly disperses their information processing resources. Numerous experiments were conducted in the 1990s by cognitive researchers in the area of multimedia instructional design, advanced reading, and even kinetics. In the process, the modality principle was established. This principle indicates that "mixed-modality presentations are superior" (Mayer & Moreno, 1999, p. 381) especially when text and visuals are presented to the learners at the same time and preferably using the same visual field — or screen in online environments (Mayer, 2003). In such cases, learner's attention span may efficiently process the information for further use.

In 1996, Jonassen defined cognitive tools as instruments that help learners form models or patterns based on their learning strategy. In itself, such learning appeared to be an approach that could equate modeling with deep learning based on utilization of templates, pattern-building skills, and active learning techniques employed by learners (Jonassen, 2006). Moreover, Moreno (2006) hypothesized that the method of instruction rather than technologies of material delivery enhance learning. The author used meta-analysis to indicate that modality principle is applicable in complex e-learning environments and in course materials where students may have very limited self-direction options. Nevertheless, cognitive load theories appear to indicate further that approaches to learning — not the technology itself — should be in focus and that cognitive

tools, cognitive patterns, and modeling could be included for further considerations as other important aspects of the multimedia learning environment.

Other scholars, Liu and Bera (2005), classified cognitive tools with the assistive technologies that help students learn, solve problems, and intentionally apply the new skills and knowledge in real-life-like situations. Both researchers observed application of certain tools ranging from preconfigured databases to video clips of expert opinion designed to help learners in their investigative, planning, decision-making, and problem solving tasks. In that study, a mock scenario consisted of assisting rescued aliens in their quest to find a suitable home in the solar system. Learners had to apply relevant tools and actively construct solutions. Although this particular study examined sixth-grade students, there appears to be no indication that both cognitive and problem-solving skills cease to exist in adulthood, since patterns of language acquisition and other cognitive growths, are integrated into general learning processes and employed beyond childhood (Pinker, 1994). Research on utilization of games, computer simulations, and other types of scenarios has offered further confirmation of findings from cognitive studies in education and linguistics (Gredler, 2004). Thus, many instances of online learning may be characterized by deep and meaningful acquisition of information, formation of patterns or models using cognitive tools, and use of higher cognitive and analytic thinking in line with the concept of learning where transformation of content and the transformation of the individual occur (Jarvis, 2006).

Implications for future research. One model of learning transpiring from cognitive research was proposed by Biggs (1987), and later revised by Kember et al. (2004), could be paralleled with theoretical foundations proposed by cognitive load theorists, as presented in Figure 5. Deep and surface learning in *The Revised Learning Process Questionnaire* with

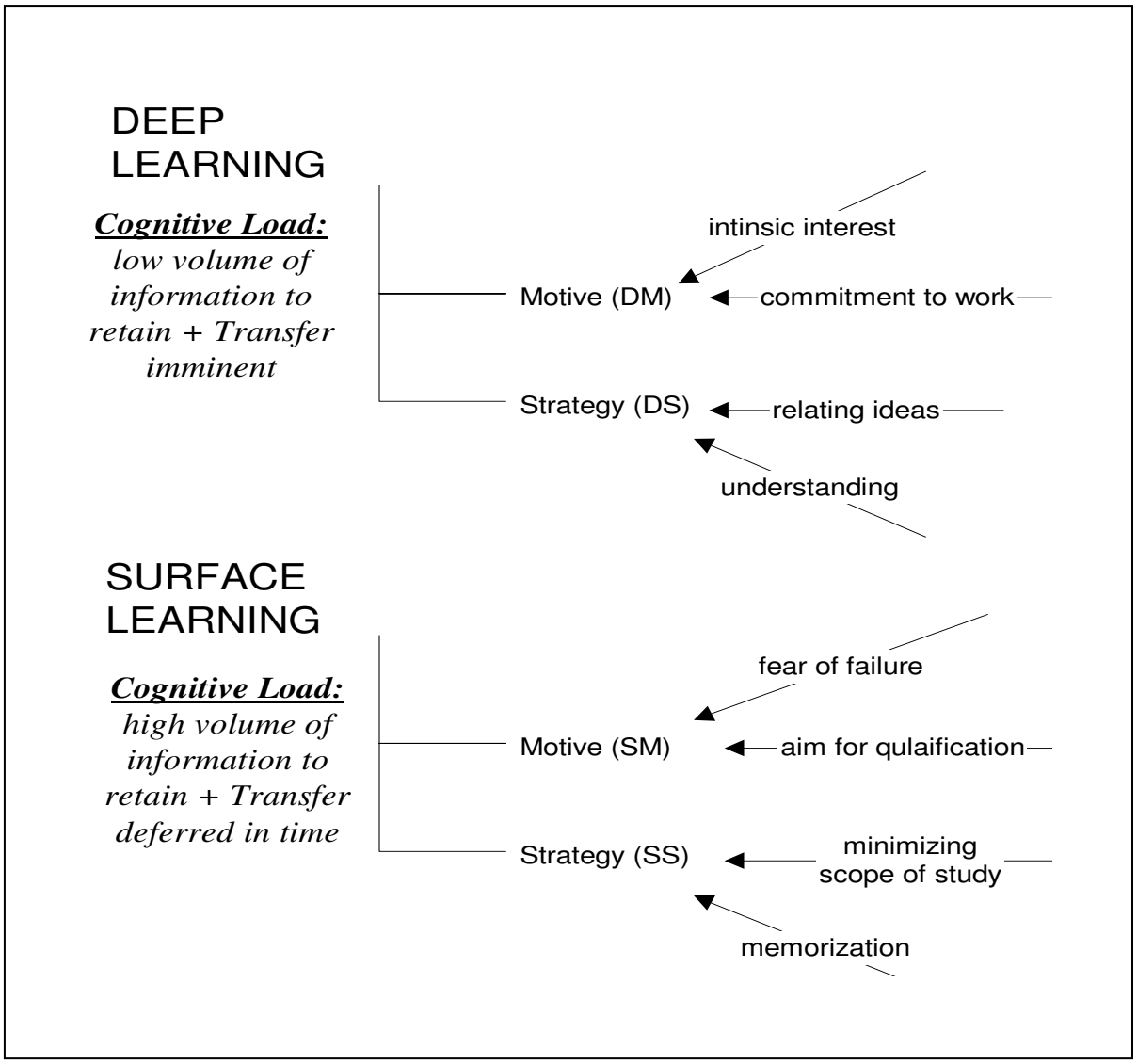

Figure 5. Conceptual assumptions based on *The Revised Learning Process Questionnaire* (Kember et al., 2004) and cognitive load theories from Moreno and Mayer (1999).

indications of possible cognitive loads that learners may be encountering corresponds to low volume or high volume of material assimilated while learning. Although the surface learning appears dominated by memorization of the information and the fact that learners may reach high cognitive loads quickly, deep learning appears more involving and requires sequencing of the information either by the learner, by the instructional design of the course materials, or both. Even though cognitive theories indicated that, learners may have limited ability to gauge their learning capabilities, assess the scope the material to acquire, and apply that to practical situations. However, there is not enough evidence that this is what actually happens in e-learning environments (Mayer, 2008) where a number of deterrents (Guglielmino, et al., 2005) may influence the learner, as well. Some researchers indicated that learners are dealing with difficulties related to technology, self-efficacy, and even ability to meta-analyze the learning in an asynchronous online environment (Dillon & Greene, 2003; Peters, 2003).

Section Summary

This part of the literature review offered a look at the learning process, second element in the three-tier conceptual framework proposed by Jarvis (2006, 2007). Particular attention has been placed on the selected adult theories, inclusive of approaches to learning, cognitive theories (especially cognitive load theory) and the importance of coursework structure as well as implications these theories and concepts have for further research. The following section will focus on the learning environment.

E-Learning Environment Factors

It is difficult to separate learners from the learning process in the research literature, since many studies analyze both the learners and their actions. It is even harder to separate the learning process from the environment that immerses both the learner and his or her choices. In

the following section, an attempt was made to focus on research that facilitates better understanding of environmental factors that complete the three-tier conceptual framework proposed by Jarvis in 2006.

Factors Influencing E-Learning

Modeling and theory building (Jonassen, 2006) help us understand the learning process and approaches learners take online and in traditional settings even further. In 1974, Argyris and Schön established that critical learners tend to form implicit theories, or theories-in-use (Jarvis, 2006), to evaluate the relevance and applicability of the learning experience. These implicit theories are highly individualized, subconscious constructs that are established throughout the learners' cognitive development. Values, beliefs, experiences, and knowledge are acquired from intentional analysis of such theories (Argyris & Schön, 1974; Jarvis, 2006; Jonassen, 2006).

Learners using implicit theories in their analysis of complex processes, and knowledge in general, use four perspectives on knowing. Based on cognitive perspectives on learning, Love and Guthrie (1999) identified unequivocal knowing, radical subjectivism, accommodation, and generative knowing and claimed that learners exhibit these cognitive patterns at different stages of their educational development. The theories that learners construct are the "major source of errors in … actions" (Love & Guthrie, 1999, p. 85), as they may be biased and subject to overgeneralization; therefore, deeming them unreliable, subconscious, and hard to remedy. In order to measure learners' cognitive posture, the authors have suggested focusing on the "degree, strength, and pervasiveness of students' meaning making" (Love & Guthrie, 1999, p. 86). Current research into modeling offers a way to integrate these tendencies into instructional situations and help understand how learners utilize applicable formats and learning enhancing tools (Jarvis, 2006; Jonassen, 2006).

Moreover, educational experience (Garrison, Archer, & Anderson, 2003) does not occur in isolation. Sustained communication (Suanpang, Petocz, & Reid, 2004) is one of the important parameters with bearing on the learning process. In their 2004 study, the researchers identified the following factors that allow learners to transfer knowledge: cognitive presence inclusive of prior knowledge, prior experience, and resulting attitudes. other factors included perceptions of learning content, as well as reflective and higher order thinking, in particular critical thinking skills. Although that 2004 study appears to have more limitations than findings, it corresponds to findings by cognitive modeling researchers, especially Jonassen (1996, 2006), where application of the material and integration of the information with existing models and knowledge were identified. As for Jarvis (2006, 2007), lifelong learning implicit of knowledge transfer has been a cornerstone concept that frames the environment for each learning episode.

In 2005, Garrison and Cleveland-Innes examined cognitive presence in relation to deep learning among graduate online course participants. Researchers used the original *Study Process Questionnaire* (Biggs, 1987) in order to assess deep learning among students taking several distinctive online courses. The reliability of that questionnaire rendered Cronbach alpha values in the range of 0.51-0.81. The courses were designed for deep and surface learning, exhibited both high and low degree of instructor involvement and student peer interactions. Results indicated that courses providing coherent, discernable structure and including "social, cognitive, and teaching presence" facilitate deep learning (Biggs, 1987, p. 144). These Canadian researchers, in turn, hypothesized existence of either internalized or externalized guiding mechanisms that lead learners through course materials and that the "reflective and collaborative properties" of online learning environment are favorable for learners' choosing deep learning approaches (Biggs, 1987, p. 145).

Similarly, for Liu and Bera (2005), hypermedia environments can significantly multiply knowledge gains in pivotal areas of learning, namely problem solving, conceptualizing, finding relevant information, and hypothesis testing. However, depending on the classification of the factors influencing learning, some psychometric measures of attitudes may be inherently inconclusive. For example, limitations listed in studies of attitudes toward mathematics and statistics indicate that Likert scales surveys may fail to capture motivations that are part of the attitudes and do not convey the breadth and depth of such investigations (Lee, 1999; Suanpang et al., 2004).

Prior knowledge. Provided learners have capable cognitive faculties and can select relevant tools and strategies to learn online, their attitudes may still heavily depend on the acquaintance with the dynamically changing technology. Carroll (1990; 1998) brought about the notion of immediacy of application. Some technology driven internet savvy learners are exhibiting content independence, strategies for coping with errors, self-discovery techniques, or recovery skills when confronted with technical issues and other unpredicted situations. They also transfer the newly acquired information into practice quickly. Requirements of reading from computer screens and the need to self-direct the learning process apparently do not deter learners unacquainted with the e-learning environment, either. Therefore, Carroll (1998) indicated that learners' resilience and self-directing are independent from the instructional model of the courseware and advocates minimalist approach to information design.

Utilization of prior knowledge becomes essential in the learning process based on principles of both adult learning and cognitive theories. Hidi (2001) pointed out that interest in the content of the text-based information is based on the learners' existing knowledge and previous experiences. Today learners may be accustomed to fast delivery of information,

freedom to self-direct the point(s) of entry into the course content, and what elements of the hypertext fits their learning processes (Calhoun, Berry, & Dawson, 2007). Jarvis (2006, 2007) appears to agree; thus, it may be prudent to analyze these relations within the context of deep and surface learning, as well.

Piecing it all together. In a comprehensive study of inventories used to measure approaches and strategies of postsecondary learners, Entwistle and McCune (2004) note that although these classifications were constructed using different nomenclatures, they are overlapping and defining the same phenomena. Many inventories have been simplified, or even temporarily abandoned, possibly due to researchers' personal approaches to learning. Jarvis (2006) adds the lack of comprehensive theory of human learning as another reason for the inconsistencies in the research.

Consequently, research into the mechanisms of learning resulted in more applied examination of the learning style concept. Ramsden (1991) indicated that in order to improve teaching, one should study learners' learning, engage students in deep learning, as postulated by Biggs in 1987, enhance achievement of learning objectives (Matron & Säljö, 1976a), and consistently align these objectives with the instructional design, as Garrison, Archer and Anderson reaffirmed in 2003. Thus, work of researchers like Entwistle or Ramsden (spanning over twenty years) integrated learners' approaches, originally proposed by Marton and Saljö in 1976, and attitudes into one concept of strategy with approaches, along with the learning styles crystallized by (Pask, 1976), and implicative of factors that may often deter or inhibit learners' success in a particular instructional design (Garrison & Cleveland-Innes, 2005).

Further Implications for E-Learning

In 2006, Richardson and Newby noted that student's self-direction and ability to manage online learning increases with practice in that environment. Moreover, these researchers indicated that the younger the students, the more likely they are to engage in surface approaches to e-learning. Cognitive research further indicates that as novice learners expert course takers are restricted in their capacity to learn by the physical limitations explicated by cognitive load theory (Mayer & Moreno, 2003; Richardson & Newby, 2006).

Numerous studies stipulate that obstacles encountered during the learning phases may control learners' approach to taking a particular type of class, either online or traditional (Caroll, 1990, 1998; Entwistle et al., 2001; Hidi, 2001; Garrison et al., 2003; Liu & Bera, 2005). Additionally, situational, cognitive, affective, and technology related factors may be influencing learners' approaches to learning, as indicated by the theoretical studies rooted in adult and cognitive theories. Bloom's and Jonssen's taxonomies of learning indicated that learners' goals, whether as motives or strategies, are intertwined with skills and competencies allowing learners to attain desired outcomes (Bloom, 1956; Jonssen, Tessmer, & Hannum, 1999). Lifelong learning theory (Jarvis, 2007) offers an elegant solution to dispersed and crisscrossing theories. By organizing learning along the three-tier framework, Jarvis was able to provide coherent structure explaining how persons transform through learning and the environment. From here, a systematic research of factors and categorization of all related studies could commence, provided enough analytic resources were available, as indicated earlier.

An effective learning episode, as defined by Tough (1979), depends also on course functionality and, in case of online learning, the technology delivering that material to learners, as well as their approaches to the electronically mediated environments. Persons who learn

(Jarvis, 2006), members of professional teams who expand their competencies encounter multidimensional and complex situations that researchers try to understand and help practitioners to harness. Hence, faculty and instructional designers need effective techniques and skills to be successful in their work (Brown, 2000; Clegg, 2003). Similarly, when faculty or instructional designers go online to enhance their knowledge, the same standards could apply.

Deterrents to the learning process. One of the authorities on retention indicates that persistence is the most important element of learners' ability to obtain their goals, as are the learners' strategies and motivations to learn. The more effort one applies, the more successful and complete the learning experience becomes (Tinto, 1982). However, only when support and interaction involving the learner, the stakeholders of the educational process, and the components of the instructional materials exist (Pascarella, 1980). Richardson and Newby (2006) indicated that the more experience with the learning process learners have, the more self-directing and self-managing they appear. Hence, orientation or introduction to the online learning episode may lessen the cognitive load and help learners succeed faster, keep them interested in the material, and relate them to others, their community of learners, thus encourage goal achievement.

Alternatively, online learners may be negatively impacted in their learning by demanding schedules, other time constraints, isolation from peers, lack of instructional feedback or administrative support, by financial concerns, or even by fear (Guglielmino et al., 2005). The following illustration, in Figure 6, presents a set of complex issues often perceived as deterrents to online learning. Research findings from explorations of common deterrents to learning (Guglielmino et al., 2005) are clustered within the three-level framework established for this

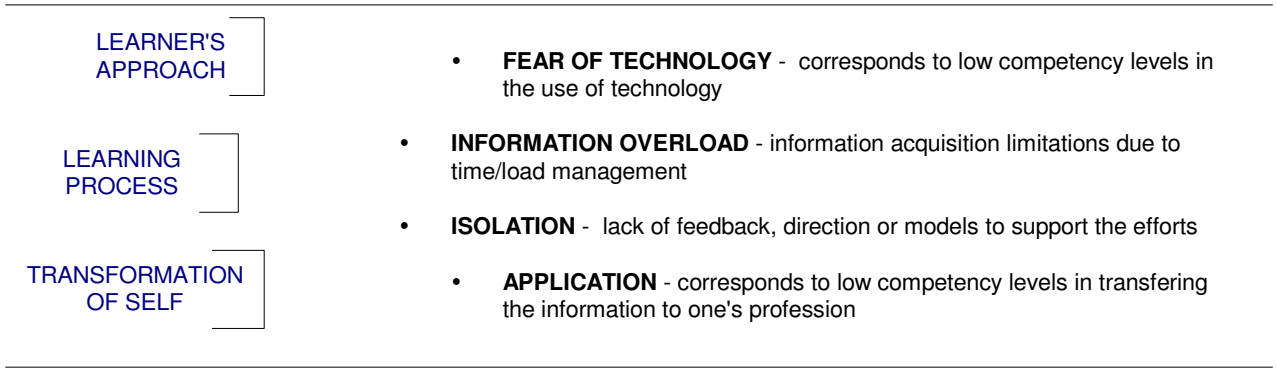

Figure 6. Deterrents to online learning - based on findings by Guglielmino et al. (2005) within three-tier conceptual framework based on Jarvis (2006, 2007).

study and related to learners, the learning process, and the transformation of learners occurring in their environment (Jarvis, 2006, 2007).

For example, if learners perceive their computer skills as insufficient, they may experience fear of failure in online courses that utilize technologically complex presentations and require multilevel interactions. Poor time management skills combined with demanding courses may also deter learners from e-learning. Some learners may favor traditional, face-to-face social interaction and immediate feedback from their peers or the instructor. For them, an idea of a help file may seem alien and the sample or model to follow not motivating enough to stay interested in the material. Some professionals with ample field experience may find theoretically bound or structured courses impractical (Guglielmino et al., 2005). Only active learning course designs with realistic activities appear to motivate some adult learners (Jarvis, 2006).

Online learning experience and technology. Trends like globalization, personal lifelong learning, or the necessity to stay current in the area of professional interests or career motivate traditional learners to be flexible and adapt quickly (Ponton, Derrick, & Carr, 2005; Evans et al., 2003; Jarvis, 2007). In such an environment, self-direction occurs on two levels, organizational and individual. Some prominent universities open their gates to online users free of charge, through the Open CourseWare movement, allowing individuals to pursue their learning interests independent of the professional engagements and demands of their organizations. According to Open CourseWare Consortium (2008), over two hundred institutions contribute to this unique endeavor by opening at least ten new courses to self-directed online learners each year. Still, it is not purely the information that appears to be crucial, but the experience of learning that makes the difference (Ponton et al., 2005; Rogers, 2005).

Evans et al. (2003) pointed out that an educational institution has to prepare students to adapt with flexibility to the multidimensional workplace and the changing environment upon completion of their formal education. Not surprisingly, Panuel (2006) in his study noted that exposing learners to innovative technologies and encouraging more practice in their use impacts computer literacy and electronic communication skills. Amid innovation and rapid digitalization of education, another prominent researcher (Moore, 2003) maintained that knowledge transfers across different electronic media and platforms; therefore, the technology may advance and extend learners' expectations.

Hence, the attitude the faculty and instructional designers have toward the technology of instruction at their institutions and the perceived ability to learn from its utilization seem to be the only affective aspects of technology behind the learning process that interest researchers. According to Purdue (2003), faculty's approaches to learning online may be influenced by the following factors: (1) quality of the online learning material, (2) rejection and unease related to electronic communication, (3) availability of resources and technology to access electronically delivered courses. As a result, these factors may determine the approach learners have to learning in the technology-rich environment, and further in their ability to learn from nontraditional materials (Purdue, 2003).

Technology allows enhancing the learning experience or provides a significant distraction from the lessons for some. Comparatively, traditional lecture is the only technology that works; according to some, lecture is the least effective instructional method because lifelong learners need to learn from one another, collaborate and actively construct knowledge in order to learn, and — as research points out — engage in meta-cognitive and goal-oriented tasks (DeShon &

Gillespie, 2005; Jarvis, 2006; Schmidt & Ford, 2003). Nevertheless, the pedagogy of learning appears to keep up with the advances in technology (Peters, 2003); although, professional development does not (Evans et al., 2003). Nonetheless, theoretical principles may not be sufficient.

Lao (2002) indicated in her study that many faculty members are ill prepared to incorporate technology and distance education methodology into their teaching. Others who research transition from traditional to online teaching support this claim. For example, Carnevale (2000) refers to faculty's actions in terms of integrity of the teaching experience and maintains that effectiveness of that transition is not standard throughout the educational institutions across the country. The same is reported in postsecondary education overseas research (Walker, 2003). Preparing faculty and instructional designers to support technology in their courses appears to be a part of their personal experience of learning online, as well. Lao (2002) and others suggested that allowing faculty to take a role of a student, anticipating the needs and challenges as learners proves effective in attitude changing and effectiveness of professional development.

Another trend may also change how learners approach and perceive e-learning. Companies like IBM already utilize in-depth knowledge building tools that merge the idea of on-demand e-learning consisting of interactive modules, theoretical units, in a form of video clips, combined with simple task-embedded help files, displaying schematics or providing installation steps. Integration of broader learning functions and practical application assistance within the work environment allows stand-alone professional development to activate the learning process on command (Calhoun et al., 2007). In addition, it would be useful, at the workstation, to engage an adult learner in a comprehensive learning episode.

Providing successful online content becomes a creative and ongoing process based on the relation building between the stakeholders: the course developer, administrator, instructor, and the learner (Walker, 2003). Planning and continuous adjusting to the changing technology driven environment are prerequisites to attaining programs delivering education *just in time*, and where needed (Jarvis, 2006, 2007; Oakes & Rengarajan, 2002; Rosenbaum & Bugental, 1998; Young &Young, 2002). Thus, faculty and instructional designers also may be able to adapt, incorporate varied models and flexible methods to facilitate the rapid evolution of e-learning.

Perceptions. Since online content is delivered to users via computer, analyzing attitudes towards e-courses from the perspective of their technical efficiency could be significant. Both accessibility and overall functionality of the information relate to the qualitative aspects of any online learning experience. Accessibility incorporates a physical ability to obtain and use the information by people with auditory, speech, motor or cognitive deficiencies (World Wide Web Consortium [WCAG 2.0], 2008). Over the years, accessibility also started to include browser compatibility and other elements of web page or application design that create ergonomically functional environments (Coe, 1996). Usability, as one of the most tangible aspects of the functional course, incorporates elements related to response time from a click on a link, display and execution of all items on the display page from navigation features or icons to the use of white space, and chunking of the information into sections or frames, as well as incorporation of multimedia features (Nielsen, 2000).

Availability of the technology, access, and usability of the online course materials was not directly investigated in this study, as these elements constitute elaborate manifestations of perceived course functionality. However, one of the most important factors is stemming from these phenomena, namely the general perception of quality embedded in the learning experience

(Jarret & Green, 1993). Attitudes towards the entire experience of learning online could be dramatically influenced by this relatively complex factor alone. However, research of entire programs with respect to the quality in planning and evaluation of learners is rare, while there appears to be a constantly growing interest in designing effective courses retaining students for programs' duration (Husson & Waterman, 2002). On the other hand, ad hoc research in what works online and what students think about the particular course dominate. No coherent theory behind online learning appears to be established.

Section Summary

This part of the literature review provided insight into e-learning environment, the third element in the three-tier conceptual framework proposed by Jarvis (2006, 2007, 2008). Particular attention has been placed on the learning strategies, especially managing the information loads, experience of learning with possible deterrents, and flexibility that self-directed professionals use to stay current in their fields. The last section of this literature review will focus on selected functional aspects of online learning.

Selected Components of Online Courses

This section of the literature review will provide a brief functional insight into the three main factors: learners' goal orientation, evaluation of the learning progress through course, and e-learning skills acquisition that roughly correspond to the three-tier conceptual framework used in this study. As indicated earlier, contemporary research is multifaceted and appears dispersed. Therefore, a cross-section look at relevant elements shaping learners' approaches, the learning process, and the learning environment follows.

Cognitive Triggers – Goal Orientation – To Understand

Orientation is a significant component of online learning as it explains pre-instructional activities and establishes the frame of reference for the learning that is about to occur (Schreiber & Berge, 1998). Researchers who study such priming conclude that self-direction, motivation, attitude, and cognitive loads appear critical (Cortese, 2005). Toohey (1999) indicated that providing clear, written guidelines about all the technical details related to signing on and off the systems, submitting comments or interacting with other participants reduces the confusion that all online learners encounter in new learning situations. Moreover, it is important for effective online learning environment to sustain learners and meet their expectations (Aoki & Pogroszewski, 1998; Berge, 1998; Guglielmino et al., 2005; Mounfield, 2005).

Learners who are not prepared for the online environments can be negatively affected by their experiences. As indicated by Petty and Johnston (2002), learners who are offered support before the online classes take place, as well as for their duration, are more likely to attain their goals. Orientation can be used to help learners identify or assess their goals and may be used to determine whether web-based instruction is a "good fit" (Petty & Johnston, 2002). Additionally, it is an opportunity to set expectations for the learning itself. This is the time when the course requirements are detailed allowing learners to self-manage and direct their activities. Experienced learners may use this information as needed and appear to benefit from its availability, as well (Graff, 2003).

Course orientation can be delivered in a variety of ways. Hopper (2003) described how the System for Adult Basic Education Support project in Massachusetts developed a specialized program for new adult basic education instructors to ease them into online learning environment. Each topic in that course had a short description, which listed the time involved in its

completion, needed materials, objectives for the session, and assigned activities. This orientation included a quick audio introduction by the facilitator highlighting the specific learning objectives. It was an opportunity for the learners to examine their goals and approaches. Additionally, learners could organize their time, set their expectations, understand the objectives of the course they were about to take, and directly influence the attitudes and self-perceptions resulting from this experience. Learners who are offered support and information about the course objectives are much more likely to succeed because they are transitioned into the material to be acquired, as well as know how and where to find supplemental information or help within the course interface, lessening the cognitive load during the learning episode (Hopper, 2003).

Affective Triggers – Evaluation – Transfer – How do Learners Know that They Have Learned Something?

Making choices about the way learners progress through a course and how each stage of that process is assessed may influence self-perception. Traditionally, assessment is used to verify knowledge acquisition and to rank learners based on their success for honors and awards. However, learners are acquainted with and expect to be able to judge their accomplishments in the course through self and peer assessments (Toohey, 1999).

Ornstein and Hunkins (2004) suggested that as an important part of the learning process, the performance-based assessment has been a key factor on which learners base their estimation of progress and accomplishment. Assessments involving open-ended tasks require use of the newly acquired knowledge or skills in unfamiliar situations or to solve problems. This authentic and continuous form of assessment pivots on real-life like activities and prevails in action learning courses (Jarvis, 2006), while systematic assessment of the learners' progress fosters self-direction (Petty & Johnston, 2002). In this sense, assessments constitute meaningful tasks

and the afforded learning opportunities centered on a broader understanding of particular lessons (Ornstein & Hunkins, 2004) foster deep approaches to learning.

Other researchers concur and indicate that the content related quality benchmarks represent authentic behavior and expectations, rather than abstract decontextualized knowledge (Jarvis, 2006; McVay Lynch, 2002). Furthermore, Entwistle (1991) found that assessment expected by the learners affects their knowledge gain and favors taking deliberate approaches to learning, either deep or surface ones. In the final assessment of an online instructional unit, providing feedback to the learner and evaluating the overall progress are the most desirable (Schreiber & Berge, 1998). The significance of this concluding assessment is reaching beyond self-perception, as it may affect the learners' approaches to future online learning, or even determine whether the content is going to be used at all. Moreover, Marton and Pang (2006) postulated that online self-directed learners have to detect the purpose of the learning activity, have to have a goal in order to succeed, and must discern that the desired information has been acquired.

All the criteria discussed in this section suggest that assessment persists and is vital to the learners, because self-evaluation allows them to quantify achievement, motivates, and records their progress. Assessment becomes meaningful and centered on understanding of a particular lesson or promotion of surface learning approaches, respectively (Ornstein & Hunkins, 2004; Thrope, 2000).

Technology – Skills

Graff (2003) reported lack of relation between attitude to computers and assessment of online learning, and that the learning style does not affect the attitude one has to the activity or content of the course. Provided that online learner is competent in expressing oneself

("verbalizer"), this student would outperform others in discussions and subsequently have a more positive attitude toward the learning experience. That satisfaction appears to derive from successful completion of a task or course requirement while the technology appears to be just a vehicle, as if transparent, for learners who are competent in its use.

Some learners who take online courses report that they gain direct access to the instructor, but also find themselves sidetracked on the technology and issues related to the learning methods rather than focused on the content and the course materials (Imel, 1998). Integrating the learning of how to use the available tools is a dynamic process and requires both determination of the instructor, course designer, and even local or statewide support (Australian Flexible Learning Framework [AFLF], n.d.). Technical support may denote providing information and help in word processing, operating web browser features, saving files to disks or downloading portable documents, as well as using e-mail, search engines, conducting online research, and even managing time while learning online. Guglielmino et al. (2005) list such important skills, referred to earlier as base or prior knowledge, as possible deterrents to successful online learning episode. Purdue (2003) also listed many of the obstacles to learning in professional development learning context, in particular.

Technical support is also about sustaining learners' motivation to continue learning, remain flexible, and patient (Berge, 2001). Some learners, curricula, or programs may not succeed online, even if the best technical support is made available. The need for classroom style learning and face-to-face interaction may be necessary to achieve some learning objectives. Taking poorly designed and executed course online may affect learners' trust and devalue the entire learning experience. Thus, it appears that balancing the need to communicate and interact in person while new technologies emerge to help learner learners learn online. Today's blended

format (Garrison, 2006; Moore, 2005) — a combination of online and face-to-face learning — is still evolving, but has already been providing a more comprehensive learning experience. Perhaps in the future, a computer generated artificial teacher-bot will greet online students, as the Microsoft's animated paper clip aspired to do in early 2000. Until then, a balanced approach where the support for learners as a team or a community is offered and originated from more than one source proves most effective (Muilenburg & Berge, 2005). Researchers consider such coordinated learner support an important aspect of the modern learning society (Garrison 2006; Jarvis, 2007).

Conclusions

Use of online learning systems is evolving, as are the twenty-first century learners (Jarvis, 2007). Human life expectancy is expanding and, consequently, more adults may be going back to school, changing careers, and filling their retirement years with pursue of knowledge (Kurtzwile, 2005). Those who grew up with minimal dependence on technology face the challenges of everyday life fully dependent on computerization from intelligent appliances helping with daily chores to selecting a retirement home. Taking advantage of the opportunities or just surviving in the technology driven world does not exclude the realm of education.

Faculty and instructional designers, as lifelong learners, have to feel comfortable with advances in technology and able to use them in order to function and advance their careers (Burniske, 2000; Jarvis 2007; Purdue, 2003). In addition to suitable, comprehensive, and usable content of the course materials (Spydarkis, 2000), adherence to the general principles of ergonomics and human factors (Coe, 1996) are indicated as necessary for the learning to take place. Functionality of information as well as learners' acquaintance with conventions and technologies used in online learning environments may serve as base indicators of quality in

modern professional development, thus, directly relate to facilitating learners' perceptions and approaches.

Situational, cognitive, affective, and technology related aspects of learning appear to contribute to the learners' success, perception of functionality and overall quality of the learning experience and, most importantly, to the approaches that learners take while learning online. Sustaining positive attitudes towards e-learning moves learners along and carries their motivation and interest for the content of the courses through further learning episodes (Jarvis, 2007). Biggs (1985) and the research following from his studies indicated that the learners strategize their approaches to pursue their learning goals deliberately.

Additionally, numerous external components and factors influence learners attempting to learn from online materials. For example, self-concept of learning determines how the learners are going to approach learning, its environment, and translate the lessons into usable knowledge (Cano, 2005; Jarvis, 2006; Schommer-Aikins, 2004). Instructional elements that include orientation, assessment, technical support, and accessibility as well as overall functionality of the online content and supporting structures within the courseware that help learners overcome a variety of obstacles in the learning process and appear to be important factors for the learner. These may be the only two dimensions of this complex process that learners manage while pursuing their goals; namely, learning from their online experiences, and transferring the newly acquired knowledge to their own work. Studies of adult learners in both educational and workplace environments may indicate that the motivation and approaches to learning (Biggs, 1987) are positively related to deep learning (Kirby et al., 2002) and sustain learners in their quest. This study investigated this relation even further by analyzing the lifelong professionals' e-learning and their perceptions of its functionality and quality.

CHAPTER 3: METHODOLOGY

This chapter presents design and procedures used to conduct this study. Implementation procedures related to deploying this quantitative survey were anchored around two overarching research questions framed into a set of thirty null hypotheses. Detailed discussion of data collection and presentation of each section within the survey became the foundation for subsequent statistical analysis of the data, reporting of the results, and discussion of the findings. Reliability and validly of the instrument used in this study closes this section.

Overarching Research Questions

Although online professional development activities have been undertaken since early 1990s (Purdue, 2003), there have been only few instances where deep and surface approaches to e-learning were scrutinized (Garrison & Cleveland-Innes, 2005; Richardson & Newby 2006). In absence of a comprehensive and universally accepted theory of human learning (Jarvis, 2006), findings from many dispersed studies analyzing overlapping and contradicting phenomena dominate what appears to be an unlimited supply of publications on e-learning. Therefore, provided with the most current, comprehensive, and inclusive conceptual framework, the following overarching research questions were posed in this study:

1. What approach to learning do faculty and instructional designers favor when engaging in online professional development activities?
2. What is the perceived functionality of course components in these online professional development materials?

This study used quantitative research methods and both descriptive and inferential statistical techniques to examine factors involved in the learning process that is taking place in the online environment when faculty and instructional designers self-direct their professional

development. Online survey consisting of four distinct sections (A-D) was applied to investigate deep and surface approaches to e-learning along with subscales of motive and strategy. Data obtained from the survey was uploaded to SPSS program for statistical analysis. *The Revised Two-Factor Learning Process Questionnaire* (Biggs et al., 2001; Kember et al., 2004) helped to determine prevalence of deep and surface approaches learning (Section C). Faculty and instructional designers were asked to evaluate statements and answer questions based on their e-learning professional development activities undertaken within the last five years. Then the researcher determined relationships between selected demographic parameters (Sections A and B) and deep or surface approaches to learning. The analysis of several factors that influence e-learning professional development activities (Section D) concluded this study.

Based on the premise of the study, the set of thirty null hypotheses was used. The null hypotheses were rejected at the significance level of 0.05 ($p \leq 0.05$). Each population grouping was analyzed in the same manner ($H_0$1 though $H_0$14) with respect to the components within the deep and surface approaches (see Table 1), as well as the perceptions ($H_0$15 though $H_0$24) these learners had about e-learning (see Table 2). Demographic factors analysis ended the analytical tasks ($H_0$25 though $H_0$30).

Chi-square test established independence of the perceptions based survey results ($H_0$15 though $H_0$24). An overview of the hypotheses used this study regardless of the break down for faculty and instructional designers within the population is indicated in Table 3. Additionally, in order to delineate influences on the two main approaches to e-learning, the following factors were analyzed in this study: (a) professional experience in teaching or instructional design ($H_0$25-26), (b) specific experience in online teaching or instructional design of e-learning materials only ($H_0$27-28), and (c) experience as a learner in online courses ($H_0$29-30).

Table 1

Factor Loads per Survey Question Number [Q15 &16] in Section C (Kember et al., 2004)

			Question #
Approaches			
		Deep (DA)	1 + 2 + 5 + 6 + 9 + 10 + 13 + 14 + 17 + 19 + 21
		Surface (SA)	3 + 4 + 7 + 8 + 11 + 12 + 15+ 16 + 18 + 20 + 22
Subscales			
Deep			
		Motive (DM)	1 + 5 + 9 + 13 + 17 + 19 + 21
		Strategy (DS)	2 + 6 + 10 + 14
Surface			
		Motive (SM)	3 + 7 + 11 + 15
		Strategy (SS)	4 + 8 + 12 + 16 + 18 + 20+ 22
Subcomponents			
Deep			
	Motive	Intrinsic interest (ID)	1 + 5 + 9
		Commitment to work (CD)	13 + 17 + 19 + 21
	Strategy	Relating ideas (RS)	2 + 6 + 10 + 16
		Understanding (UD)	10 + 14
Surface			
	Motive	Fear of failure (FS)	3 + 7
		Aim for qualification (AS)	11 + 15
	Strategy	Minimizing the scope of study (MS)	4 + 8 + 12 + 16
		Memorization (MeS0	18+20+22

Note. To obtain the main scale scores each question scores were added and means calculated from these scores.

Table 2

Overview of the Perceptions Learners Have about Factors Influencing Approaches to E-Learning with the Corresponding Questionnaire Numbers in Section D, (see Appendix B)

	Essential in a Course:	Question #
Components:		
	Orientation	17.1
	Modeling and Templates	17.6
	Audio/Visual Channeling	17.3
	Collaboration	17.4
	Assessment	17.5
Perceived functionality of:		
	Features (combined)	17.1-5
	Technology – frustration with	17.2
	Practice	17.7
	Online Prof. Dev. (stand alone)	17.8
	Mixed Prof. Dev. (traditional/online)	17.9

Table 3

Overview of the Research Hypotheses for Multiple Components of Deep (DA) and Surface (SA) Approaches (Kember et al., 2004) to E-Learning and the Perceptions Learners Have about Selected Factors Influencing E-Learning Approaches

Sections of the Survey with the Null Hypotheses Reference Numbers [H_0X]		
Approaches with Subscales and Components:		
Deep Approach (DA) [$H_0$1]		
	Motive (DM) [$H_0$3]	Intrinsic interest (ID [H_{07}]
		Commitment to work (CD) [H_{08}]
	Strategy (DS) [$H_0$4]	Relating ideas (RS) [$H_0$9]
		Understanding (UD) [$H_0$10]
Surface Approach (SA) [$H_0$2]		
	Motive (SM) [$H_0$5]	Fear of failure (FS) [$H_0$11]
		Aim for qualification (AS) [$H_0$12]
	Strategy (SS) [$H_0$6]	Minimizing the scope of study (MS) [$H_0$13]
		Memorization (MeS) [$H_0$14]
Essential Course Components:		
		Orientation [$H_0$15]
		Modeling and templates [$H_0$16]
		Audio/Visual channeling [$H_0$17]
		Collaboration [$H_0$18]
		Assessment [$H_0$19]
Perceived Functionality of:		
		Features [$H_0$20]
		Technology – frustration with [$H_0$21]
		Professional needs [$H_0$23]
		Mixed Prof. Dev. (F2F/online) [$H_0$24]

Null Hypotheses

Ho1 - There is no significant difference between faculty members and instructional designers in their deep approach to e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variables of preference for deep approach to e-learning analyzed (see Table 1).

Ho2 - There is no significant difference between faculty members and instructional designers in their surface approach to e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variables of preference for surface approach to e-learning analyzed (see Table 1).

Ho3 - There is no significant difference between faculty members and instructional designers in their respective deep motive (DM) to undertake e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for the deep motive (DM) subscale approach to e-learning analyzed (see Table 1).

Ho4 - There is no significant difference between faculty members and instructional designers in their respective deep strategy (DS) to undertake e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for the deep strategy (DS) subscale approach to e-learning analyzed (see Table 1).

Ho5 - There is no significant difference between faculty members and instructional designers in their respective surface motive (SM) to undertake e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for the surface motive (SM) subscale approach to e-learning analyzed (see Table 1).

Ho6 - There is no significant difference between faculty members and instructional designers in their surface strategy (SS) to undertake e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for the surface strategy (SS) subscale approach to e-learning analyzed (see Table 1).

Ho7 - There is no significant difference between faculty members and instructional designers in their intrinsic interest (ID) to undertake e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of

faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for the intrinsic interest (ID) component approach to e-learning analyzed (see Table 1).

Ho8 - There is no significant difference between faculty members and instructional designers in their commitment to work (CD).

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of the commitment to work (CD) component approach to e-learning analyzed (see Table 1).

Ho9 - There is no significant difference between faculty members and instructional designers in relating ideas (RD).

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of preference for relating ideas (RD) component approach to e-learning analyzed (see Table 1).

Ho10 - There is no significant difference between faculty members and instructional designers in their understanding (UD) of e-learning courses.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of understanding (UD) component approach to e-learning analyzed (see Table 1).

Ho11 - There is no significant difference between faculty members and instructional designers in their fear of failure (FS) in e-learning environment.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable related to fear of failure (FS) component approach to e-learning analyzed (see Table 1).

Ho12 - There is no significant difference between faculty members and instructional designers in their aim for qualification (AS).

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of aim for qualification (AS) component approach to e-learning analyzed (see Table 1).

Ho13 - There is no significant difference between faculty members and instructional designers in their tendency to minimize the scope of study (MS) in e-learning.

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of the tendency to minimize the scope of study (MS) component approach to e-learning analyzed (see Table 1).

Ho14 - There is no significant difference between faculty members and instructional designers in their strategy to memorize (MeS).

A *t*-test was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The independent variables of

faculty members [Q 1.1] and instructional designers [Q 1.2] were established and dependent variable of the strategy to memorize (MeS) component approach to e-learning analyzed (see Table 1).

Ho15 - There is no statistical difference between the perceived need for orientation to an online course and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.1], see Table 2).

Ho16 - There is no statistical difference between the use of models and templates in online courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.6], see Table 2).

Ho17 - There is no statistical difference between the use of audio/visual channeling of the learned material in online courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.3], see Table 2).

Ho18 - There is no statistical difference between the use of online collaboration tools in the courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.4], see Table 2).

Ho19 - There is no statistical difference between the use of assessment tests in online courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.5], see Table 2).

Ho20 - There is no statistical difference between the perceived functionality of combined course features in online courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.1-5], see Table 2).

Ho21 - There is no statistical difference between the perceived frustrations with technology employed in online courss and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.2], see Table 2).

Ho22 - There is no statistical difference between the perceived need for practice and learning of relevant tools and skills in online courses and the respective approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.7], see Table 2).

Ho23 - There is no statistical difference between the perceived needs of the population regarding online courses and their approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.8], see Table 2).

Ho24 - There is no statistical difference between the perceived needs for mixed learning environment of the population and their approaches to e-learning.

Chi-square test was used to determine the difference ($\chi 2$) within these categories. The null hypothesis was rejected at $p \leq 0.05$ ([Q 17.9], see Table 2).

Ho25 - There is no statistical difference between the years of professional experience and deep approaches to e-learning.

Four groupings from the sample (based on survey question # 7, declared years of experience: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way analysis of variance, and means for each group compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Ho26 - There is no statistical difference between the years of professional experience and surface approaches to e-learning.

Four groupings from the sample (based on survey question # 7, declared years of experience: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way analysis of variance, and means for each group compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Ho27 - There is no statistical difference between the years of experience in online teaching or designing courses and deep approaches to e-learning.

Four groupings from the sample (based on question # 8, declared years of experience: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way analysis of variance, and means for each group compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Ho28 - There is no statistical difference between the years of experience in online teaching or instructional designing and surface approaches to e-learning.

Four groupings from the sample (based on question # 8, declared years of experience: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way analysis of variance, and means for each group compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Ho29 - There is no statistical difference between the number of online courses taken (regardless of reasons and types of courses – totals from questions # 9-11: Section B) and deep approaches to e-learning.

Five groupings from the sample (based on the number of courses taken: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way variance analysis, comparing the means from each grouping compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Ho30 - There is no statistical difference between the number of online courses taken (regardless of reasons and types of courses – totals from questions # 9-11: Section B) and surface approaches to e-learning.

Five groupings from the sample (based on the number of courses taken: 0, 1-5, 6-10, and 11+) were identified and analyzed using ANOVA, one-way variance analysis, comparing the means from each grouping compared to determine the difference within these categories (see Table 1). The null hypothesis was rejected at $p \leq 0.05$.

Target Population

In order to obtain data from a very diverse group of professionals who have applied experience in designing and conducting e-learning courses, members of a nonprofit professional association were surveyed. Society for Technical Communication (STC) recruits its members among college students who intend to become technical writers, instructors, or instructional designers; established professionals from academia, business, and industry, as well as researchers and other members (STC, 2008). Upon permission of the STC's Board of Directors to conduct the study, members of several interest groups (SIG) within the society associating academics and instructional designers responded to this survey.

More than eighty percent of all STC members identify themselves with one of several interest communities (SIGs). Based on that affiliation in July 2008, there were 10,707 members residing in the United States. Using STC to populate the study appears suitable since this organization is the largest technical communication association in the world recruiting both faculty and instructional designers. STC chapters are located throughout the United States and in twenty-six countries with additional student chapters in at least 20 major universities worldwide (STC, 2008).

The sample of the population for this study included faculty and instructional designers, members of STC residing within the continental United States. E-mail invitations were routed through the Instructional Design interest groups (SIG), as well as to members who have an educational institution e-mail address. A sample for statistical analysis was prepared from all qualifying responses by selecting faculty and instructional designers, residing in the USA, and having at least one-year experience in delivering or designing online courses.

Survey Design

Following feedback from the focus group and a necessity to design the survey for two different web interfaces (Questionpro.com and ECU's Perseus based mirror site), several design adjustments had to be made to the initial survey layout. Thus, the survey was spread across several pages to include the progress indicator and allow grouping of the questions to insure accuracy of the answers (e.g. questions about employment were located on separate pages to allow a crosscheck of the results). The final version of the survey is located in Appendix B and includes: [Q1-6] demographics (with Q1 set up as a required question to encourage self-sorting), [Q7-14] learning and professional experience, [Q15 and Q16] formatted as matrix of required questions to contain all twenty-two question long instrument adapted to e-learning from *The*

Revised Learning Process Questionnaire (Kember et al., 2004), and [Q17] also formatted as a matrix type question with nine statements requiring "yes", "no", or "not applicable" selections. Question 18, an invitation to receive an update on the results of the survey or participate in drawing of prizes, was added to involve participants in the research and obtain higher response rate.

Participants

Strict privacy policies that The Society for Technical Communication (STC) maintains restrict third party access to the member list. As a result, e-mail invitation was sent to approximately 2,500 faculty members, instructional and information designers by the Director of Marketing, Tom Gorski. This study was approved by Susan Burton (personal communication, July 22, 2009), CEO in June 2009, and became one of the studies that STC sponsors each year.

Based on the collaboration with STC the following members were contacted: faculty and college instructors with ".edu" e-mail addresses, members of the Instructional Design subject interest groups (SiGs). Overall, the response rate was based on approximately 2,500 technical communicators who have received e-mail invitations with the survey link on behalf of the researcher. As the participants self-sorted out of the survey after reading the first three questions from the demographic section of the survey, the total number of 722 unduplicated views (based on the IP address) was recorded on the participation confirmation screen of the survey. The survey was also sent to technical writers who do not have instructional design or academic status nor consider themselves to be instructors or designers of instruction. Therefore, several website visitors e-mailed the researcher to inform about their inability to complete the survey, since they did not meet the initial demographic criteria.

Participant's acknowledgement, acceptance of the terms of the survey, and advancement to the second page of the online questionnaire constituted the number of started surveys (n = 533). On average, participants took about ten minutes to complete this task between mid August and September of 2009. All data and information was permanently removed from the Question Pro website account by November 1, 2009.

Survey Design

The survey was limited to forty-two items that displayed to participants in sections of 3-5 questions per screen to minimize the need to scroll the page on smaller screens and progress through the survey efficiently on low bandwidth or wireless connections. Unobtrusive, plain, and well-contrasted text and background aimed to enhance accessibility to participants who spend many hours reading computer screens.

The combination of web-based multiple choice and Likert scale survey questions deployed from a private server site procured by the researcher and accessible to any internet user through a private access link and non-indexed webpage, enhancing security and integrity of both the content of the survey and the data collection. This survey, located in Appendix B, was conducted utilizing statements and questions in the following order: (a) demographic section [Q 1 - 6], (b) e-learning related experience section [Q 7-14], (c) customized two-factor revised version of *The Learning Process Questionnaire* (Biggs et al., 2001; Kember et al., 2004) in [Q15 & 16], and (d) a short section investigating perceived functionality and quality of online courses [Q17].

Section A of the survey offered pull-down selections of numerical and textual information, for example years of experience. Section B of the survey utilized pull-down numerical selections and radio buttons allowing participants to select all applicable parameters;

for example, goals for undertaking online learning. Numerical scales from 1-5 denoting "never or rarely true of me" to "always or almost always true of me" was used in Section C. Lastly, the perceived functionality of online course materials assessment (Section D) provided participants three-answer options to a short list of statements about their experience with online professional development course materials.

The Instrument

Section A [Q1-6]. Participants in this research started the survey with five demographic information questions that were analyzed respective of approaches to e-learning. All survey participants were asked about professional affiliation and employment in the capacity of faculty member or instructional designer for online program, course, or training. A focus group established content validity for this section of the survey.

Section B [Q7-14]. This portion of the survey determined what types of actual courses participants have taken online within the last five years to indicate the scope of online professional activities. Participants were able to select applicable information from a range of predetermined choices. Data collected from these questions assisted in general exploration of learners' goals and determination in pursuing e-learning activities. Content validity was established for this section of the survey by the same focus group.

Section C [Q15 & 16]. After establishing the learners' status and levels of experience in online environments, this section focused on the actual approaches participants take in e-learning. Twenty-one statements (in two matrix type questions) had five possible answer choices ranging from "A) this item is never true about me" to "E) this item is almost always true about me". Selections were also augmented with "not applicable" choice for those participants who did not have any online learning experience. Table 2 illustrates the structure of *The Revised Learning*

Process Questionnaire (Kember et al., 2004). The breakdown of the survey questions that correspond to deep and surface approaches to learning is located at the top, with motive and strategy within each of the approaches in the mid section of the table, and the components for each subscale, as established by Kember et al. (2004) at the bottom of the table.

The analysis of strategy and motive subscales was performed according to covariance matrices developed by the authors of the instrument. The validity of the instrument (Cronbach alpha values of 0.82 for deep and 0.71 for surface approaches to learning) is well documented (Kember et al., 2004) and verified by confirmative factor analysis to control for Type I and Type II errors. However, a focus group, with a small panel of several participants, was intended to verify that the minor semantic adjustments to the original wording of the questionnaire to the e-learning environment were clear and suitable.

Section D [Q17]. In this part of the survey, learners' estimation of online course components' functionality, inclusive of perceptions of quality and deterrents to e-learning, was solicited. Participants had an option to agree or disagree with nine statements related to the perceived functionality and relevance of selected instructional course elements. Rendering each statement applicable or not applicable to their recent online learning experiences, or stating their neutrality to that statement was augmented with "not applicable" selection. Survey data from this section was analyzed in two main subsections, (a) essential instructional design components facilitating or deterring e-learning and (b) perceived functionality, quality and usability, of online instruction for professional development. The list of factors and the corresponding question numbers constitute Table 3. This section of the survey was scrutinized by the focus group to assure the content validity.

Implementation

Execution of this study occurred in three stages to preserve sound design, careful implementation, and accurate evaluation of the results. Feedback on the survey structure and wording from the focus group (the first step), prompted some adjustments and within two weeks, the short pilot test (the next step) was conducted for about ten days. According to Gall, Gall, and Borg (2005) focus groups offer an insight into individual reactions to a survey and provide feedback on unanticipated issues, while pilot studies allow researchers to try out the data collection to safeguard for unpredicted obstacles related to the implementation of the study. Once all the adjustments are completed, the final step occurred, and the final version of the survey was deployed for over a month in the fall of 2009. Data collection was monitored on the server by the researcher through error logs and manual backups were created in regular intervals to avail any fatal hardware failure or accidental data loss. A web-based survey proved to be the most suitable form of querying population professionally engaged in electronic communication and familiar with online environments.

Focus group. Initially, over the span of two weeks, a focus group was employed to both pretest and assess the feasibility of the design and content of the entire survey. This conveniently selected sample of seven postsecondary online faculty who completed the survey with a goal of providing feedback to the researcher. Several group members offered comments and suggestions regarding the survey and its deployment. Detailed list of questions used to facilitate the discussion is located in Appendix A. Participants used an invitation-only online discussion forum to share information, but in the end opted to contact the researcher directly. The researcher summed-up the comments, updated the survey, and shared it for any final considerations by the group. No further feedback or changes were offered.

Pilot study. A ten day pilot test of the entire survey deployed to a conveniently selected sample of several postsecondary educators from Fayetteville Technical Community College and students from Technical Writing master's program at East Carolina University. This short pilot test insured the technical feasibility of the study including data collection, information retrieval, and secure storage procedure. A trial data analysis was conducted to verify the plans for the study more realistically.

Data Collection

Participants received the following: (a) an e-mail letter explaining the project and instructions to access the research project portal via internet; (b) privacy, and confidentiality statement; (c) access to the survey with general directions; (d) consent form, and (e) a Thank You note on a printable web page with contact information to receive copy of the results automatically generated by the survey application. System encrypted and fully anonymous verification of completion of each survey was available to the researcher in real time. Regular backup of data was scheduled every twelve hours.

Validity and Reliability

The Revised Learning Process Questionnaire (Kember et al., 2004) has factor hierarchy structure with inherent multidimensionality of its components within the motive and strategy subscales, as indicated in Table 4. Biggs et al. (2001) indicate that the instrument may be used, with adaptations to measure how particular learning objectives are handled.

Content validity (Fraenkel & Wallen, 2003; Kubishyn & Borich, 1990) of the survey section C was reaffirmed by: (1) selection of the target population for this study among professional educators accustomed to critical analysis of learning processes and (2) utilization of

Table 4

Cronbach Alpha Values for the Construct, Subscales and Subcomponents (Kember et al., 2004)

			Value Range
Approaches:			0.71-0.82
	Deep (DA)		
	Surface (SA)		
Subscales:			0.58-0.75
	Deep	Motive (DM)	
		Strategy (DS)	
	Surface	Motive (SM)	
		Strategy (SS)	
Subcomponents:			0.52-0.70
Deep	Motive	Intrinsic interest (ID)	
		Commitment to work (CD)	
	Strategy	Relating ideas (RS)	
		Understanding (UD)	
Surface	Motive	Fear of failure (FS)	
		Aim for qualification (AS)	
	Strategy	Minimizing the scope of study (MS)	
		Memorization (MeS)	

inputs from the focus group. Sections A, B, and D used face validity and content validity based on the researcher's literature review and feedback obtained from the focus group.

Internal validity (Fraenkel & Wallen, 2003; Gall et al., 2005) of the entire survey was assured by the following:

1. the researcher conducted data collection, coding for statistical analysis, and interpretation;
2. the test was not altered, changed, or previewed prior to its completion within the allocated time;
3. the researcher refrained from making any comments regarding subject matter in online forums frequented by STC members who are the target population of the study; and,
4. the study was designed to display the survey on standard computer systems to preserve unrestricted participation.

The reliability of the instrument, Cornbach alpha values of 0.82 for deep and 0.71 for surface approaches to learning, is documented by the authors of the original questionnaire (Kember et al., 2004) and verified by confirmative factor analysis to control for Type I and Type II errors. Based on the covariance matrices developed by the authors of the instrument and feedback from the focus group, this survey offered solid grounds for inquiry into learners' approaches to e-learning.

Summary

This chapter presented design and implementation tasks for this study, inclusive of the subdivision of data based on several factors that may be influencing online learning process of the target population of postsecondary faculty and instructional designers. These factors,

reported in the literature review and specific to e-learning environment, were analyzed with respect to deep and surface approaches to learning within the two main components, subscales and subcomponents of these scales (see Tables 1-2). Additionally, the focus group and the pilot study presented a verification that all variables analyzed in this study render statistically valid results, which follow in the next section.

CHAPTER 4: RESULTS

This chapter details the descriptive and inferential statistical results from the survey comprised of demographic questions, modified *The Revised Two-Factor Learning Process Questionnaire* (Biggs et al. 2001; Kember et al., 2004), and perceptions of selected factors influencing e-learning. The purpose of this study was to identify (deep and surface) approaches to on-line learning for faculty, those who have direct contact with students, and instructional designers, those who work with on-line adult learners indirectly. Since these professional educators appear to have clearly identifiable goals, motivations, and strategies in their own professional development, their perspective on the following overarching research questions were analyzed:

1. What approach to learning do faculty and instructional designers favor when engaging in online professional development activities?
2. What is the perceived functionality of course components in these online professional development materials?

Twelve identifiers of participants' online learning acquaintance and level of involvement, twenty two statements indicating deep and surface learning, and nine reflecting perceptions about factors that influence online learning (based on literature review findings) were used. Data obtained through this study was subjected to descriptive and inferential statistical scrutiny including frequencies, cross-tabulations, validity checks, *t*-tests, and chi-square analyses. All data received from the survey was analyzed using SPSS software at the significance level of $p \leq 0.05$.

Survey Deployment and its Participants

The focus group and pilot test were undertaken in July of 2009 to insure validity and feasibility of the study. Eight conveniently selected participants were invited to evaluate the survey. Each of them was either a former East Carolina University (ECU) Technical Writing master's or doctoral programs' student, or had at least 5 years of experience in higher education online teaching, and some experience in online surveys. Seven participants met the initial criteria and shared their views on the survey and its merit. Focus group participants did not elect to collaborate using an online form and opted to directly contact the researcher with their opinions and concerns. Two typos, missing geographical location, and "not applicable" feature for online instructors who do not have online professional development experience were identified. Overall participants indicated that the survey was clear, appeared user friendly, with minor edits was free of apparent errors or flaws, contained control questions as expected, and was not too long.

Both the focus group and pilot test were conducted on a survey posted on the questionpro.com website. On the first day of the scheduled focus group session, the server was off line due to the service provider's datacenter fire. It became imperative to set up a mirror site for the next phase of data collection using an entirely different provider, and most importantly, at a geographically distant location to avert any problems or access issues due to unpredictable circumstances. The mirror site was established by the end of July, 2009 on East Carolina University's servers operating *Perseus* software; however, it was never engaged.

Data Analysis - Response Rates and Participants' Demographics

There were approximately 2,500 STC members who have received the invitation from STC to take the survey. A total of 722 of participants who visited the survey site, a 28.9% yield

of STC members volunteering to participate in the survey. While just shy of the 30% marker, which would suggest the inclusion of a large enough fraction of participants to generate results independent from selection and other biases, the number of participants is sizeable. As such results from the survey should be broadly generalizable, with caveats due to the response rate. Of the 533 participants who began the survey, 82.2% completed it, (n=436). Based on the number of completed surveys, n= 436, 208 participants identified as faculty members, trainers, or instructors who have contact with students (48%). The 228 remainder participants were instructional designers who do not have contact with students (52%). This calculation was based on participants' answers to the first question on the survey [Q1]. Descriptive statistics, of two demographic identifiers, participants' gender ([Q2]: 31% male and 69% female) and whether they were born before 1980 ([Q3]: 91% were) relate the survey takes to what researchers mark as a border between the internet and non-internet generations (Purdue, 2003). These results are displayed in Table 5.

Cross tabulations based on these three questions, presented in Table 6, indicated that 76 (36%) faculty members were male, 132 (64%) were female, and one instructional designer opted not to disclose his or her gender. Respectively, 59 (26%) of instructional designers were male, and 12 (74%) were female, bringing the overall male participation to 31% (n=135) and overall female participation to 69% (n=301). The gross majority of participants, n= 400 (91%), were born before 1980. Interestingly, the proportions between males and females in this regard were reversed. Proportionally, more male participants were born after 1980 and more of them identified themselves as instructional designers, as indicated in Table 6. Due to the very low number of these younger survey takers, these results may only tentatively indicate any significant

Table 5

Response Rates by Function, Gender, and Birth (Before 1980): Descriptive Statistics

		f (N-436)	%
Function			
	Faculty	208	47.7
	Instructional designers	228	52.3
Gender			
	Male	135	31.0
	Female	301	69.0
Born before 1980			
	Yes	398	91.3
	No	38	8.7

Table 6

Gender and Birth (Before 1980): Descriptive Statistics Continued

		Faculty	Instructional Designers	Total
Gender male				
	Count	76	59	135
	Within gender	56.3%	43.7%	100.0%
Gender female				
	Count	132	169	301
	Within gender	43.9%	56.1%	100.0%
Born before 1980				
	Yes	193	205	398
	No	15	23	38

trend as further discussed in chapter 5. More likely, this may have been a procedural circumstance related to the society's recruitment activities only.

Employment, Geographical Location, and Experience

The majority of the responses came from US residents (82.3%), instructional designers who are full-time employees (35.6%) with more than one year of professional experience in business and industry (47.9%). These professionals have not exceeded taking five online courses in the last five years as personal or professional learning engagements. Additionally, these participants have completed only slightly more of other types of web based training sessions. Interestingly, only 37% of those who have not taken any mandated online professional courses have refrained from taking online courses for personal reasons, as well.

Employment. Every participant replied to the first question about employment [Q4] and 45.9% identified the employers as business and industry while 28.2% participants indicated that they are affiliated with an educational institution. Cross tabulations in Table 7 further indicate that: 81 (18.6%) faculty members were affiliated with universities or four-year colleges, 62 (14.2%) represented business or industry, 28 (6.4%) were self-employed, 27 (6.2%) were community or two-year college employees, and 9 (2.1%) selected a fill in option to indicate that they had other employment status (e.g. dual employment, government position, retired, or were unemployed). Instructional designers were most frequently representing business and industry (34.6% [n = 151]) or self employment status (10.8% [n = 47]), with only 3.2% (n = 14) identifying universities or four-year colleges as their employer. Two instructional designers worked for community or two-year college (0.2%) or an online college (0.2%).

Faculty and instructional designers surveyed in this study (with exception of one person) answered one more clarifying question regarding their employment [Q6]. In both groups,

Table 7

Cross Tabulations by Function and Employment

	Faculty	Instructional Designers	Total
Community college, two-year college	27 6.20%	1 0.20%	28 6.40%
University, four-year college	81 18.60%	14 3.20%	95 21.80%
Online college or university	1 0.20%	1 0.20%	2 0.50%
Business/industry	62 14.20%	151 34.60%	213 48.90%
Self-employed	28 6.40%	47 10.80%	75 17.20%
Other (fill in box optional)	9 2.10%	14 3.20%	23 5.30%
Count	208 47.70%	228 52.30%	436 100.0%

majority (62.5%) of faculty and instructional designers were employed full time (n = 272), and 35% or the respondents were either contract or part time (15.2% of faculty [n = 66] and 7.6% (n = 33) instructional designers) or self-employed (4.4% of faculty [n = 19] and 8% of instructional designers [n = 35]. As indicated in Table 8, only 2.3% of participants reported other type of employment including retirement, dual type of employment, research/study or unemployment.

Location. Participant's geographical location question [Q5] revealed that STC members who responded to this survey are located in several countries and on all continents. Majority of survey takes (82.3%) were from the Continental United States (n = 358), while Canadians and Europeans accounted for 13.4%. US Territories, Africa, Asia, and Australia had fewer than ten respondents each, as indicated in Table 9 (with one respondent who did not complete the selection). Further statistical analyses in this study were completed on the data obtained from the 385 respondents residing within the Continental United States.

Experience. Both overall [Q7] and online only professional experience [Q8], as well as experience as a learner [Q9-11] were surveyed. Table 10 includes the breakdown of the results from these questions in cross tabulation tables based on responses from 434 participants who completed this section without skipping a question. Two participants failed to select the answers to question 7 (n = 434) 433 respondents to question 8, while all survey takes responded to question 9 (n = 436).

Years of experience as faculty or instructional designers question [Q7] was subdivided into four categories: from 0-11 months, 1-4 years, 5-10 years, and 11 or more years (11+). Out of 434 responses to this question, 6.7% of the participants, n = 30, indicated that they have less than a year of professional experience, as noted in Table 10. In second category of 1-4 years of professional experience, there were 99 (22.8%) survey takers with 39 faculty members (9%)

Table 8

Cross Tabulations by Function and Employment Type with Percentages

	Faculty	Instructional Designers	Total
Full time	117 26.9%	155 35.6%	272 62.5%
Contract or part time	66 15.2%	33 7.6%	99 22.8%
Self-employed	19 4.4%	35 8.0%	54 12.4%
Other fill in box optional	6 1.4%	4 .9%	10 2.3%
Total	208 47.8%	227 52.2%	435 100.0%

Table 9

Cross Tabulations by Function and Location

Location	Faculty	Instructional Designers	*n*
Continental US	170	188	358
U.S. Territories	4	5	9
Canada	18	18	36
Europe Middle East	11	11	22
Africa	1	0	1
Asia Pacific	2	5	7
Australia	2	0	2
Total	208	227	435

Table 10

Length of Professional Experience [Q7 & Q9]

		Faculty		Instructional Designers		Total	
	Years	*n*	%	*n*	%	*n*	%
Overall	<1	10	0.02	20	0.046	30	0.07
	1-4	39	0.09	60	0.138	99	0.23
	5-10	60	0.14	59	0.136	119	0.27
	11+	97	0.22	89	0.205	186	0.43
Online	<1	72	0.17	84	0.194	156	0.36
	1-4	67	0.16	73	0.169	140	0.32
	5-10	52	0.12	44	0.102	96	0.22
	11+	16	0.04	25	0.058	41	0.10

and 60 instructional designers (13.8%). Majority of faculty and instructional designers, in almost exact proportions had more than 5 years of professional experience (70.3% of participants, n = 305).

Professional experience as online faculty or online instructional designer [Q8] yielded 433 valid responses to the same four categories of: 0-11 months, 1-4 years, 5-10 years, and 11 or more years (11+). Here 36% of participants had less than a year of experience (n = 156) and the remaining 64% of results was rather evenly distributed between faculty and instructional designers indicating 32.3% survey takers with 1-4 years and another 31.3% with a cumulative 5 or more years of experience (see Table 10). Only data from faculty and instructional designers with at least one year of online experience was retained for null hypotheses testing.

In questions Q9-11, participants were asked to account for their experience as online learners within the last five years. Combined data from this section was used to test several null hypotheses [Ho29 and Ho30]. A total of 435 (n = 436) responses were indicated for the first question related to any licensure or employer mandated online course, and 433 (n = 436) participants responded to the second question about their experience in personal online learning by indicating a number of courses taken in the last five years [Q10]. All respondents answered the last question [Q11] in this segment related to other formats of online learning that they have undertaken since 2004.

More instructional designers than faculty members were taking online courses or engaging in other online training (see Tables 11-13). Respectively, 39.9% of instructional designers as compared to 31% of faculty members took online courses mandated by licensure or employers. Forty three and a half percent took online courses for personal reasons as compared to 28.9% of faculty and 49.9% instructional designers engaged in other forms of online training

Table 11

Experience as E-Learners within the Last Five Years (Since 2004)

		Faculty		Instr. Designers		Total	
	Years	*n*	%	*n*	%	*n*	%
Mandated*	0	73	16.80	56	12.90	129	29.70
	1-5	94	21.60	88	20.20	182	41.80
	6-10	20	4.60	40	9.20	60	13.80
	11+	21	4.80	43	9.90	64	14.70
		208	47.80	227	52.20	**435**	**100.00**
Personal**	0	77	17.80	39	9.00	116	26.80
	1-5	96	22.20	128	29.60	224	51.70
	6-10	19	4.40	29	6.70	48	11.10
	11+	14	3.20	31	7.20	45	10.40
		206	47.60	227	52.40	**433**	**100.00**
Other***	0	29	6.70	10	2.30	39	8.90
	1-5	101	23.20	90	20.60	191	43.80
	6-10	29	6.70	52	11.90	81	18.60
	11+	49	11.20	76	17.40	125	28.70
		208	47.70	228	52.30	**436**	**100.00**

Note. Total number of responses per question bolded.
*Licensure or employer recommended mandated online courses [Q9].
**Online courses taken for personal reasons [Q10].
***Webcasts or other type of web based training sessions [Q11].

Table 12

Goals for Online Professional Development

	n	%
Curiosity	242	55.50
Interest in the topic	360	82.60
Interest in new methodology or pedagogy	252	57.80
Interest in new technologies	332	76.10
Need to satisfy a set personal goal	160	36.70
Need to satisfy a set professional goal	297	68.10
Peer motivation	78	17.90

Table 13

Types of Online Development within the Last Five Years (since 2004) by Purpose

		n	%
Professional development			
	Commercial online course or training	226	52
	College or university online course	151	35
	Professional organization or conference online sessions	261	60
	In-house online professional development course	223	51
	Free online course from nonprofit, academic, etc.	192	44
Personal learning			
	Commercial online course or training	139	32
	College or university online course	129	32
	Professional organization or conference online sessions	168	39
	Employers online course unrelated to my current job	88	20
	Free online course from nonprofit, academic, etc.	210	48

as compared to 41.1% of faculty members. Overall, since 2004, about 30% of the survey participants did not take any online courses, either mandated by employers or licensing authorities or personal reasons. Survey results (see Table 11) also indicate that many of these learners reached for other online courses (81.1%).

Among principal motivators to undertake online learning participants selected interest in the topic and new technologies most frequently (see Table 12). The need to satisfy personal goals (selected 299 times), curiosity (244 times) and interests (950 times) account for over 78% of all the applicable goals for online professional development. Peer related motivations (selected 78 times) were the least selected of the remaining goals.

As may be expected from participants active in a professional organization, many types of online professional courses taken by the survey takes were offered by professional organizations (either paid or free) as well as commercial enterprises. Accordingly, faculty members tend to take slightly more college courses than instructional designers. Only 14.4% of respondents took college or university online courses to satisfy their professional development goals, while 17.8% of respondents selected that type of course as a type of online personal learning course. The employer's online course unrelated to respondent's current job was the least chosen option, selected by only 89 participants (12%). In Table 13 counts and percentages are detailed accordingly.

Deep and Surface Learning Analysis – Frequencies and Sample Management

Responses to the demographics section of the survey [Q1-14] included some missing entries and information gathered to help manage the sample in order to analyze and cross reference results more accurately. Several adjustments to the data set were made before further analysis: (a) only responses with selection of "continental United States" were included (n =

358), and (b) only those participants who had at least one year of professional experience [Q7] (*n* = 334). Tabulation of the results of the two factor questionnaire (Biggs et al., 2001; Kember et al., 2004) is based on Table 1 detailing point values from 1-5 to answers A-E in two matrix questions of the survey [Q15.16] that were comprised of 22 unique statements requiring survey takers to estimate how true these statements were about them. In order to account for the fact that some online faculty and instructional designers have never taken online courses themselves, two sections of the survey (matrix questions 15-17) were augmented with "Not Applicable" selections. Interestingly, just under 7% of respondents opted to indicate that they have not taken any form of online professional development (even webinars, podcasts or other shorter forms of online training). Overall about 14% of faculty and 7% of instructional designers have not taken any employer mandated or any other online professional development training courses within the last five years. These results were not analyzed beyond descriptive information respondents provided.

Faculty - demographic profile. Looking at the more focused set of survey responses, faculty and online members of STC accounted for 48% of respondents (18% male and 30% female). Most of them (*n* = 151) were 30 or more years old, work for colleges of universities (*n* = 82) in full time capacity, and have 11 or more years of professional experience (*n* = 84). Only 4 % of faculty respondents had 11 or more years' experience in online environment teaching, and about 30% of the participants had less than 5 years experience with online instruction. Respectively, experience as an online learner indicated that most of the faculty were undertaking online learning activities for professional (*n* = 127) or personal (*n* = 132) development reasons within the last five years. Interestingly, there was only a small discrepancy between the employer mandated and personal reasons for taking online courses.

Instructional designers - demographic profile. Instructional Designers accounted for 52% of respondents (with 12% male and 50% female). Most of them (n = 154) work for business and industry or are self-employed (n = 157) in full time capacity or on contract (n = 170). Only 6% of instructional designers had 11 or more experience in online environment, and about 16% of the participants had less than 5 years experience with online instructional design. Respectively, experience as an online learner indicated that instructional designers are undertaking online learning activities for professional development reasons throughout their career. Interestingly there was only a small discrepancy between the employer mandated (n = 127) and personal (n = 132) reasons for taking online courses.

Data Analysis - Deep and Surface Approaches to Online Learning

As illustrated in Figures 7 and 8 faculty and instructional designers selected more frequently answers on numerical scales from 3 - 5 denoting: "half the time true about me", "frequently true of me", and "always or almost always true of me" in questions preloaded to identify deep approaches to e-learning and favored selections indicating surface approaches with some ambivalence.

Subscale approaches and their respective components were calculated based on different number of questions; therefore, further analysis must be based on individual means instead of cumulative data (see Table 14). Based on these calculations in Table 14, the individual mean values for deep approaches ranged from 2.99 (commitment to work motive component) to 4.36 (deep learning strategy to understand). Surprisingly, ranges of means in answers indicative of surface approaches were 1.92 (strategy to minimize the scope of study) to 3.20 (aim for qualification). Further analysis using parametric statistics to accept or reject the null hypotheses proposed for this study follows.

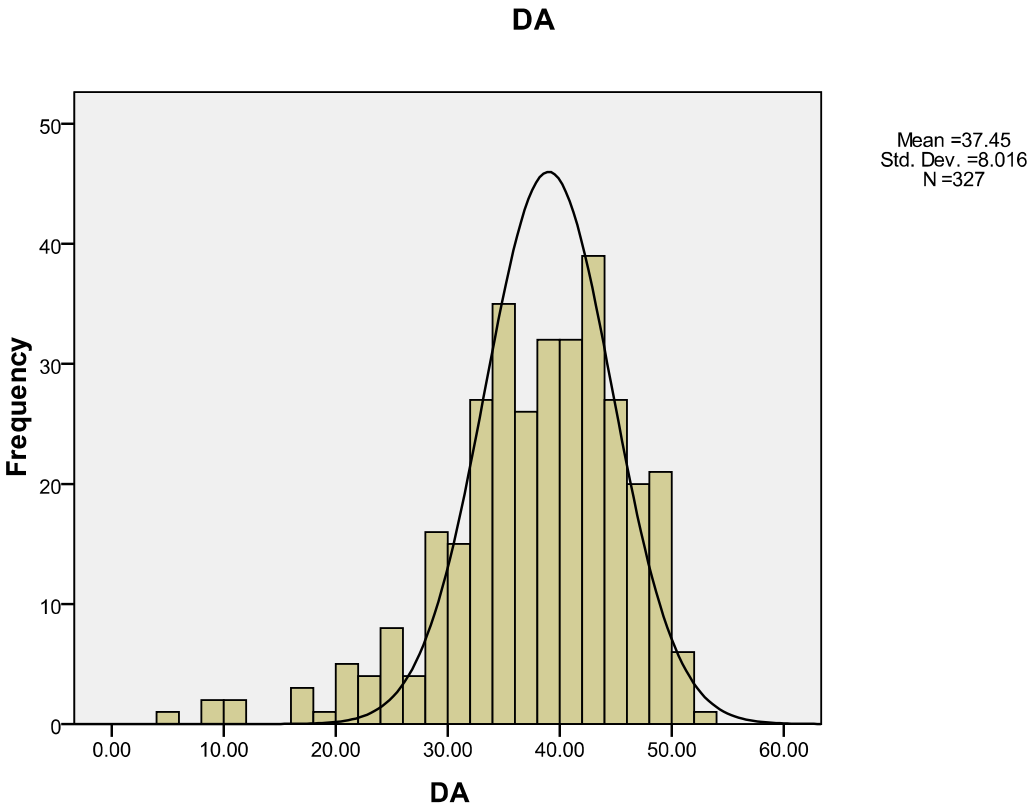

Figure 7. Analysis of sums of scores in questions preloaded for deep approach (DA) to learning based on Table 1.

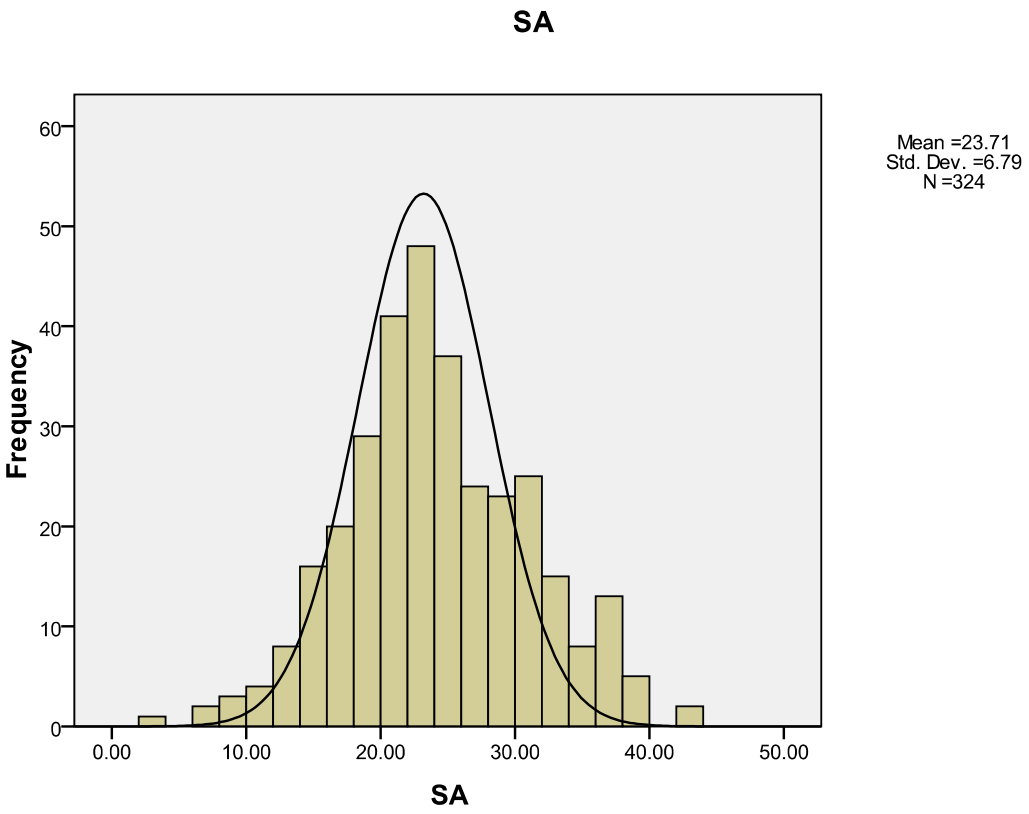

Figure 8. Analysis of sums of scores in questions preloaded for surface approach (SA) to learning based on Table 1.

Table 14

Cumulative Mean Scores for Deep and Surface Approaches to E-Learning

Mean	N	Min.	Max.	Sum	*M*	*SD*	Variance
Deep Approach	327	1.00	4.73	1146.11	3.50	0.62	0.39
Surface Approach	324	1.00	3.91	730.43	2.25	0.56	0.32

Data Analysis - Perceptions on Factors Influencing Approaches to E-Learning

The following essential components were identified in the literature review as possible influences on approaches to learning: orientation, modeling and using templates, audio visual channeling, collaboration, and assessment. Additionally the following aspects and features of online learning have been analyzed against the main approaches to e-learning: frustration with technology, practice and functionality of online courses, professional expectations and necessity for more traditional elements in workforce development. As illustrated in Tables 15-16, faculty and instructional designers shared relatively similar perceptions about course components' functionality in online learning. Neither group indicated that they have diametrically different perceptions or expectations from online courses.

Participants were asked to relate nine factors [Q17.1-9] to the best online courses taken within the last five years and only valid answers were analyzed. However, in Table 15 missing responses were included. These selections indicate a "not applicable" option that may have been selected for a number of reasons from opting to skip the question because only traditional courses were among professional development activities undertaken, to suggesting that discussion or collaboration were not used in the best online course taken recently [Q17.5]. Overall, factors preselected to this study as influencing approaches to e-learning had more positive responses. In case of the technology related question, instructional designers appear to have fewer frustrations by answering "no" (31.7%) than faculty (26%). They also tend to disagree that traditional professional development courses are better than online ones. More designers selected "no" in question [17.9] (24.3%) than faculty (18.5%), as presented in Table 16.

Table 15

Factors Influencing Approaches to E-Learning – Descriptive Statistics

Question #17	*N*	M	*SD*	Missing
[1] Orientation and introductions…	316	1.24	.43	18
[2] Technology – frustrations with…	300	1.58	.50	34
[3] Audio/video channeling…	317	1.12	.32	17
[4] Discussion and collaboration…	294	1.40	.49	40
[5] Assessment tests…	310	1.35	.48	24
[6] Templates and modeling used…	303	1.24	.43	31
[7] Practice and learning of relevant skills…	323	1.10	.30	11
[8] Sufficient for professional needs…	308	1.53	.50	26
[9] Traditional learning better…	313	1.43	.50	21

Table 16

Factors Influencing Approaches to E-Learning - Distribution of Answers by Participants

Question #			Faculty	% Instructional Designers	Total
[Q17.1]	Orientation…	Yes	35.8	39.9	75.6
		No	11.4	13.0	24.4
[Q17.2]	Technology…	Yes	22.0	20.3	42.3
		No	26.0	31.7	57.7
[Q17.3]	Audio/video…	Yes	40.4	47.9	88.3
		No	6.3	5.4	11.7
[Q17.4]	Discussion and …	Yes	30.3	29.6	59.9
		No	17.3	22.8	40.1
[Q17.5]	Assessment tests…	Yes	30.0	35.5	65.5
		No	17.7	16.8	34.5
[Q17.6]	Templates and …	Yes	31.4	44.9	76.2
		No	15.5	8.3	23.8
[Q17.7]	Practice…	Yes	41.2	48.9	90.1
		No	5.9	4.0	9.9
[Q17.8]	Sufficient…	Yes	21.1	25.6	46.8
		No	25.3	27.9	53.2
[Q17.9]	Traditional…	Yes	29.7	27.5	57.2
		No	18.5	24.3	42.8

Data Analysis – Null Hypotheses

The Revised Two-Factor Learning Process Questionnaire (Biggs et al., 2001; Kember et al., 2004) was used to determine prevalence of deep and surface approaches to e-learning (see Table 17). Faculty and instructional designers were asked to evaluate statements and answer questions based on their online professional development activities undertaken within the last five years. Based on the premise of the study, the set of 30 null hypotheses was evaluated. Fourteen null hypotheses were rejected at alpha level of 0.05 ($p \leq 0.05$). Each population grouping, faculty and instructional designers, were analyzed in the same manner ($H_0$1 though $H_0$14) with respect to the components within the deep and surface approaches (see Tables 6-10), as well as the perceptions ($H_0$15 though $H_0$24) these learners have about e-learning (see Tables 11-20). Demographic factors analysis complete the analysis in Tables 21-30 ($H_0$25 though $H_0$30).

Chi-square tests were used to determine independence of the perceptions based survey results ($H_0$15 though $H_0$24). An overview of the hypotheses used for this study regardless of the break down for faculty and instructional designers within the population is indicated in Table 3. Additionally, in order to delineate influences on the two main approaches to e-learning, the following factors were analyzed using ANOVA statistics in relation to: (a) professional experience in teaching or instructional design ($H_0$25-26), (b) specific experience in online teaching or instructional design of online materials only ($H_0$27-28), and (c) experience as a learner in online courses ($H_0$29-30).

Table 17

Deep Approach (DA), Surface Approach (SA), Motive (M), and Strategy (S) Means of Cumulative Scores Obtained from Adding the Responses' Values Preloaded for Each Factor from Table 1

Category				*M*	*SD*
Approaches			Deep (DA)	3.50	0.62
			Surface (SA)	2.25	0.56
Subscales					
	Deep		Motive (DM)	3.24	0.72
			Strategy (DS)	4.02	0.69
	Surface		Motive (SM)	2.64	0.86
			Strategy (SS)	2.04	0.68
Subcomponents					
	Deep	Motive	Intrinsic interest (ID)	3.48	0.87
			Commitment to work (CD)	2.99	0.76
		Strategy	Relating ideas (RS)	3.47	0.67
			Understanding (UD)	4.36	0.70
	Surface	Motive	Fear of failure (FS)	2.06	1.05
			Aim for qualification (AS)	3.20	1.10
		Strategy	Minimizing the scope of study (MS)	1.92	0.82
			Memorization (MeS)	2.20	0.85

Null Hypotheses - T-Tests

Ho1 - There is no significant difference between faculty members and instructional designers in their deep approach to e-learning.

An independent samples *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty members and instructional designers in their deep approach to e-learning was small ($M_{Faculty} = 3.52$, $SD_{Faculty} = 0.67$; $M_{Instructional\ Designers} = 3.49$, $SD_{Instructional\ Designers} = 0.58$; $t\ (325) = 0.360$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preferences for deep approach in e-learning environments. The null hypothesis is not rejected.

Ho2 - There is no significant difference between faculty members and instructional designers in their surface approach to e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their preferences for surface approach to e-learning was small ($M_{Faculty} = 2.22$, $SD_{Faculty} = 0.57$; $M_{Instructional\ Designers} = 2.25$, $SD_{Instructional\ Designers} = 0.56$; $t\ (322) = -1.01$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preferences for surface approach in e-learning environments, and the null hypothesis is not rejected.

Ho3 - There is no significant difference between faculty members and instructional designers in their respective deep motive (DM) to undertake e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their preferences for deep motive subscale approach to e-learning was small ($M_{Faculty} = 3.25$, $SD_{Faculty} = 0.77$; $M_{Instructional\ Designers} = 3.24$, $SD_{Instructional\ Designers} = 0.67$; $t\ (324) = 0.13$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preferences for deep motive approach to e-learning. The null hypothesis is not rejected.

Ho4 - There is no significant difference between faculty members and instructional designers in their respective deep strategy (DS) to undertake e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach of preference ($M = 4.03$, $SD = 0.69$, $t\ (325) = 0.04$, $p > 0.05$). The difference between faculty and instructional designers in their preferences for deep strategy subscale approach to e-learning was small ($M_{Faculty} = 4.03$, $SD_{Faculty} = 0.74$; $M_{Instructional\ Designers} = 4.03$, $SD_{Instructional\ Designers} = 0.69$; $t\ (325) = 0.04$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preference for deep strategy subscale approach to e-learning. The null hypothesis is not rejected.

Ho5 - There is no significant difference between faculty members and instructional designers in their respective surface motive (SM) to undertake e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this approach. The difference between faculty and instructional designers in their preferences for

surface motive approach to e-learning was large ($M_{Faculty} = 2.51$, $SD_{Faculty} = 0.89$; $M_{Instructional\ Designers} = 2.65$, $SD_{Instructional\ Designers} = 0.81$; $t\ (322) = -2.63$, $p < 0.05$). This difference is statistically significant. Therefore, faculty and instructional designers differ in their preferences for surface motive approaches to e-learning. Instructional designers selected answers indicating that assessment scores in online tests [Q15.3 and Q15.7] or relevancy of online courses to their future career prospects were more frequently true about them than faculty members [Q15.11 and Q16.15]. The null hypothesis is rejected.

Ho6 - There is no significant difference between faculty members and instructional designers in their surface strategy (SS) to undertake e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their preferences for surface strategy subscale approach to e-learning was small ($M_{Faculty} = 2.07$, $SD_{Faculty} = 0.74$; $M_{Instructional\ Designers} = 2.04$, $SD_{Instructional\ Designers} = 0.68$; $t\ (322) = 0.74$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preferences for surface strategy subscale approach to e-learning. The null hypothesis is not rejected.

Ho7 - There is no significant difference between faculty members and instructional designers in their intrinsic interest (ID) to undertake e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their intrinsic interest deep motive approach to e-learning was small ($M_{Faculty} = 3.46$, $SD_{Faculty} = 0.90$; M

$_{\text{Instructional Designers}}$ = 3.50, SD $_{\text{Instructional Designers}}$ = 0.85; t (324) = -0.47, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their intrinsic interest deep motive approaches to e-learning. The null hypothesis is not rejected.

Ho8 - There is no significant difference between faculty members and instructional designers in their commitment to work (CD).

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this deep approach. The difference between faculty and instructional designers in their preferences for deep motive of commitment to work was small (M $_{\text{Faculty}}$ = 3.05, SD $_{\text{Faculty}}$ = 0.79; M $_{\text{Instructional Designers}}$ = 2.95, SD $_{\text{Instructional Designers}}$ = 0.72; t (320) = 1.14, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their commitment to work. The null hypothesis is not rejected.

Ho9 - There is no significant difference between faculty members and instructional designers in relating ideas (RD).

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this deep approach strategy. The difference between faculty and instructional designers in their preferences for relating ideas deep strategy was small (M $_{\text{Faculty}}$ = 3.52, SD $_{\text{Faculty}}$ = 0.70; M $_{\text{Instructional Designers}}$ = 3.43, SD $_{\text{Instructional Designers}}$ = 0.63; t (325) = 1.20, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their preferences for relating ideas in e-learning. The null hypothesis is not rejected.

Ho10 - There is no significant difference between faculty members and instructional designers in their understanding (UD) of e-learning courses.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this deep strategy approach. The difference between faculty and instructional designers in their preferences for strategy to understand material seep strategy was small ($M_{Faculty} = 4.32$, $SD_{Faculty} = 0.79$; $M_{Instructional\ Designers} = 4.41$, $SD_{Instructional\ Designers} = 0.60$; $t\ (320) = -1.23$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in strategy to understand material in e-learning. The null hypothesis is not rejected.

Ho11 - There is no significant difference between faculty members and instructional designers in their fear of failure (FS) in e-learning environment.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this surface motive approach. The difference between faculty and instructional designers related to fear of failure surface motive was small ($M_{Faculty} = 1.96$, $SD_{Faculty} = 1.04$; $M_{Instructional\ Designers} = 2.2$, $SD_{Instructional\ Designers} = 1.05$; $t\ (310) = -1.63$, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ as related to fear of failure in e-learning. The null hypothesis is not rejected.

Ho12 - There is no significant difference between faculty members and instructional designers in their aim for qualification (AS).

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their preferences for aim of qualification surface approach was large ($M_{Faculty} = 3.04$, $SD_{Faculty} = 1.23$; $M_{Instructional\ Designers} = 3.35$, $SD_{Instructional\ Designers} = 0.96$; $t\ (318) = -2.5$, $p < 0.05$). This difference is

statistically significant. Therefore, faculty and instructional designers differ in their aim for qualification. Instructional designers selected answers indicating that relevancy of online courses to their future career prospects were more frequently true about them than faculty members [Q15.11 and Q16.15]. The null hypothesis is rejected.

Ho13 - There is no significant difference between faculty members and instructional designers in their tendency to minimize the scope of study (MS) in e-learning.

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their surface approach tendency to minimize the scope of study was small ($M_{Faculty}$ =1.94, $SD_{Faculty}$ = 0.89; $M_{Instructional\ Designers}$ = 1.91, $SD_{Instructional\ Designers}$ = 0.75; t (321) = 0.38, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their surface strategy approach of minimizing the scope of study in online learning. The null hypothesis is not rejected.

Ho14 - There is no significant difference between faculty members and instructional designers in their strategy to memorize (MeS).

An independent sample *t*-test for equality of means was used to compare how many faculty members and how many instructional designers selected questions preloaded for this particular approach. The difference between faculty and instructional designers in their preferences for surface strategy to memorize was small ($M_{Faculty}$ = 2.26, $SD_{Faculty}$ = 0.83; $M_{Instructional\ Designers}$ = 2.22, $SD_{Instructional\ Designers}$ = 0.86; t (321) = 1.05, $p > 0.05$). This difference is not statistically significant. Therefore, faculty and instructional designers do not differ in their strategy to memorize material. The null hypothesis is not rejected.

Null Hypotheses - Chi-Square Tests

Ho15 - There is no statistical difference between the perceived need for orientation to an online course and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive orientation in online courses just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 83.051$, $df = 1$, $p < 0.0001$) and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive orientation to be an essential component of online course [Q17.1] and their approach to online learning. Effectively, the residual difference between the learners' perceptions was -81 out of the total of 316 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell counts below 5 (see Table 18 and 19), indicating that some respondents' selections rendered the analysis for independence of these variables inconclusive. Valid and significant responses to questions 15.6 (strategy component) and 16.21 (motive component) for Deep Approaches and question 16.15 (motive component) for Surface Approaches were obtained. Overall, motives account for the most significant difference between learners in relation to the perceived need for orientation in online courses.

Ho16 - There is no statistical difference between the use of models and templates in online courses and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive the need for models and templates in an online course just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 83.436$, $df = 1$, $p < 0.0001$), and the

Table 18

Deep Approach (DA) Questions [Q15 & 16] and Orientation ... [Q17.1] Results

				x^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	314	94.0	15.081[a]	4	0.005	Yes	9	66	50	90	23
							No	11	27	10	21	7
[Q15.2]	"...relate/ other online courses..."	309	92.5	11.108[a]	4	0.025	Yes	8	35	24	88	79
							No	7	18	10	25	15
[Q15.5]	"... any topic / interesting..."	314	94.0	4.028[a]	4	0.402	Yes	13	28	42	80	74
							No	6	15	14	22	20
[Q15.6]	"...constructing theories / fit odd things ..."	311	93.1	11.168	4	0.025	Yes	15	33	31	80	75
							No	8	5	20	26	18
[Q15.9]	"... work hard / material interesting..."	305	91.3	18.717[a]	4	0.001	Yes	2	21	50	97	59
							No	6	14	19	24	13

Table 18 *continued*

[Q15.10]	"... relate new material / topic..."	308	92.2	10.990[b]	4	0.027	Yes	2	4	11	86	132
							No	2	6	6	24	35
[Q16.13]	"... free time / more about topics..."	308	92.2	1.770[a]	4	0.778	Yes	12	71	50	67	33
							No	6	24	12	23	10
[Q16.14]	"...read online / understand..."	308	92.2	16.228[b]	4	0.003	Yes	2	4	10	90	127
							No	2	8	6	22	37
Q16.17]	"...approach online learning / questions ..."	311	93.1	7.542[a]	4	0.110	Yes	9	37	57	87	44
							No	7	19	18	22	11
[Q16.19]	"...going over material/ in my mind..."	307	91.9	7.520[a]	4	0.111	Yes	51	69	54	43	14
							No	27	23	10	11	5
[Q16.21]	"...do enough online / form conclusions ..."	305	91.3	11.317	4	0.023	Yes	30	42	61	75	21
							No	13	26	16	18	3

Note. *p≤0.05.
[a] 1 cell has an expected count of less than 5.
[b] 4 cells have an expected count of less than 5.

Table 19

Surface Approach (DA) Questions [Q15 & 16] and Orientation ... [Q17.1] Results

				x^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	297	88.9	9.051[a]	4	0.060	Yes	112	61	25	21	6
							No	38	19	5	3	7
[Q15.4]	"... no point in learning material / not on test ..."	309	92.5	23.636[b]	4	0.000	Yes	161	54	13	4	1
							No	40	22	2	9	3
[Q15.7]	"...worry / not be able to do well ..."	298	89.2	7.771	4	0.100	Yes	72	74	32	32	14
							No	35	16	8	8	7
[Q15.8]	"... doing enough to pass / little time online ..."	300	89.8	17.852[a]	4	0.001	Yes	110	67	33	17	1
							No	25	25	9	7	6
[Q15.11]	"... doing well in online courses / good job..."	294	88.0	4.428	4	0.351	Yes	37	43	57	49	37
							No	14	17	21	8	11
[Q16.12]	"... restrict my study / unnecessary to do extra.."	309	92.5	9.055[a]	4	0.060	Yes	85	88	28	30	2
							No	26	25	11	9	5

Table 19 *continued*

[Q16.15]	"...online classes / do better at my current job..."	305	91.3	11.937	4	0.018	Yes	12	38	40	94	46
							No	13	13	11	23	15
[Q16.16]	"... not / study in depth. Passing sufficient..."	306	91.6	8.189[a]	4	0.085	Yes	91	76	38	23	4
							No	27	18	12	12	5
[Q16.18]	"... learn by rote / not understand in depth... "	312	93.4	4.791[a]	4	0.309	Yes	84	74	37	32	9
							No	27	27	13	4	5
Q16.20]	"... continually going over online material ..."	302	90.4	0.747[a]	4	0.945	Yes	60	70	48	40	9
							No	22	23	15	11	4
[Q16.22]	" ...memorizing key sections..."	298	89.2	21.794[a]	4	0.000	Yes	97	73	34	19	3
							No	28	13	11	12	8

Note. $p \leq 0.05$.
[a]1 cell has an expected count of less than 5.
[b]4 cells have an expected count of less than 5.

null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive modeling to be an essential component of online course [Q17-6]. The residual difference between the learners' perceptions was -79.5 out of 303 observed responses.

To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5 (Table 20 and 21) indicating that some respondents' selections rendered the analysis of these variables inconclusive. Valid responses were obtained in case of question 15.1 (motive component) for Deep Approaches and questions 15.11 and 16.15 (Aim for Qualification motive component) for Surface Approaches. Overall, motives account for the significant differences between learners in relation to the perceived need for modeling in online courses.

Ho17 - There is no statistical difference between the use of audio/visual channeling (A/V) of the learned material in online courses and the respective approaches to e-learning.

A chi- square test was used to determine if deep learners perceive the need for audio/visual channeling in an online course just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 186.274$, $df = 1$, =, $p < 0.0001$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive channeling to be an essential component of online course [Q17-3]. The residual difference between the learners' perceptions was -121.5 out of 317 observed responses. To identify wherein the differences lay, cell counts were conducted.

Table 20

Deep Approach (DA) Questions [Q15 & 16] and Modeling ... [Q17.6] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	302	90.4	24.455	4	0.000	Yes	9	64	44	88	25
							No	12	26	17	16	1
[Q15.2]	"...relate/ other online courses..."	297	88.9	12.425[a]	4	0.014	Yes	7	38	22	84	75
							No	7	15	13	20	16
[Q15.5]	"... any topic / interesting..."	301	90.1	3.658a	4	0.454	Yes	12	29	39	81	68
							No	7	12	14	22	17
[Q15.6]	"...constructing theories / fit odd things ..."	299	89.5	3.336	4	0.503	Yes	17	27	35	84	64
							No	4	8	14	20	26
[Q15.9]	"... work hard / material interesting..."	294	88.0	30.885a	4	0.000	Yes	3	19	45	102	54
							No	5	17	23	14	12
Q15.10]	"... relate new material / topic..."	295	88.3	5.545b	4	0.236	Yes	2	7	9	81	125
							No	1	3	7	29	31

Table 20 *continued*

[Q16.13]	"... free time / more about topics..."	297	88.9	6.909[a]	4	0.141	Yes	9	69	42	71	35
							No	7	25	16	15	8
[Q16.14]	"...read online / understand..."	298	89.2	11.383[b]	4	0.023	Yes	1	7	9	84	126
							No	3	4	7	25	32
Q16.17]	"...approach online learning / questions ..."	299	89.5	9.268[a]	4	0.055	Yes	8	37	56	85	42
							No	8	16	17	21	9
[Q16.19]	"...going over material/ in my mind..."	295	88.3	9.821[a]	4	0.044	Yes	47	74	51	39	15
							No	27	17	11	11	3
Q16.21]	"...do enough online / form conclusions ..."	295	88.3	9.121	4	0.058	Yes	26	48	57	72	21
							No	17	16	19	16	3

Note. $p \leq 0.05$.
[a]1 cell has an expected count of less than 5.
[b]4 cells have an expected count of less than 5.

Table 21

Surface Approach (DA) Questions [Q1 5& 16] and Modeling ...[Q17.6] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	290	86.8	2.397[a]	4	0.663	Yes	108	62	25	18	10
							No	36	14	7	8	2
[Q15.4]	"... no point in learning material / not on test ..."	297	88.9	12.229[b]	4	0.016	Yes	149	60	9	8	1
							No	40	15	7	5	3
[Q15.7]	"...worry / not be able to do well ..."	288	86.2	8.271[a]	4	0.082	Yes	71	70	27	36	16
							No	29	17	13	4	5
[Q15.8]	"... doing enough to pass / little time online ..."	293	87.7	20.629[a]	4	0.000	Yes	106	73	28	14	2
							No	21	19	14	11	5
[Q15.11]	"... doing well in online courses / good job..."	286	85.6	18.379	4	0.001	Yes	27	45	57	48	40
							No	23	14	17	9	6
[Q16.12]	"... restrict my study / unnecessary to do extra.."	298	89.2	15.998[a]	4	0.003	Yes	82	90	31	21	4
							No	26	15	9	17	3

Table 21 *continued*

[Q16.15]	"...online classes / do better at my current job..."	294	88.0	36.087	4	0.000	Yes	9	34	35	89	56
							No	16	16	13	23	3
[Q16.16]	"... not / study in depth. Passing sufficient..."	298	89.2	8.491[a]	4	0.075	Yes	93	71	36	21	6
							No	24	17	12	15	3
[Q16.18]	"... learn by rote / not understand in depth... "	300	89.8	6.953[a]	4	0.138	Yes	77	74	35	33	10
							No	30	20	14	3	4
[Q16.20]	"... continually going over online material ..."	292	87.4	7.653[a]	4	0.105	Yes	54	71	53	35	10
							No	27	15	12	13	2
[Q16.22]	" ...memorizing key sections..."	290	86.8	16.066[a]	4	0.003	Yes	88	73	34	19	6
							No	33	8	12	12	5

Note. $p \leq 0.05$.

[a]1 cell has an expected count of less than 5.

[b]4 cells have an expected count of less than 5.

Ho18 - There is no statistical difference between the use of audio/visual channeling (A/V) of the learned material in online courses and the respective approaches to e-learning.

A chi- square test was used to determine if deep learners perceive the need for audio/visual channeling in an online course just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 186.274$, $df = 1$, =, $p <$ 0.0001), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive channeling to be an essential component of online course [Q17-3]. The residual difference between the learners' perceptions was -121.5 out of 317 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5 indicating that some respondents' selections rendered the analysis of these variables inconclusive. No valid and statistically significant statistics were obtained in this test as all statistically significant results had cell frequency of less than 5 (see Table 22 and 23).

Ho19 - There is no statistical difference between the use of online collaboration tools in the courses and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive online collaboration just as the surface learners do. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 11.442$, $df = 1$, $p < 0.001$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive collaboration to be an essential component of online courses [Q17-4]. The residual

Table 22

Deep Approach (DA) Questions [Q15 & 16] and A/V Channeling ... [Q17.3] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	315	94.3	6.498[b]	4	0.165	Yes	15	83	56	100	24
							No	5	8	6	12	6
[Q15.2]	"...relate/ other online courses..."	310	92.8	5.301[b]	4	0.258	Yes	14	48	28	103	81
							No	1	5	7	9	14
[Q15.5]	"... any topic / interesting..."	314	94.0	7.980[a]	4	0.092	Yes	19	38	46	96	78
							No	1	5	10	6	15
[Q15.6]	"...constructing theories / fit odd things ..."	312	93.4	7.219[b]	4	0.125	Yes	21	35	41	99	79
							No	3	3	10	7	14
[Q15.9]	"... work hard / material interesting..."	308	92.2	4.768[b]	4	0.312	Yes	6	29	62	110	65
							No	2	6	11	10	7
[Q15.10]	"... relate new material / topic..."	310	92.8	2.936[c]	4	0.569	Yes	3	10	13	101	147
							No	1	0	3	12	20

Table 22 *continued*

[Q16.13]	"... free time / more about topics..."	311	93.1	7.326[a]	4	0.120	Yes	16	82	51	84	41
							No	3	13	12	7	2
[Q16.14]	"...read online / understand..."	311	93.1	8.661[c]	4	0.070	Yes	2	12	13	96	151
							No	2	0	3	15	17
[Q16.17]	"...approach online learning / questions ..."	314	94.0	7.860[a]	4	0.097	Yes	11	50	67	98	51
							No	5	7	11	9	5
[Q16.19]	"...going over material/ in my mind, break..."	310	92.8	.858[a]	4	0.931	Yes	69	85	55	48	16
							No	10	9	9	7	2
[Q16.21]	"...do enough online / form conclusions ..."	307	91.9	5.046[b]	4	0.283	Yes	37	63	70	83	19
							No	6	6	8	9	6

Note. $p \leq 0.05$.

[a]1 cell has an expected count of less than 5.

[b]4 cells have an expected count of less than 5.

[c]3 cells have an expected count of less than 5.

Table 23

Surface Approach (DA) Questions [Q15 & 16] and A/V Channeling ... [Q17.3] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	300	89.8	1.409[c]	4	0.843	Yes	130	70	29	23	12
							No	20	10	2	3	1
[Q15.4]	"... no point in learning material / not on test ..."	312	93.4	2.488[d]	4	0.647	Yes	176	69	14	13	3
							No	25	9	2	0	1
[Q15.7]	"...worry / not be able to do well ..."	301	90.1	4.296[c]	4	0.367	Yes	92	80	36	39	18
							No	13	14	5	1	3
[Q15.8]	"... doing enough to pass / little time online ..."	303	90.7	3.831[b]	4	0.429	Yes	122	82	37	20	5
							No	12	13	6	4	2
[Q15.11]	"... doing well in online courses / good job..."	295	88.3	9.047	4	0.06	Yes	40	53	71	55	43
							No	11	7	8	2	5
[Q16.12]	"... restrict my study / unnecessary to do extra.."	312	93.4	0.795[c]	4	0.939	Yes	100	100	36	33	6
							No	12	14	4	6	1

Table 23 *continued*

[Q16.15]	"...online classes / do better at my current job..."	307	91.9	4.866[a]	4	0.301	Yes	23	42	45	104	57
							No	4	10	6	12	4
[Q16.16]	"... not / study in depth. Passing sufficient..."	308	92.2	2.973[b]	4	0.562	Yes	108	85	43	29	7
							No	12	9	7	6	2
[Q16.18]	"... learn by rote / not understand in depth... "	314	94.0	4.223[b]	4	0.377	Yes	98	92	42	34	11
							No	13	9	9	3	3
[Q16.20]	"... continually going over online material ..."	304	91.0	4.255[a]	4	0.373	Yes	75	84	57	42	11
							No	8	8	7	10	2
[Q16.22]	" ...memorizing key sections..."	301	90.1	10.005[b]	4	0.04	Yes	110	81	40	27	7
							No	18	5	6	3	4

Note. $p \leq 0.05$.

[a] 1 cell has an expected count of less than 5.

[b] 2 cells have an expected count of less than 5.

[c] 3 cells have an expected count of less than 5.

[d] 4 cells have an expected count of less than 5.

difference between the learners' perceptions was -29 out of 294 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5 indicating that some respondents' selections rendered the analysis of these variables inconclusive. In case of questions 15.1, 15.5, 16.17, 16.19 (motive component questions), and 15.2 (strategy component) for Deep Approaches and question 15.11 (motive component) for Surface Approaches valid and statistically significant statistics were obtained (see Table 24 and 25). Overall motives account for the most significant differences between learners in relation to the perceived need for orientation in online courses.

Ho20 - There is no statistical difference between the use of assessment tests in online courses and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive assessment in online courses just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 29.729$, $df = 1$, $p < 0.0001$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive assessment to be an essential component of online courses and their approach to online learning [Q17-5]. The residual difference between the learners' perceptions was -48 out of 310 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5, indicating that some respondents' selections rendered the analysis of these variables inconclusive. In case of question 16.5 (motive component) for Surface Approaches valid statistics were obtained (see Table 26 and 27). Overall

Table 24

Deep Approach (DA) Questions [Q15 & 16] and Collaboration ... [Q17.4] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	292	87.4	14.614	4	0.006	Yes	6	47	34	67	21
							No	14	41	24	31	7
[Q15.2]	"...relate/ other online courses..."	290	86.8	13.226	4	0.010	Yes	4	26	13	70	61
							No	10	22	17	38	29
[Q15.5]	"... any topic / interesting..."	291	87.1	14.000	4	0.007	Yes	5	23	29	58	60
							No	13	20	22	38	23
[Q15.6]	"...constructing theories / fit odd things ..."	290	86.8	7.851	4	0.097	Yes	6	20	28	62	56
							No	13	15	22	38	30
[Q15.9]	"... work hard / material interesting..."	287	85.9	15.458[a]	4	0.004	Yes	3	14	36	66	52
							No	5	19	30	47	15
[Q15.10]	"... relate new material / topic..."	287	85.9	11.663[b]	4	0.020	Yes	0	5	4	61	101
							No	1	5	11	47	52

Table 24 *continued*

[Q16.13]	"... free time / more about topics..."	289	86.5	9.217	4	0.056	Yes	5	48	35	58	27
							No	12	38	22	31	13
[Q16.14]	"...read online / understand..."	289	86.5	9.780[b]	4	0.044	Yes	0	5	8	63	97
							No	4	7	7	46	52
[Q16.17]	"...approach online learning / questions ..."	292	87.4	18.756	4	0.001	Yes	2	30	44	57	41
							No	11	24	26	45	12
[Q16.19]	"...going over material/ in my mind, break..."	289	86.5	19.799	4	0.001	Yes	27	52	41	38	14
							No	43	35	20	14	5
[Q16.21]	"...do enough online / form conclusions ..."	286	85.6	6.030	4	0.197	Yes	20	39	38	55	19
							No	20	24	33	32	6

Note. * $p \leq 0.05$.
[a] 2 cells have an expected count of less than 5.
[b] 3 cells have an expected count of less than 5.

Table 25

Surface Approach (DA) Questions [Q15 & 16] and Collaboration ... [Q17.4] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	279	83.5	5.999	4	0.199	Yes	78	48	14	17	9
							No	58	25	18	8	4
[Q15.4]	"... no point in learning material / not on test ..."	290	86.8	9.364[b]	4	0.053	Yes	119	40	10	3	1
							No	69	30	6	10	2
[Q15.7]	"...worry / not be able to do well ..."	281	84.1	2.301	4	0.681	Yes	53	53	22	26	11
							No	46	34	15	13	8
[Q15.8]	"... doing enough to pass / little time online ..."	283	84.7	12.157[b]	4	0.016	Yes	83	55	21	6	2
							No	45	34	18	14	5
[Q15.11]	"... doing well in online courses / good job..."	278	83.2	11.439	4	0.022	Yes	21	31	40	36	36
							No	27	27	30	17	13
[Q16.12]	"... restrict my study / unnecessary to do extra.."	289	86.5	3.103[b]	4	0.541	Yes	66	67	21	16	3
							No	40	39	17	17	3

Table 25 *continued*

[Q16.15]	"...online classes / do better at my current job..."	287	85.9	4.905	4	0.297	Yes	11	29	27	67	37
							No	15	22	19	42	18
[Q16.16]	"... not / study in depth. Passing sufficient..."	290	86.8	10.624[a]	4	0.031	Yes	79	53	23	15	3
							No	37	33	26	15	6
[Q16.18]	"... learn by rote / not understand in depth... "	291	87.1	2.844	4	0.584	Yes	56	64	27	19	8
							No	44	32	21	14	6
[Q16.20]	"... continually going over online material ..."	283	84.7	6.082	4	0.193	Yes	44	57	30	31	5
							No	35	29	27	17	8
[Q16.22]	" ...memorizing key sections..."	281	84.1	9.249[a]	4	0.055	Yes	69	52	25	15	2
							No	49	28	18	14	9

Note. * $p \leq 0.05$.
[a] 1 cells have an expected count of less than 5.
[b] 2 cells have an expected count of less than 5.

Table 26

Deep Approach (DA) Questions [Q15 & 16] and Assessment ... [Q17.5] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	308	92.2	9.109[a]	4	0.058	Yes	8	60	37	79	18
							No	12	31	23	29	11
[Q15.2]	"...relate/ other online courses..."	302	90.4	7.673[a]	4	0.104	Yes	6	31	27	68	66
							No	9	20	8	38	29
[Q15.5]	"... any topic / interesting..."	307	91.9	14.930[a]	4	0.005	Yes	8	20	34	74	64
							No	12	21	21	28	25
[Q15.6]	"...constructing theories / fit odd things ..."	305	91.3	8.668[a]	4	0.070	Yes	12	25	31	77	54
							No	11	12	21	25	37
[Q15.9]	"... work hard / material interesting..."	301	90.1	14.047[a]	4	0.007	Yes	4	17	38	90	48
							No	4	17	32	29	22
[Q15.10]	"... relate new material / topic..."	302	90.4	7.464[b]	4	0.113	Yes	2	4	7	73	111
							No	2	6	9	38	50
[Q16.13]	"... free time / more about topics..."	305	91.3	6.763	4	0.149	Yes	8	58	40	65	28
							No	11	36	20	26	13

Table 26 *continued*

[Q16.14]	"...read online / understand..."	303	90.7	5.499[c]	4	0.240	Yes	2	5	7	79	105
							No	2	7	6	33	57
[Q16.17]	"...approach online learning / questions ..."	306	91.6	5.943	4	0.203	Yes	7	34	48	71	40
							No	9	22	27	34	14
[Q16.19]	"...going over material/ in my mind, break..."	302	90.4	4.549	4	0.337	Yes	43	62	41	39	14
							No	33	30	20	15	5
[Q16.21]	"...do enough online / form conclusions ..."	300	89.8	3.522	4	0.475	Yes	24	46	45	60	20
							No	18	21	28	32	6

Note. * $p \leq 0.05$.

[a] 1 cell has an expected count of less than 5.

[b] 3 cells have an expected count of less than 5.

[c] 4 cells have an expected count of less than 5.

Table 27

Surface Approach (DA) Questions [Q15 & 16] and Assessment ... [Q17.5] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	294	88.0	1.025[a]	4	0.906	Yes	95	50	22	17	10
							No	51	28	10	8	3
[Q15.4]	"... no point in learning material / not on test ..."	304	91.0	11.659[c]	4	0.020	Yes	137	47	9	4	1
							No	60	28	6	9	3
[Q15.7]	"...worry / not be able to do well ..."	296	88.6	4.201	4	0.380	Yes	68	59	21	31	14
							No	36	32	18	10	7
[Q15.8]	"... doing enough to pass / little time online ..."	298	89.2	8.698[b]	4	0.069	Yes	97	59	22	12	4
							No	37	32	21	11	3
[Q15.11]	"... doing well in online courses / good job..."	289	86.5	4.279	4	0.370	Yes	30	35	50	39	34
							No	23	24	23	18	13
[Q16.12]	"... restrict my study / unnecessary to do extra.."	305	91.3	6.947[b]	4	0.139	Yes	71	76	30	18	4
							No	38	38	9	19	2

Table 27 *continued*

[Q16.15]	"...online classes / do better at my current job..."	301	90.1	12.446	4	0.014	Yes	14	28	33	72	49
							No	14	23	17	40	11
[Q16.16]	"... not / study in depth. Passing sufficient..."	301	90.1	12.114[a]	4	0.017	Yes	81	66	30	14	5
							No	37	25	19	20	4
[Q16.18]	"... learn by rote / not understand in depth... "	307	91.9	5.760[a]	4	0.218	Yes	69	61	33	30	9
							No	41	36	17	6	5
[Q16.20]	"... continually going over online material ..."	298	89.2	5.087[a]	4	0.279	Yes	49	63	40	37	6
							No	32	27	23	14	7
[Q16.22]	" ...memorizing key sections..."	296	88.6	6.087[a]	4	0.193	Yes	85	60	26	17	5
							No	42	23	18	14	6

Note. * $p \leq 0.05$.

[a] 1 cell has an expected count of less than 5.

[b] 2 cells have an expected count of less than 5.

[c] 3 cells have an expected count of less than 5.

motives account for the most significant difference between learners in relation to the perceived need for assessment in online courses.

Ho21 - There is no statistical difference between the perceived functionality of combined course features in online course and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive that there is a need for the combined course components of orientation, modeling, A/V channeling, collaboration, and assessment just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 420.074$, $df = 9$, $p < 0.0001$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small indicating that there is a significant difference between those who perceive the combined course features to be essential components of online courses and their respective approach to online learning [Q17.1, 17.3, 17.4, 17.5, and 17.6]. The residual difference between the learners' perceptions was -109 out of 324 observed responses. No cell count was needed for the combined results (see Table 28).

Ho22 - There is no statistical difference between the perceived frustrations with technology employed in online courses and the respective approaches to e-learning.

Chi-square test was used to determine if deep learners perceived frustrations with technology used in online learning just as the surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 7.053$, $df = 1$, $p < 0.008$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was small and indicated that there is a significant difference between those who perceive frustrations with technology to have bearing on the functionality of online course [Q17-2]. The residual difference between the learners' perceptions was 23 out of 300 observed responses. To identify wherein the differences lay, cell counts were conducted.

Table 28

Chi-Square Analysis: Combined Results for Deep & Surface Approaches and Course Components

		Combined [Q 17]	Deep Approach Mean	Surface Approach Mean
Chi-Square		420.074	376.128	467.765
Df		9	58	58
P		0.000	0.000	0.000
Observed *N*	324			
Residual *N*	-109			

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had several results with expected cell count below 5 indicating that some respondents' selections rendered the analysis inconclusive. Only in case of question 15.1 (motive component) for Deep Approaches to learning, valid statistics were obtained (see Table 29 and 30).

Ho23 - There is no statistical difference between the perceived need for practice and learning of relevant tools and skills in online courses and the respective approaches to e-learning.

A chi-square test was used to determine if deep learners perceive online courses with respect to practice and skill building opportunities just as surface learners. The results indicated that there was a small statistical difference between these learners ($\chi^2 = 207.681$, $df = 1$, $p < 0.0001$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was smaller indicating that there is a significant difference between those who perceive need for practice and skill building as essential components of online professional development courses [Q17-7]. The residual difference between the learners' perceptions was -129.5 out of 323 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5, indicating that some respondents preferred the opposite e-learning approach or opting to not respond to the question rendered the analysis for independence of these variables inconclusive. Only in case of question 15.11 (motive component) for Surface Approaches valid statistics were obtained (see Table 31 and 32).

Ho24 - There is no statistical difference between the perceived needs of the population regarding online courses and their approaches to e-learning.

A chi-square test was used to determine if deep learners perceive the need for online professional development just as the surface learners. The results indicated that there no

Table 29

Deep Approach (DA) Questions [Q15 & 16] and Technology ... [Q17.2] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	298	89.2	13.430	4	0.009	Yes	6	43	29	45	4
							No	12	44	29	61	25
[Q15.2]	"...relate/ other online courses..."	293	87.7	5.981	4	0.201	Yes	4	26	16	47	31
							No	10	24	17	59	59
[Q15.5]	"... any topic / interesting..."	297	88.9	1.667	4	0.797	Yes	6	19	24	41	37
							No	12	23	25	57	53
[Q15.6]	"...constructing theories / fit odd things ..."	296	88.6	0.233	4	0.994	Yes	8	15	21	45	37
							No	13	20	29	58	50
[Q15.9]	"... work hard / material interesting..."	292	87.4	7.576[a]	4	0.108	Yes	3	12	25	60	24
							No	5	22	40	55	46
[Q15.10]	"... relate new material / topic..."	294	88.0	2.194b	4	0.700	Yes	2	2	6	48	68
							No	2	7	10	57	92

Table 29 *continued*

[Q16.13]	"... free time / more about topics..."	295	88.3	.718	4	0.949	Yes	6	38	26	39	17
							No	11	52	31	50	25
[Q16.14]	"...read online / understand..."	294	88.0	3.496[a]	4	0.478	Yes	2	6	4	51	61
							No	2	6	10	56	96
[Q16.17]	"...approach online learning / questions ..."	297	88.9	3.907	4	0.419	Yes	3	23	27	48	24
							No	11	30	45	58	28
[Q16.19]	"...going over material/ in my mind, break..."	294	88.0	2.294	4	0.682	Yes	28	41	28	21	6
							No	47	46	34	32	11
[Q16.21]	"...do enough online / form conclusions ..."	292	87.4	1.872	4	0.759	Yes	17	25	30	42	10
							No	24	40	43	45	16

Note. * $p \leq 0.05$.
[a] 2 cells have an expected count of less than 5.
[b] 3 cells have an expected count of less than 5.

Table 30

Surface Approach (SA) Questions [Q15 & 16] and Technology ... [Q17.2] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	285	85.33	9.072	4	.059	Yes	60	32	7	15	6
							No	80	45	24	9	7
[Q15.4]	"... no point in learning material / not on test ..."	296	88.62	7.360[b]	4	.118	Yes	76	35	10	4	1
							No	117	38	4	8	3
[Q15.7]	"...worry / not be able to do well ..."	285	85.33	7.766	4	.101	Yes	48	29	15	20	9
							No	50	61	25	18	10
[Q15.8]	"... doing enough to pass / little time online ..."	288	86.23	3.241[b]	4	.518	Yes	51	42	20	6	2
							No	75	50	22	15	5
[Q15.11]	"... doing well in online courses / good job..."	282	84.43	5.464[a]	4	.243	Yes	16	30	33	25	17
							No	33	27	42	29	30
[Q16.12]	"... restrict my study / unnecessary to do extra.."	296	88.62	1.565[b]	4	.815	Yes	44	49	18	13	2
							No	62	61	20	22	5

Table 30 *continued*

[Q16.15]	"...online classes / do better at my current job..."	292	87.43	2.352	4	.671	Yes	10	21	18	52	21
							No	16	27	29	60	38
[Q16.16]	"... not / study in depth. Passing sufficient..."	293	87.72	3.589[a]	4	.464	Yes	44	40	23	15	2
							No	71	47	24	20	7
[Q16.18]	"... learn by rote / not understand in depth... "	297	88.92	3.897	4	.420	Yes	42	38	19	19	8
							No	63	57	29	16	6
[Q16.20]	"... continually going over online material ..."	289	86.53	4.087	4	.394	Yes	31	32	30	25	4
							No	50	53	31	25	8
[Q16.22]	" ...memorizing key sections..."	286	85.63	2.165[a]	4	.705	Yes	46	37	16	15	5
							No	74	45	27	16	5

Note. * $p \leq 0.05$.
[a] 1 cell has an expected count of less than 5.
[b] 2 cells have an expected count of less than 5.

Table 31

Deep Approach (DA) Questions [Q15 & 16] and Practice ... [Q17.7] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	318	95.2	34.291[b]	4	0.000	Yes	12	82	55	107	30
							No	9	12	7	4	0
[Q15.2]	"...relate/ other online courses..."	311	93.1	33.286[b]	4	0.000	Yes	8	46	30	101	94
							No	7	9	5	10	1
[Q15.5]	"... any topic / interesting..."	318	95.2	7.566[b]	4	0.109	Yes	15	39	51	93	88
							No	5	5	5	12	5
[Q15.6]	"...constructing theories / fit odd things ..."	316	94.6	10.039[b]	4	0.040	Yes	18	33	45	102	86
							No	6	4	8	6	8
[Q15.9]	"... work hard / material interesting..."	308	92.2	32.224[b]	4	0.000	Yes	4	26	60	117	69
							No	3	10	12	5	2
[Q15.10]	"... relate new material / topic..."	313	93.7	20.420[c]	4	0.000	Yes	2	8	13	99	159
							No	2	2	5	15	8

Table 31 *continued*

[Q16.13]	"... free time / more about topics..."	313	93.7	5.877[b]	4	0.209	Yes	15	85	56	83	42
							No	4	12	6	9	1
[Q16.14]	"...read online / understand..."	312	93.4	14.421[c]	4	0.006	Yes	2	9	13	100	157
							No	2	2	3	15	9
[Q16.17]	"...approach online learning / questions ..."	314	94.0	29.076[a]	4	0.000	Yes	10	52	61	106	54
							No	6	6	14	4	1
[Q16.19]	"...going over material/ in my mind, break..."	311	93.1	12.073[a]	4	0.017	Yes	64	86	58	54	19
							No	14	9	6	1	0
[Q16.21]	"...do enough online / form conclusions ..."	309	92.5	10.895[b]	4	0.028	Yes	35	62	70	85	26
							No	10	5	7	9	0

Note. * $p \leq 0.05$.

[a] 1 cell has an expected count of less than 5.

[b] 2 cells have an expected count of less than 5.

[c] 4 cells have an expected count of less than 5.

Table 32

Surface Approach (DA) Questions [Q15 & 16] and Practice ... [Q17.7] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	300	89.8	2.310[c]	4	0.679	Yes	133	71	29	22	13
							No	17	8	3	4	0
[Q15.4]	"... no point in learning material / not on test ..."	312	93.4	16.601[d]	4	0.002	Yes	186	70	11	11	2
							No	15	8	5	2	2
[Q15.7]	"...worry / not be able to do well ..."	301	90.1	4.128[c]	4	0.389	Yes	94	85	33	38	19
							No	10	9	8	3	2
[Q15.8]	"... doing enough to pass / little time online ..."	305	91.3	17.155[c]	4	0.002	Yes	130	86	34	19	5
							No	5	10	9	6	1
[Q15.11]	"... doing well in online courses / good job..."	298	89.2	17.310	4	0.002	Yes	39	53	72	55	47
							No	13	8	7	3	1
[Q16.12]	"... restrict my study / unnecessary to do extra.."	315	94.3	4.567[c]	4	0.335	Yes	107	102	35	34	6
							No	6	13	5	6	1

Table 32 *continued*

[Q16.15]	"...online classes / do better at my current job..."	309	92.5	26.247[a]	4	0.000	Yes	18	45	44	110	61
							No	9	6	8	8	0
[Q16.16]	"... not / study in depth. Passing sufficient..."	311	93.1	15.169[c]	4	0.004	Yes	116	89	40	28	8
							No	6	6	9	8	1
[Q16.18]	"... learn by rote / not understand in depth... "	317	94.9	4.688[b]	4	0.321	Yes	103	90	46	36	11
							No	10	11	6	1	3
[Q16.20]	"... continually going over online material ..."	303	90.7	7.101[a]	4	0.131	Yes	77	85	58	40	12
							No	5	8	7	10	1
[Q16.22]	" ...memorizing key sections..."	301	90.1	13.744[c]	4	0.008	Yes	115	81	43	23	7
							No	12	6	3	8	3

Note. * $p \leq 0.05$.
[a] 1 cell has an expected count of less than 5.
[b] 2 cells have an expected count of less than 5.
[c] 3 cells have an expected count of less than 5.
[d] 4 cells have an expected count of less than 5.

statistically significant difference between these learners ($\chi^2 = 1.299$, $df = 1$, $p > 0.254$), and the null hypothesis was not rejected at $p \leq 0.05$. The residual difference between the learners' perceptions was 10 out of 308 observed responses. All the cells in this analysis had expected frequency of at least 5. No post hoc analysis was conducted.

Ho25 - There is no statistical difference between the perceived needs for mixed learning environment of the population and their approaches to e-learning.

A chi-square test was used to determine if deep learners perceive the need for mixed online environment in professional development just as surface learners. The results indicated that there is a statistically significant difference between these learners ($\chi^2 = 6.47$, $df = 1$, $p < 0.011$), and the null hypothesis was rejected at $p \leq 0.05$. The probability was smaller indicating that there is a significant difference between those who perceive need for mixed learning environments [Q17-1]. The residual difference was -22.5 out of 313 observed responses. To identify wherein the differences lay, cell counts were conducted.

Most of the analyzed questions preloading for Deep and Surface Approaches to learning had results with expected cell count below 5. In case of questions 15.1, 16.13, 16.19 (motive component) and 15.2 (strategy component) for Deep Approaches and 15.3, 16.15 (motive component) and 16.18, and 16.20 (strategy component) for Surface Approaches valid statistics were (see Tables 33 and 34).

Null Hypotheses - ANOVA

Ho26 - There is no statistical difference between the years of professional experience and deep approaches to e-learning.

Three groupings from the sample (based on survey question 7, declared years of professional experience: 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of

Table 33

Deep Approach (DA) Questions [Q15 & 16] and Traditional ... [Q17.9] Results

				χ^2				True				
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.1]	"... learning online / happy and satisfied..."	307	91.92	28.402	4	0.000	Yes	18	63	40	44	11
							No	3	29	20	61	18
[Q15.2]	"...relate/ other online courses..."	301	90.12	11.664	4	0.020	Yes	11	39	21	58	43
							No	4	14	13	51	47
[Q15.5]	"... any topic / interesting..."	307	91.92	2.797	4	0.592	Yes	14	24	33	55	49
							No	5	20	22	46	39
[Q15.6]	"...constructing theories / fit odd things ..."	306	91.62	7.748	4	0.101	Yes	10	21	32	52	59
							No	14	16	19	52	31
[Q15.9]	"... work hard / material interesting..."	300	89.82	26.534[a]	4	0.000	Yes	5	28	50	64	24
							No	3	8	20	53	45
[Q15.10]	"... relate new material / topic..."	303	90.72	8.102[b]	4	0.088	Yes	2	9	12	69	81
							No	2	1	5	46	76

Table 33 *continued*

[Q16.13]	"... free time / more about topics..."	303	90.72	9.346	4	0.053	Yes	10	66	30	49	19
							No	9	29	28	40	23
[Q16.14]	"...read online / understand..."	302	90.42	3.353	4	0.501	Yes	2	8	10	67	85
							No	2	4	5	42	77
[Q16.17]	"...approach online learning / questions ..."	304	91.02	6.825	4	0.145	Yes	8	38	47	54	26
							No	7	19	26	52	27
[Q16.19]	"...going over material/ in my mind, break..."	300	89.82	13.068	4	0.011	Yes	50	59	30	23	7
							No	27	31	31	31	11
[Q16.21]	"...do enough online / form conclusions ..."	300	89.82	9.056	4	0.060	Yes	23	45	46	47	10
							No	21	21	28	43	16

Note. * $p \leq 0.05$.
[a] 2 cells had an expected count of less than 5.
[b] 3 cells have an expected count of less than 5.

Table 34

Surface Approach (SA) Questions [Q15 & 16] and Traditional ... [Q17.9] Results

				χ^2			True					
		N	%	Value	*df*	Sig.*		1	2	3	4	5
[Q15.3]	"... discouraged & worried by poor test ..."	292	87.4	9.359	4	0.053	Yes	77	51	21	15	4
							No	70	25	11	9	9
[Q15.4]	"... no point in learning material / not on test ..."	303	90.7	10.096[b]	4	0.039	Yes	104	43	12	11	4
							No	90	33	4	2	0
[Q15.7]	"...worry / not be able to do well ..."	295	88.3	.428	4	0.980	Yes	59	53	24	23	11
							No	47	37	17	15	9
[Q15.8]	"... doing enough to pass / little time online ..."	297	88.9	19.581[b]	4	0.001	Yes	60	54	33	17	6
							No	73	36	9	8	1
[Q15.11]	"... doing well in online courses / good job..."	290	86.8	8.357	4	0.079	Yes	34	34	51	29	19
							No	18	25	27	27	26
[Q16.12]	"... restrict my study / unnecessary to do extra.."	304	91.0	3.661[b]	4	0.454	Yes	58	63	27	21	5
							No	51	48	12	17	2

Table 34 *continued*

[Q16.15]	"...online classes / do better at my current job..."	299	89.5	24.406	4	0.000	Yes	20	39	31	62	20
							No	8	10	20	52	37
[Q16.16]	"... not / study in depth. Passing sufficient..."	302	90.4	21.108[a]	4	0.000	Yes	56	46	36	25	9
							No	62	45	13	10	0
[Q16.18]	"... learn by rote / not understand in depth... "	307	91.9	13.551	4	0.009	Yes	56	60	28	16	14
							No	51	41	22	19	0
[Q16.20]	"... continually going over online material ..."	296	88.6	9.142	4	0.058	Yes	38	52	39	29	11
							No	44	39	22	20	2
[Q16.22]	" ...memorizing key sections..."	295	88.3	20.758[a]	4	0.000	Yes	58	48	29	24	11
							No	67	36	15	7	0

Note. * $p \leq 0.05$.
[a] 1 cell has an expected count of less than 5.
[b] 2 cells have an expected count of less than 5.

variance. The means and standard deviations are presented in Table 35. The null hypothesis was rejected at $p \leq 0.05$ and revealed no significant differences between groups ($F(2, 324) = 0.35$, $p = 0.70$). No post analysis was necessary. Results from the one-way ANOVA are located in Table 36.

Ho27 - There is no statistical difference between the years of professional experience and surface approaches to e-learning.

Three groupings from the sample (based on survey question 7, declared years of experience: 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of variance. The means and standard deviations are presented in Table 29. The null hypothesis was rejected at $p \leq 0.05$ and revealed no significant differences between groups ($F(2, 321) = 5.2$, $p = 0.006$). Because the interrelation between the variables was statistically significant (see Table 37) and the groups were uneven, a post hoc comparisons using a Tukey Test for harmonic mean samples was conducted. The post hoc test indicated that 1-4 years of professional experience is a significant factor in preferences for surface approaches to online learning (see Table 38).

Ho28 - There is no statistical difference between the years of experience in online teaching or designing courses and deep approaches to e-learning.

Four groupings from the sample (based on survey question 8, declared years of experience: 0, 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of variance. The means and standard deviations are presented in Table 39. The null hypothesis was rejected at $p \leq 0.05$ and revealed no significant differences between groups ($F(3, 321) = 0.97$, $p = 0.41$). No post analysis was necessary. Results from the one-way ANOVA are located in Table 40.

Table 35

Descriptive Statistics for Deep and Surface Approach Means and Years of Professional Experience [Q7]

Approach	Years	*N*	M	*SD*
Deep (DA)				
	1-4	76	3.55	0.65
	5-10	99	3.48	0.59
	11+	152	3.50	0.64
Surface (SA)				
	1-4	76	2.43	0.51
	5-10	98	2.22	0.56
	11+	150	2.19	0.57

Note. Participants with less than one year of professional experience have been eliminated from the study.

Table 36

One-Way ANOVA: Years of Experience for Deep Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	0.28	2	0.14	0.35	0.70
Within Groups	126.71	324	0.39		
Total	126.99	326			

Table 37

One-Way ANOVA: Years of Experience for Surface Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	3.19	2	1.60	5.20	0.006
Within Groups	98.57	321	0.31		
Total	101.76	323			

Table 38

Post Hock Test (Tukey HSD): Years of Professional Experience for Surface Approaches to Online Learning

(I) Years	(J) Years	Mean Difference (I-J)	Standard Error	*p*
1-4	5-10	0.21*	0.08	0.03
	11+	0.24*	0.08	0.01
5-10	1-4	-0.21*	0.08	0.03
	11+	0.03	0.07	0.91
11+	1-4	-0.24*	0.08	0.01
	5-10	-0.03	0.07	0.91

Note. *p≤0.05.

Table 39

Descriptive Statistics for Deep and Surface Approach Means and Years of Online Professional Experience [Q8]

Approach	Years	*N*	*M*	*SD*
Deep (DA)				
	<1	103	3.45	0.62
	1-4	108	3.55	0.69
	5-10	81	3.47	0.55
	11+	33	3.63	0.59
Surface (SA)				
	<1	100	2.29	0.57
	1-4	108	2.38	0.54
	5-10	81	2.12	0.52
	11+	33	2.06	0.63

Table 40

One-Way ANOVA: Years of Online Professional Experience for Deep Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	1.14	3	0.38	0.97	0.41
Within Groups	125.67	321	0.39		
Total	126.81	324			

Ho29 - There is no statistical difference between the years of experience in online teaching or instructional designing and surface approaches to e-learning.

Four groupings from the sample (based on survey question 8, declared years of experience: 0, 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of variance. The means and standard deviations are presented in Table 41. The null hypothesis was rejected at $p \leq 0.05$ and revealed no significant differences between groups ($F(3, 318) = 5.08$, $p = 0.002$). Because the interrelation between the variables was statistically significant and the groups were uneven, a post hoc comparisons using a Tukey test for harmonic mean samples was conducted. The Tukey test indicated that 1-4 years of online experience factors in preferences for surface approaches to online learning (see Table 42).

Ho30 - There is no statistical difference between the number of online courses taken (regardless of reasons and types of courses – totals from questions 9-11) and deep approaches to e-learning.

Four groupings from the sample (based on means of declared numbers of courses taken as a learner: 0, 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of variance (see Table 43). The null hypothesis was rejected at $p \leq 0.05$ and revealed no significant differences between groups ($F(10, 316) = 1.94$, $p = 0.04$). Because the interrelation between the variables was statistically significant and the groups were uneven, a post hoc comparisons using a Tukey test for harmonic mean samples was conducted. The Tukey test indicated that participants who selected deep learning approaches loaded questions more often indicated that they have not been taking online classes for personal reasons and either tried (1-5) times to take other types of online learning types of materials or used them more frequently (11 or more) within the least five years (see Table 44).

Table 41

One-Way ANOVA: Years of Online Professional Experience for Surface Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	F	*p*
Between Groups	4.65	3	1.55	5.08	0.002
Within Groups	97.01	318	0.31		
Total	101.65	321			

Table 42

Post Hock Test (Tukey HSD): Years of Online Experience as Faculty or Instructional Designer for Surface Approaches to Online Learning

(I) Years	(J) Years	Mean Difference (I-J)	Standard Error	*p*
<1	1-4	-0.09	0.08	0.61
	5-10	0.17	0.08	0.18
	11+	0.23	0.11	0.15
1-4	<1	0.09	0.08	0.61
	5-10	0.26*	0.08	0.01
	11+	0.33*	0.11	0.02
5-10	<1	-0.17	0.08	0.18
	1-4	-0.26*	0.08	0.01
	11+	0.07	0.11	0.94
11+	<1	-0.23	0.11	0.15
	1-4	-0.33*	0.11	0.02
	5-10	-0.07	0.11	0.94

Note. *p≤0.05.

Table 43

One-Way ANOVA: Combined Online Learner Experience and Deep Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	F	*p*
Between Groups	7.33	10	0.73	1.94	0.04
Within Groups	119.66	316	0.38		
Total	126.99	326			

Table 44

Combined Post Hock Test (Tukey HSD): Online Learner Experience and Deep Approaches to Online Learning

Type	(I) # of courses	(J) # of c ourses	Mean Difference (I-J)	Standard Error	*p*
Personal					
	0	1-5	-0.22*	0.08	0.04
		6-10	-0.37*	0.12	0.02
		11+	-0.45*	0.12	0.00
	1-5	0	0.22*	0.08	0.04
		6-10	-0.15	0.11	0.55
		11+	-0.23	0.11	0.12
	6-10	0	0.37*	0.12	0.02
		1-5	0.15	0.11	0.55
		11+	-0.09	0.14	0.93
	11+	0	0.45*	0.12	0.00
		1-5	0.23	0.11	0.12
		6-10	0.09	0.14	0.93
Other	0	1-5	-0.08	0.14	0.94
		6-10	-0.24	0.15	0.38
		11+	-0.34*	0.14	0.08
	1-5	0	0.08	0.14	0.94
		6-10	-0.16	0.09	0.32
		11+	-0.26*	0.08	0.01
	6-10	0	0.24	0.15	0.38
		1-5	0.16	0.09	0.32
		11+	-0.10	0.10	0.75
	11+	0	0.34*	0.14	0.08
		1-5	0.26*	0.08	0.01
		6-10	0.10	0.10	0.75

Note. *p≤0.05.

Ho31 - There is no statistical difference between the number of online courses taken (regardless of reasons and types of courses – totals from items #5-7: Section B) and surface approaches to e-learning.

Four groupings from the sample (based on survey item # 4, declared years of experience: 0, 1-5, 6-10, and 11+) were analyzed using ANOVA, one-way analysis of variance. The means and standard deviations are presented in Table 45. The null hypothesis was accepted at $p \leq 0.05$ and revealed no significant differences between groups ($F(10, 313) = 0.95$, $p = 0.49$). No post hoc analysis was needed.

Data Analysis – Overarching Research Questions

Educators' perspective on the first overarching research question has been analyzed: What approach to learning do faculty and instructional designers favor when engaging in online professional development activities? As indicated in this chapter, faculty and online instructors favor deep approaches to learning based on their responses to questions adapted to e-learning environment from *The Revised Two-Factor Learning Process Questionnaire* (Biggs & Kember, 2001; Kember et al., 2004). The answer to the second overarching research question about the perceived functionality of online course components for faculty and instructional designers who use online professional development materials, is more complex. Overall, individual motives of this purposefully selected sample of goal oriented professionals favor predominantly deep learning approaches to e-learning.

Table 45

One-Way ANOVA: Combined Online Learner Experience and Surface Approaches to Online Learning

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	2.99	10	0.30	0.95	0.49
Within Groups	98.77	313	0.32		
Total	101.76	323			

Summary

Thirty null hypotheses were analyzed in this study and several of them required post hoc analyses. A detailed analysis of the first set of the null hypotheses ($H_0$1-14) assessed if there were any statistical differences between faculty and instructional designers with respect to their approaches to learning based on *The Revised Two-Factor Learning Process Questionnaire* (Biggs & Kember, 2001; Kember et al., 2004). Two null hypotheses were rejected in this set. There was a significant difference between faculty and instructional designers linked to their surface motivation to undertake e-learning professional development, specifically with regard to aim of qualification. The remaining twelve hypotheses in this set were not rejected.

The second set of analyses ($H_0$15-24) assessed if there were any statistical difference between perceptions that the deep and surface learners have with respect to the structural elements of online courses and the quality and functionality of online professional development courses they have taken within the last five years. All but one null hypothesis were rejected in this set. Orientation, use of models and templates, audio visual channeling, collaboration and assessments ($H_0$15-19) were perceived as important parts of successful online courses by learners who had selected questions preloaded for both deep and surface motive components. Technology used in the online professional development courses was also linked with motive components of learning ($H_0$21). Online professional development appears sufficient for online faculty and instructional designers' needs ($H_0$23). Participants in this study agree that although online courses may supply plenty of application practice provided learners have strong motivations, the traditional and face-to-face environments benefit professional development more than online courses ($H_0$22 and $H_0$24). The last hypothesis in this set could not be rejected.

In the last set of five null hypotheses ($H_0$25-30), assessment of statistical difference between selected demographic information and approaches to e-learning occurred. Two null hypotheses pertaining to surface learning approaches were rejected ($H_0$26 and $H_0$28). Years of both professional experience as faculty or instructional designer and particularly online experience link to surface approaches to e- learning. Two null hypotheses pertaining deep approaches and professional experience could not be rejected ($H_0$25 and $H_0$27). Interestingly, post hoc analyses of hypothesis 29 revealed that when courses are taken for personal reasons or learners utilize alternative modes of professional development (webinars, etc), deep learning approaches are favored among those learners who have taken more online courses. Those who took less than five and more than eleven online courses account for rejection of this hypothesis. There is no statistical link between the number of mandated courses and preference for deep or surface approaches to online learning. The last hypothesis in this set could not be rejected.

CHAPTER 5: DISUCSSION AND RECOMMENDATIONS

The purpose of this quantitative study was to examine the factors influencing approaches to e-learning of faculty, who directly instruct others, and instructional design professionals, who work with adult learners indirectly. Although a great deal is already known about discrete aspects of the learning process, it is unclear how education professionals engage in e-learning activities and what determines their approaches to online learning. In order to understand how learning approaches factor into electronic environments the following sections of this chapter present conceptual framework behind this study followed by discussion of findings, limitations, and recommendations for practitioners and future researchers.

Conceptual Framework

This study of over 300 faculty and instructional designers' approaches to learning is based on interdisciplinary theories pivoting around a three-tier conceptual foundation of human learning proposed by Jarvis (2006, 2007, 2008): t he learner (whole person), the learning process (lifelong and self-directed), and the experience of learning (allowing transformation of self). Moreover, interpretation of findings from this study may be further contextualized by several theories including multidimensional approaches to learning (Biggs, 1987; Biggs et al., 2001; Kember et al., 2004; Shreiber & Berge, 1998); cognitive theories: cognitive load theories (van Merriënboer & Sweller, 2005), meaningful understanding of multimedia (Mayer & Moreno, 2003), and cognitive engagement in online learning identified by Richardson and Newby (2006); and epistemological aspects of the learning process that has direct bearing on the learners' choices (Bråten & Olaussen, 2005; Fazio, 1989; Jarvis, 2006; Roskos-Ewoldson & Fazio, 1992; Schommer-Aikins, 2004; van Orvalle & Siebler, 2005; Zhang, 2002). Resulting matrix of

established theories helped to identify the most relevant aspects of e-learning at the beginning of the study and supports the following findings after the analysis of the data.

Findings

There are three major findings in this study. The first finding is that online learners favor deep approaches to e-learning. The second finding is that these learners are inclined to switch to surface approaches only if that switch aligns with their motivations. Lastly, both experience as professionals and as online learners are relevant to the approaches to online learning in general. Although, several factors characterize e-learners from employment details, age, and gender to the types of online courses taken within the last five years, these factors are of secondary importance.

Deep learning approaches dominate online. Analysis of the two fundamental factors – deep and surface approaches to learning in online specific contexts – revealed that lifelong learners (predominantly female members of a professional organization with at least one year of professional experience in their field) favor deep approaches to e-learning. This finding is consistent with comprehensive, three-tier look at the lifelong learning process leading to transformation of learners (Jarvis, 2006, 2007, 2008).

However, when online learners reflect on the best recently taken e-courses, *motivation* components within deep and surface approaches (rather than only deep or only surface approaches) factor into their evaluation of specific course components such as use of templates, tests, or audio and visual channeling. This finding relates to the dispersed theories included in the conceptual framework behind this study (multimedia, cognitive, or epistemological aspects of learning) even modeling (Jonassen, 2006), and collaborative learning theories (Garrison, 2006; 2007) that analyze flexible and motivation driven approaches to learning of adult learners.

In addition to deep approaches and motivation related factors, *experience* as professionals and as online learners are crucial. Online learners who have over five years of professional experience or are frequently learning online favor deep approaches, while learners with some (1-5) years of professional experience tend to be surface learners. This finding also is reflected in cognitive load theory. Mayer and Moreno (2003) found that prior multimedia learning experience, as a form of pre-training, reduces cognitive loads and allows proficient learners engage in deep learning. This tendency was also addressed by Richardson and Newby (2006) who indicated that learners appear to be self-directed the more experienced in e-learning they become.

Interestingly, there is a small (7%) segment of online faculty and instructional designers in the sample who do not take online courses at all. There are no findings about these professionals related to e-learning approaches or their perceptions of online learning as such. However, Allen and Seaman (2007, 2010) indicate that there is a continuing mistrust among educators of non-traditional forms of learning that may account for some reasons as to why some faculty and online instructional designers who have at least one year of professional experience do not use non-traditional forms of professional development themselves.

Overall, faculty and instructional designers differ in their motivations for undertaking learning online. Perceptions about features and functionality of e-courses vary as well. Summative discussion of these most significant findings grouped under three main factors of *approach* (deep and surface), *experience* (professional and e-learning), and *motivations* follows.

Discussion of the Findings

Analysis of the two fundamental factors – deep and surface approaches to learning in online specific contexts – revealed that lifelong learners (predominantly female members of a

professional organization with at least one year of professional experience in their field) favor deep approaches to e-learning and prefer online course features that support their motivations and fit their learning strategies. In particular, learners have a preference for courses that include proven learning enhancing features (templates, discussions, assessments, etc.), as these help them attain their goals and fit their motivations better. For example, if the aim of qualification is the motivation for learning, audio/visual channeling appears to be most frequently linked with the deep learning approaches as the most cognitively efficient mode of delivering online content to learners. Similarly, motivation factors into the perceived need for job related skill development and practice through online courses. Although both deep and surface learners do not differ in their estimation that exclusively online professional development is sufficient for online professionals, they fall short of indicating that traditional professional development methods are superior.

Educators, goal-oriented members of a professional organization with some professional experience in their field and significant online learning experience, tend to prefer deep and more cognitively engaging approaches to e-learning. As lifelong learners continuously accumulating experience in learning new skills professionals, they appear motivated and cognizant of the most efficient ways to achieve their goals. For instance, online professional development appears to offer them sufficient preparation to be effective in their work; however, traditional courses and learning are still perceived essential for their overall professional development needs. Trust in the function of one's own online endeavors appears to be an important aspect of online professional development and relates to the overall approach to learning. This finding relates to current research. Allen and Seaman (2007, 2010) remark on the steadily growing number of online courses and online students; however, the acceptance of online education and its value are

at a disjuncture with that growth. These researchers indicate that faculty mistrust the quality of online offerings (Allen & Seaman, 2007) and perceive them inferior to face-to-face learning (Allen & Seaman, 2010). Educators in this study tend to display similar preferences, but trust that online professional development (their own professional field) is suitable for furthering online instructional and design careers.

However, in case of educators with the relatively short (1-5 years) professional career span, surface learning approaches dominate, while a significant number of online courses taken (over 11) predisposes the deep learning approach. Perhaps these results account for the strategies and motivations inexperienced online learners utilize to cope with technological challenges (technical frustrations or completely new applications, which tend to increase cognitive loads while learning) or the overall transformation into lifelong learners that, in turn, takes time. Such learners' increased proficiency, and the diminished need for short term gain or simply achieving only surface motivations, may (given time and more frequent use of online courses) transform these learners into lifelong deep learners.

Additionally, perceptions of online course content and the overall function of online professional development relate to motivations and strategies behind the learning approaches that learners tend to adopt online. In cases of online course orientation, for example, learners differ in aspects of strategy employed in relating ideas and transferring the acquired information. When use of models or templates is concerned, learners differ in their perceptions of online material and indicate preferences for more surface motivations. In the use of audio/visual channeling of information, deep learners see practical implications of this instructional method when better career opportunities are motivating their e-learning. Not unexpectedly, perceptions related to online collaboration are dominated by deep motivations, as analysis of the learned material

would be needed in order to share learning experiences with other course participants. Lastly, assessment techniques appear to be mostly surface motivators that indicate need for more instant feedback on the currently studied material to allow learner progress to the next task.

Furthermore, variation between faculty and instructional designers appears to be most vivid in case of frustrations with technology delivering online content. Faculty find technology more frustrating than instructional designers, and yet they find online tests more preferable. In contrast, the ability to practice and acquire specific skills and knowledge in electronically mediated environments is more likely to satisfy instructional designers as is the use of templates and models. However, these learner group specific results may depend on a different set of motivations behind learning that elude analysis by a quantitative technique. Motivations in this study range from a need for specialized training to advance one's career, or a desire to stay current in the particular field of professional interest to pure interest in educational technology. Although differences related to job specific skills appear to factor into the learning approach, they seem more complex on the level of motivations, but may more easily relate to course components and perceptions of their functionality in e-learning.

In all, deep and surface learners are not approaching online professional development courses alike, as highlighted by Purdue (2003). Some significant differences pivot also on the overall satisfaction with e-learning technology and the role online professional development may play in career advancement (landing a well-paid job identified in this study as being one of the most typical motivators in joining a trade organization or a society). Self-perception and ability to adjust to the learning situation might factor in and prompt selections along deep learning strategies; nonetheless, both surface and deep approaches to e-learning consist of complex underlying factors that vary with the length of professional experience, practice in taking online

courses, and motivations (or goal orientation in general) that allow one to favor deep or surface learning strategies depending on the situation and environment.

Recommendations for Practitioners

Leaders in the institutions that employ faculty and instructional designers may need to recognize the lifelong learning tendencies of their cadre, may elect to foster diverse modes of delivery of professional development (length, features, utilization of technology, level of expertise), and may want to keep adopting more holistic approaches to professional development, inclusive of alternative and personal e-learning selections. As highlighted in this study, online learning practice is helping faculty and instructional designers build their skills, technology mediated learning techniques, and more importantly may help transfer their experience (directly or indirectly, as in case of instructional designers) to students. Large enterprises and the military already include an assortment of personal learning opportunities from language training to self-help e-courses to capitalize on the findings based on cognitive load theories. Broadening online professional development activities for educators with such personal e-learning opportunities could lead to higher competency, expertise, and trust in non-traditional instruction. Perhaps the statistics and national averages from future surveys would show less disparity between the value of online and traditional learning if more professional development and other courses were available online for employees in educational institutions.

Targeted and systematic evaluation of professionals seeking online learning may be needed, especially when motivations and strategies vary and as there seems to be no professional development course that fits all. Moreover, better understanding of e-learners at specific institutions, and the actual use of online professional development courses may offer valuable insights. Furthermore, a simplified version of *The Revised Study Questionnaire* used in this

study could be compiled into a self-scoring web tool that would incorporate techniques used to transfer the new skills into work-related solutions and best practices, perhaps as a part of an online orientation or assessment module type of professional development course. Understanding self-directed, lifelong, and adaptive learning rather one general learning style that may be age or context specific, could prove advantageous to practitioners in charge of education.

Overall, practical implications from this study may be useful to novice online learners who use e-learning materials in their professional development, self-directed experienced professionals, and administrators who supervise diverse groups of professionals. It appears that assessment of the deep and surface learning approaches is linked to the very structure of the courses, the learning process itself, and the more intrinsic realm of motivations that learners bring into the e-learning environment. This study indicates that identifying approaches to e-learning is effective, holds well, and evolves with learners and their learning environments.

Recommendations for Future Research

Further analysis of factors related to course structure and approaches to e-learning may be in order, due to the complexity of the learning process. Specifically, close attention could be paid to both the years of overall and online professional experience (and age) and the experience in teaching (if less than five years). More information about the younger professionals born after 1980 who may take e-learning for granted could become very revealing as to the approaches they take while utilizing online professional development materials. Since respondents to this study were predominantly female, studies with a more substantial population of males, or equal number of females and males, would be useful in more clearly understanding if gender relates to the deep and surface learning approaches at all. Additionally, more similar studies of professionals who are motivated to learn, have the ability to critically analyze the learning

process, and reflect on the technology-mediated learning processes could offer relevant implications for online course designers, instructors, and program administrators who support postsecondary academic and professional adult learners.

More specific, qualitative or mixed, research methods including follow-up interviews appear to be needed to investigate and assess the prevailing, as well as emerging, factors that influence approaches to lifelong learning. In addition to age specific groups, researchers may find that technology and the use of internet, especially social or virtual networks and collaboration tools, could be useful in understanding how e-learning functions as part of the comprehensive lifelong learning process. Distinguishing between different formats of online professional development and both job related and personal learning may also prove to be an interesting area for further inquiries. Additionally, identifying prior knowledge about the subject matter and the technical skill levels of learners may be helpful as well. Many faculty members and instructional designers remain current in their profession and may be assessing their own perceptions of online learning environments through their expectations rather than actual experiences. Diligent analysis of such underlying factors may prove valuable, especially if longitudinal studies could be afforded.

This analysis of faculty and instructional designers' approaches to e-learning may assist both professionals and their institutions in better understanding of learners' expectations from online education, more deliberate implementations of deep or surface learning choices, incorporation of alternative material presentation techniques, and creation of future courses that promote functional and best possible experiences for each demographic and professional grouping. An interesting study that capitalizes on the current results could investigate trends characteristic of e-learners with similar tasks and examine the learning preferences based on

different types of online courses (from help files, short webinars, to comprehensive courses, or just-in-time type of e-tutorial sessions delivered directly at the workstations) to re-evaluate the classification of motives and strategies within deep and surface approaches to e-learning. Understanding the complexity of how goal-orientation, lifelong learning habits, or immediate strategies that influence discrete strategies learners undertake may be valuable. Alternatively, investigation of possible barriers related to the cognitive capacities of learners when overload of poorly designed information occurs could be revealing and helpful.

Limitations

Results can be drawn to a similar strongly motivated self-directed population of learners as more and more online learners may fit that category. However, technical communicators who directly or indirectly instruct others and have professional interests in learning might not be the most representative sample of today's online learners. The participation rate, just shy of 30%, adds to the specific characterization of this sample of online learners, and may not be generalizable to the entire population of online professional development learners. Additionally, implementation and design of the survey were determined by the scope of this study. Thus, the survey length limited a meticulous inquiry into reasons for the specific selections. Particularly in cases where participants were teaching or designing online instruction without taking online professional development courses may influence the interpretation of the results reflective of the entire population of online faculty and instructional designers.

Conclusion

Comprehensive theory of human learning, although inherently complex and multidimensional, may not be so distant or even unattainable as Jarvis (2006) suggests. One day, mapping the learning process on a molecular level may lead to a more direct way of analyzing

factors that influence how humans approach learning in diverse environments. For now, studies that investigate individual approaches, motivations and strategies, and perceptions inclusive of cognitive competencies help piece the process together and help elucidate how we learn a bit more. This study confirms that bridging the gap between what is known from dispersed single model theories narrowly focused on cognition, instructional design, or professional development could help explain e-learning processes and inspire better professional development practices in technology rich workplaces. After all, the same online educational technology, which appeared to be a hindrance to some at the end of the twenty-first century, seems to be the key to understanding the puzzling complexities of the learning process in postsecondary education today.

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APPENDIX A: CORRESPONDENCE

Correspondence & Templates

Focus Group Facilitation Questions

1. What is ambiguous, confusing, or inadequate?
2. Is the survey population described adequately (Section A–B)?
    a. What other questions should be added to the demographics section to characterize the faculty members better?
    b. What other questions should be added to the demographics section to characterize the instructional designers better?
3. Is the terminology in Section C clear?
    a. Are the references in the question reflecting the learning process well?
    b. What could be changed or improved?
4. What other questions should be asked in Section D?
    a. Are the questions confusing or ambiguous?
        i. How should they be rephrased?

Open discussion: Follow-up questions (1-3 and/or as needed) for each item should be posted to make sure nothing is omitted and missed.

Permissions to Survey and Use the Instrument: Related Correspondence

From: <b105947@mailserv.cuhk.edu.hk>
To: BEATA PETERSON
Date: Friday - April 21, 2006 12:26 AM
Subject: Re: R-SPQ-2F - permission to use for research

Dear Bea,

Feel free to use it and make modifications to suit on-line teaching.

If you obtain a largish dataset we would be willing to analyse it and compare factor structures to those obtained in the classroom.

David

This e-mail is sent by CUHK WebMail http://webmail.cuhk.edu.hk

RE: Survey
Susan Burton [susan@stc.org]
Sent: Wednesday, July 22, 2009 5:56 PM
To: Peterson, Beata K
Cc: Tom Gorski [tom.gorski@stc.org]

Dear Beata:

As we agreed a few weeks ago, your study has been approved as an official research survey (faculty members and IDL SIG).

I see from your email that you have very thoughtfully set up an application to handle the survey mailing and automated response. However, STC's privacy policy is that STC does not release email addresses.

You can provide Tom Gorski, Director of Communications, with the copy you want sent to the list with the link to the survey. He will then send a second message to the list when you ask him to follow up.

TOM: please note the list you should order is those with a faculty (edu address), those who have self identified themselves as faculty, and those who are on instructional design SIG list.

Thank you!

Sincerely,

Susan Burton, CAE
Executive Director/CEO
Society for Technical Communication
9410 Lee Highway, Suite 300
Fairfax, VA 22031 USA
Direct: +1 571 366 1901
Office: +1 703 522 4114
Fax: +1 703 522 2075
susan@stc.org

APPENDIX B: SURVEY

Section A [Q1 (*required) - Q6]

1. I am*:
   1. faculty member, trainer, or instructor who has contact with students
   2. instructional designer who does not have contact with students

2. Gender:
   1. male
   2. female

3. Born before 1980:
   1. yes
   2. no

4. Employer:
   1. community college, two-year college
   2. university, four-year college
   3. online college or university
   4. business/industry
   5. self
   6. other (fill in box optional) _____

5. Location:
   1. Continental US
   2. US Territories
   3. Canada
   4. South America
   5. Europe & Middle East
   6. Africa
   7. Asia & Pacific
   8. Australia

6. Type of employment:
   1. full-time
   2. contract or part-time
   3. self-employed
   4. other (fill in box optional) _____

Section B [Q7-14]

7. Years of professional experience as faculty or instructional designer:
   1. 0-11 months
   2. 1-4 years
   3. 5-10 years
   4. 11+ years

8. Years of teaching/instructional design experience in online environment:
   1. 0-11 months
   2. 1 - 4 years
   3. 5-10 years
   4. 11+ years

9. Experience – as a LEARNER within the last five years: How many licensure or employer recommended/mandated online courses have you taken since 2004?
   1. 0
   2. 1-5
   3. 6-10
   4. 11+

10. Experience – as a LEARNER within the last five years: How many online courses have you taken for personal reasons in the same period?
   1. 0
   2. 1-5
   3. 6-10
   4. 11+

11. Experience – as a LEARNER within the last five years: How many webcasts or other type of web-based training sessions have you taken since 2004?
   1. 0
   2. 1-5
   3. 6-10
   4. 11+

12. Select ALL applicable goals for your online professional development activities:
   1. Curiosity
   2. Interest in the topic
   3. Interest in new methodology/pedagogy
   4. Interest in new technologies
   5. Need to satisfy a set personal goal (instrumental value – not related to the current career path)
   6. Need to satisfy a set professional goal (directly related to your current job)
   7. Peer motivation, e.g. others have taken this course or utilize such skill(s)

13. (Please select all applicable ones in the last five years)Type of courses taken online for professional development purposes

1. Commercial online course or training
2. College or university online course
3. Professional organization or conference online session(s)
4. In-house online professional development course
5. Free online course from nonprofit organization, academic or other institution

14. Type of online courses taken for personal learning purposes (Please select all applicable ones in the last five years)

1. Commercial online course or training
2. College or university online course
3. Professional organization or conference online session(s)
4. Employers online course unrelated to my current job
5. Free online course from nonprofit organization, academic or other institution

Section C [Q15.1-16.22]

15. PART 1 OF 2 How true about your online learning are the following statements:

A—this item is never or only rarely true about me,
B—this item is sometimes true about me,
C—this item is true about me about half the time,
D—this item is frequently true about me,
E—this item is always or almost always true about me

	A	B	C	D	E	n/a
1. I find that at times learning online makes me feel really happy and satisfied.	❑	❑	❑	❑	❑	❑
2. I try to relate what I have learned in one online course to what I learn in other online courses.	❑	❑	❑	❑	❑	❑
3. I am discouraged by poor results on an online test and worry about how I will do on the next one.	❑	❑	❑	❑	❑	❑
4. I see no point in learning material, which is not going to be on the test or needed to complete an online course.	❑	❑	❑	❑	❑	❑
5. I feel that nearly any topic can be highly interesting once I get into it.	❑	❑	❑	❑	❑	❑
6. I like constructing theories to fit odd things together.	❑	❑	❑	❑	❑	❑
7. Even when I have studied hard for an online test, I worry that I may not be able to do well in it.	❑	❑	❑	❑	❑	❑
8. As long as I feel that I am doing enough to pass the assessment(s), I devote as little time to studying online as I can.	❑	❑	❑	❑	❑	❑
9. I work hard at my online studies because I find the material interesting.	❑	❑	❑	❑	❑	❑
10. I try to relate new material as I go to what I already know on that topic.	❑	❑	❑	❑	❑	❑

11. Whether I like it or not, I can see that doing well in online courses is a good way to land a well-paid job.	❑	❑	❑	❑	❑	❑

16. PART 2 OF 2 How true about your online learning are the following statements:

A—this item is never or only rarely true about me,
B—this item is sometimes true about me,
C—this item is true about me about half the time,
D—this item is frequently true about me,
E—this item is always or almost always true about me

	A	B	C	D	E	n/a
12. I generally restrict my study to what is specifically set in the course as I think it is unnecessary to do anything extra.	❑	❑	❑	❑	❑	❑
13. I spend a lot of my free time finding out more about interesting topics that have been discussed in different courses I took.	❑	❑	❑	❑	❑	❑
14. When I read the course materials for my online course, I try to understand what the author/instructor means.	❑	❑	❑	❑	❑	❑
15. I intend to take online classes because I feel that I will then be able to get or do better at my current job.	❑	❑	❑	❑	❑	❑
16. I find it is not helpful to study topics in depth. Passing acquaintance with the material is sufficient to complete an online course.	❑	❑	❑	❑	❑	❑
17. I approach most of my online learning sessions with questions that I want answered.	❑	❑	❑	❑	❑	❑
18. I learn some things by rote, going over them repeatedly until I know them by heart even if I do not understand them in depth.	❑	❑	❑	❑	❑	❑
19. I find that I am continually going over the online course material in my mind at times, like when I am on break, walking, or lying in bed.	❑	❑	❑	❑	❑	❑
20. I find that the best way to complete online assessments is to try to remember answers to the most likely questions.	❑	❑	❑	❑	❑	❑
21. I like to do enough online learning and studying on a topic so that I can form my conclusions before I proceed with the material.	❑	❑	❑	❑	❑	❑
22. I find that I can get by in most online assessments by memorizing key sections rather than trying to understand them.	❑	❑	❑	❑	❑	❑

Section D [Q17 and optional Q 18]

17. Please indicate if you agree or disagree with the following statements about quality online courses:

	Yes	No	n/a
1. Orientation and/or ample introduction to online courses were essential parts of the best online courses I have taken.	❑	❑	❑
2. Technology needed for the course was a frustrating part of the least helpful courses I have taken.	❑	❑	❑
3. At least one of the following was used in the best online courses I have taken, narrated video/animation and/or textual and graphic information displayed at the same time and/or next to each other on the screen.	❑	❑	❑
4. Discussion and collaboration with other participants was adequately utilized in the best online courses I have taken.	❑	❑	❑
5. Assessment tests at the end of courses or sections were very helpful sections in the best online courses I have taken.	❑	❑	❑
6. Online course(s) helped me expand my professional knowledge because it offered models and template solutions.	❑	❑	❑
7. Online courses allow professionals to practice and learn relevant tools and skills.	❑	❑	❑
8. Online courses provide sufficient professional development for online instructors/developers.	❑	❑	❑
9. Traditional, synchronous, & face-to-face learning environments benefit my professional development more than online courses.	❑	❑	❑

18. Please supply your e-mail address if you would like to:
    1. receive more information about the study and its results
    2. take part in the drawing for one of the $10 certificates to Barnes and Noble online store
    3. e-mail _____

APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

University and Medical Center Institutional Review Board
East Carolina University
Ed Warren Life Sciences Building • 600 Moye Boulevard • LSB 104 • Greenville, NC 27834
Office **252-744-2914** • Fax **252-744-2284** • **www.ecu.edu/irb**
Chair and Director of Biomedical IRB: L. Wiley Nifong, MD
Chair and Director of Behavioral and Social Science IRB: Susan L. McCammon, PhD

TO: Beata Peterson,

FROM UMCIRB

DATE: February 5, 2009

RE: Human Research Activities Determined to Meet Exempt Criteria

TITLE: "Factors Influencing Approaches to Lifelong E-Learning Among Postsecondary Education Faculty and Professional Instructional Designers"

UMCIRB #08-0775

This research study has undergone IRB review on 1.31.09. It is the determination of the IRB Chairperson (or designee) that these activities meet the criteria set forth in the federal regulations for exemption from 45 CFR 46 Subpart A. These human research activities meet the criteria for an exempt status because it is a research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects and any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
The Chairperson (or designee) deemed this **unfunded** study **no more than minimal risk.** This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any changes must be submitted to the UMCIRB for review prior to implementation to allow determination that proposed changes do not impact the activities eligibility for exempt status. Should it found that a proposed change does require more substantive review, you will be notified in writing within five business days.

The following items were reviewed in determination exempt certification:
- Internal Processing Form-- Exempt Application (dated 12.9.08)
- Letter of Support (dated 1.6.09)
- Survey
- Consent Form for Participants (Webpage Content Listing)

It was furthermore determined that the reviewer does not have a potential for conflict of interest on this study.

The UMCIRB applies 45 CFR 46, Subparts A-D, to all research reviewed by the UMCIRB regardless of the funding source. 21 CFR 50 and 21 CFR 56 are applied to all research studies that fall under the purview of Food and Drug Administration regulations. The UMCIRB follows applicable International Conference on Harmonisation Good Clinical Practice guidelines.