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**BARRIERS TO E-LEARNING JOB TRAINING: GOVERNMENT EMPLOYEE
EXPERIENCES IN AN ONLINE WILDERNESS MANAGEMENT COURSE**

By

LISA AYRDRIE KATHLEEN EIDSON

B.S. Chemistry, University of Montana, Missoula, MT, 1999
B.A. Journalism, University of Montana, Missoula, MT, 1999

Thesis

presented in partial fulfillment of the requirements
for the degree of

Master of Science
in Forestry

The University of Montana
Missoula, MT

December 2009

Approved by:

Perry Brown, Associate Provost for Graduate Education
Graduate School

Wayne Freimund, Chair
Department of Society and Conservation
College of Forestry and Conservation

Laurie Yung, Committee Member
Department of Society and Conservation
College of Forestry and Conservation

Fletcher Brown, Committee Member
School of Education

Abstract

Eidson, Lisa Ayrdrrie Kathleen, M.S. December 2009

Forestry

Barriers to E-Learning Job Training: Government Employee Experiences in an Online Wilderness Management Course

Committee Chair: Wayne Freimund

Learning at work as an employee is inherently different from being a student in an academic setting and, as such, is beset with different challenges. As trends in the adoption of e-learning for the delivery of job training increase, new challenges related to distance learning with technology have also emerged. Recognition that continued learning in the workplace, now via technological methods, is required for maintaining proficiency and achieving career goals means that understanding the challenges unique to learning at work is paramount.

This qualitative study explored barriers to successful online job learning. Interviews with thirty federal government employees from the Forest Service and National Park Service enrolled in an online wilderness planning course revealed that attrition frameworks typically used to describe barriers to persistence in academia and distance education only partially describe hindering factors relevant to workplace learning. Although these hindering factors can generally be categorized as workplace; personality trait, and preference; course design/structure; or technology barriers, such categorization oversimplifies the true nature of employees' struggles to learn on the job.

This study's findings reveal three overarching systemic problems: 1) *illusion of convenience*, 2) *absence of deeper learning*, and 3) *lack of an organizational culture of learning*. These systemic problems demonstrate that complex interactions between various barriers create a cyclic system often preventing attainment of student-controlled, student-centered learning, two benefits of self-paced study. Other barrier interactions can foster employment of superficial, rather than deep, learning strategies possibly leaving employees ill-prepared to negotiate the situations for which they are supposedly being trained. Cultural elements of the structure and organization of work suggest that workplace learning is devalued, under-recognized and often unsupported, making the challenges to adaptation in an increasingly technological era even more significant.

Acknowledgements

Many individuals and organizations helped me complete this research. I am tremendously grateful to these people for their time, support, and invaluable insights. My appreciation and special thanks go first and foremost to the study participants who wholeheartedly shared with me their problems, challenges, hardships and triumphs. I would also like to thank the Arthur Carhart National Wilderness Training Center for its approval of this project for funding several weeks of my salary during which to complete key portions of the research. Thanks also go to the Wilderness Institute for funding the professional transcription of interviews. Center representative Chris Barns deserves an extra thank you for his insights during the initial coding process. I would like to thank fellow graduate students Dave Craig and Randy Tanner for their generous donations of time during the initial coding process, as well. I owe a special thanks to my thesis committee: Dr. Wayne Freimund, Dr. Laurie Yung, and Dr. Fletcher Brown. Their support and guidance were invaluable throughout this project. Thank you to my chair, Wayne Freimund, for your incredible patience, and to Laurie Yung, for your unsurpassed responsiveness and thorough, constructive feedback. Finally, I would like to thank my beloved husband for his never-ending patience throughout my graduate work.

Table of Contents

Abstract.....	ii
Table of Contents.....	iv
List of Tables and Figures.....	vi
Introduction.....	1
Rationale for the Research.....	2
Research Questions.....	4
Introduction Summary.....	5
Literature Review.....	5
What is E-Learning?.....	5
E-Learning and Andragogy.....	7
General Trends in E-Learning Adoption.....	9
Benefits of E-Learning.....	11
E-Learning Effectiveness and Satisfaction.....	12
E-learning Attrition.....	13
Barriers in E-Learning.....	14
Summary.....	17
Methodology.....	18
Introduction.....	18
Arthur Carhart National Wilderness Training Center.....	19
Wilderness Stewardship Planning Framework.....	20
Registrants, Interviewees, Sample.....	24
Interview Process.....	26
Interview Instrument.....	28
Data Analysis.....	30
Reliability and Validity of Interview Research.....	31
Results.....	32
Introduction.....	32
Sample Characterization and Quantification.....	33
Discussion and Analysis.....	36
Introduction.....	36
Successful E-Learning Experience Defined.....	38
Comparison To The Five-Pronged Attrition Framework.....	40
Work Environment Barriers to E-Learning.....	41
Introduction.....	41
Competing Priorities.....	42
Competition between field work and office work.....	49
Feelings of Guilt for Using Work Time to Learn.....	50
Study Environment Distractions.....	52
Hindsight Desire for Coordinated Learning with Other Staff.....	57
Summary.....	58
Personality Trait and Preference Barriers to E-Learning.....	60
Introduction.....	60
Procrastination and Cramming.....	61
Expectations.....	69

Learning Style Preferences	73
Technical Aptitude.....	77
Summary	80
Course Design/Structure Barriers to E-Learning.....	83
Introduction.....	83
Weaknesses of the E-Learning Format	84
Lack of interaction.....	85
Lack of networking.....	88
Lack of affirmation.....	90
Unreliable technology.....	92
Difficulty reading on screen.....	93
Ignoring multiple learning styles.....	94
Lack of sequestration and ease of distraction.....	95
Retention issues.....	98
Weaknesses of the Course/Course Materials	101
Compressed format.....	101
Focus on words not concepts.....	103
Testing issues.....	105
Need for more examples.....	106
Lack of Relevance.....	107
Summary	111
Technology Barriers to E-Learning	114
Introduction.....	114
Connectivity Problems.....	115
Login Problems.....	119
Hardware/Software Audio Problems	121
Navigation Problems.....	123
Testing Problems	124
Summary	127
Systemic Problems.....	129
Illusion of Convenience	130
Absence of Deeper Learning	137
Lack of an Organizational Culture of Learning.....	143
Conclusions and Recommendations	152
References.....	159
Appendix A: Definition of Terms.....	168
Appendix B: Project Timeline	170
Appendix C: Interview Guide.....	171
Appendix D: Verbal Consent (spoken to interviewee by interviewer).....	174
Appendix E: Quantitative Data Extracted From Sample	175
Appendix F: Detailed Comparison of This Study to the Five-Pronged Attrition Framework....	179

List of Tables and Figures

<i>Figure 1.</i> Relationships between and examples of distance education, technology-based learning, computer-based learning and e-learning.	6
<i>Figure 2.</i> Graphical model of e-learning barriers.	16
<i>Figure 3.</i> Screen snap of presentation format and key.	22, 23
<i>Figure 4.</i> Diagram of relationships between categories and systemic problems.	37
<i>Figure 5.</i> Interaction of barriers to produce the illusion of convenience.	131
<i>Figure 6.</i> Single- and double-loop learning.	144
Table 1. <i>Barriers experienced by learners in e-learning courses</i>	16
Table 2. <i>Barriers and categories from the five-pronged attrition framework and this study</i>	179, 180

Introduction

The year 2007 represented a pivotal time in the evolution of the Arthur Carhart National Wilderness Training Center (Carhart Center), the wilderness education and training arm of the federal government. The Carhart Center is unique in that it remains the only institution specifically tasked with providing wilderness-related job training for the federal wilderness management workforce. Previous to 2007, the Carhart Center conducted all of its job training courses, most tailored to meet the needs of mid-level field managers (i.e. wilderness managers and rangers), in a 3-5 day workshop/conference-style format. In the fall of 2006, the Carhart Center began transitioning many of these courses into e-learning (see definitions for relevant terms in Appendix A) courses through a partnership with the Institute for Distance and Distributed Learning (IDDL) at the Virginia Polytechnic Institute and State University (Virginia Tech). These courses were delivered over the Internet starting in 2008.

Increasing trends in adoption of e-learning as a viable training method are not new, however, 2008 was the first year in which the Internet served as the primary method for delivering wilderness management job training courses to federal government employees. Internal and external resistance to this format change exists. As such, this was a critical year to evaluate successful e-learning by the Carhart Center's target audience.

The remainder of this chapter describes the rationale for this study, defines terms including barrier and success, introduces a key five-pronged framework referenced in this study, and articulates the study's research questions.

The second chapter supports the research questions by reviewing relevant literature and discusses in detail the five-pronged framework describing various e-learning barriers. That

chapter will also provide the reader with an understanding of e-learning, its relationship to andragogy, recent trends in its adoption, its benefits, its effectiveness, and attrition in e-learning.

The third chapter discusses the study methodology, including a description of the sample, data collection methods and analysis.

The fourth chapter presents an overview of the study results including quantitative data.

The fifth chapter contains qualitative findings and applicable analysis organized by subsection.

The sixth chapter contains conclusions and recommendations.

Relevant appendices are included following the reference section.

Rationale for the Research

Although the literature suggests that e-learning courses can be as effective as traditional classroom courses and learners are generally satisfied with the e-learning experience (Institute for Higher Education Policy, 1999; Russell, 1999), dropout, or attrition, rates are much higher than those for classroom courses (Valasek, 2001). As such, a variety of studies have focused on the causes of attrition by isolating, evaluating, and modeling predictive factors (Gibson & Graff, 1992; Muse, 2003; Radhadrishna & Saxena, 2005; Sweet, 1986; Tinto, 1975; Valasek). The field, however, has long called for a realization that barriers causing attrition are interrelated and multifaceted, and this has given way to further research investigating and documenting barriers more broadly and as complex, interactive systems (Brindley, 1988; Garrison, 1987; Morgan & Tam, 1999; Woodley, 1983).

But what exactly is meant by barriers? In an educational context, a barrier is defined as an obstacle that negatively affects a learner's ability to start, continue, or finish a course. While

this definition might imply that the presence of barriers will automatically result in attrition, interestingly, learners that drop out and learners that persist report experiencing the same barriers (Brindley, 1988; Garland 1993a). This conclusion is supported by Brindley and Garland, whose studies concluded that persisting and non-persisting learners enrolled in both classroom and distance education courses experienced the same obstacles hindering their learning and ability to complete coursework.

These studies suggest that although barrier frameworks have been developed specifically to describe attrition, these same frameworks can be used to study barriers independent of attrition. However, if not barriers to persistence, then barriers to what? This study explored whether one particular complex attrition-based barrier framework was applicable in describing barriers to successful e-learning experiences. Although success or effectiveness can be defined in many ways—Piccoli, Ahmad & Ives (2001), for example, have defined effectiveness as satisfaction and high self-efficacy—this study allowed its sample to define what a successful e-learning experience entailed.

However, when applying any framework to a new situation, it is always necessary to ask whether the framework truly encompasses the breadth of phenomena being studied. Few studies have examined barriers experienced by employees enrolled in private sector or government job-based training courses (Bassi & Lewis, 1999; Simmons, 2002). Since several of these studies and anecdotal evidence suggest that barriers to job training can be somewhat different than those characteristic of academic settings (Osberg, 2002; Zelinski, 2000), in essence, it is questionable whether current research has characterized the breadth of barriers specific to employee e-learning experiences.

Therefore, while barriers can be categorized systematically in many ways, this study assessed the applicability to e-learning job training of a five-pronged framework characterizing barriers as situational, institutional, dispositional, epistemological, or technological in nature (Garland, 1992; Rubenson, 1986; Schilke, 2001). Using the strengths of qualitative interviewing, this study assessed the inclusiveness of this five-pronged framework by understanding and describing the full range of barriers to successful e-learning job training. Assessment of the five-pronged framework did not include a true framework test, however. Instead, it was used to guide and inform this research through its use in the development of interview questions to reveal barriers both within and outside its scope. Specifically, this study focused on federal government wilderness managers enrolled in an online job training course offered by the Carhart Center.

The ultimate goal of this research was then both academic and practical. Understanding barriers employees face during e-learning job training contributes to learning theory by broadening its scope to be inclusive of different types of learning. Revealing barriers, and the complex factors behind them—one of the strengths of qualitative research—can also help the Carhart Center, and other training institutions, improve e-learning experiences for students. By alleviating barriers revealed in this study, the Carhart Center will hopefully be able to increase the overall quality of future e-learning job training courses for the wilderness management workforce.

Research Questions

To achieve this goal, the following questions were used to guide this study: 1) What are the barriers to successful e-learning experiences in a wilderness management course? 2) How applicable is the five-pronged attrition framework in describing these barriers?

Introduction Summary

The Carhart Center’s recent transition to delivering e-learning courses provided a unique opportunity to understand barriers to successful e-learning experiences related to job training. Although previous research documented various barriers to persistence in academia, research on barriers related to job training courses was, and continues to be, much scarcer. Since academic coursework and job training are fundamentally different, existing frameworks may not adequately describe the full range of barriers experienced by employees. Therefore the purpose of this research was to document the breadth of barriers specific to government employees enrolled in online job training, assess the applicability of one attrition framework, and ultimately, provide adequate information for the alleviate of barriers face by students.

Literature Review

What is E-Learning?

“Most learners and many organizations associate e-learning with learning via a computer...however, the concept is increasingly being given a wider focus...” (Pollard & Hillage, 2001, p. 8).

E-learning is often referred to by many names—technology-based learning, computer-assisted learning, online learning, web-based learning, web-supported learning. However, the Institute for Employment Studies (Pollard & Hillage, 2001) reports that not all of these terms are equal. A narrow definition of e-learning equates it solely with computer-based learning or training, while the broadest view places e-learning as a subset of distance learning and defines it as the delivery of learning materials through various electronic methods including the computer, Internet, satellite broadcast, interactive TV, video, and CD-ROM (Pollard & Hillage). Despite

the inclusiveness of what Rossett (2002, p. 7) calls the “big tent” definition of e-learning, Rosenberg (2000) suggests that technologies such as interactive TV, video, and CD-ROM are not part of e-learning, as illustrated in Figure 1.

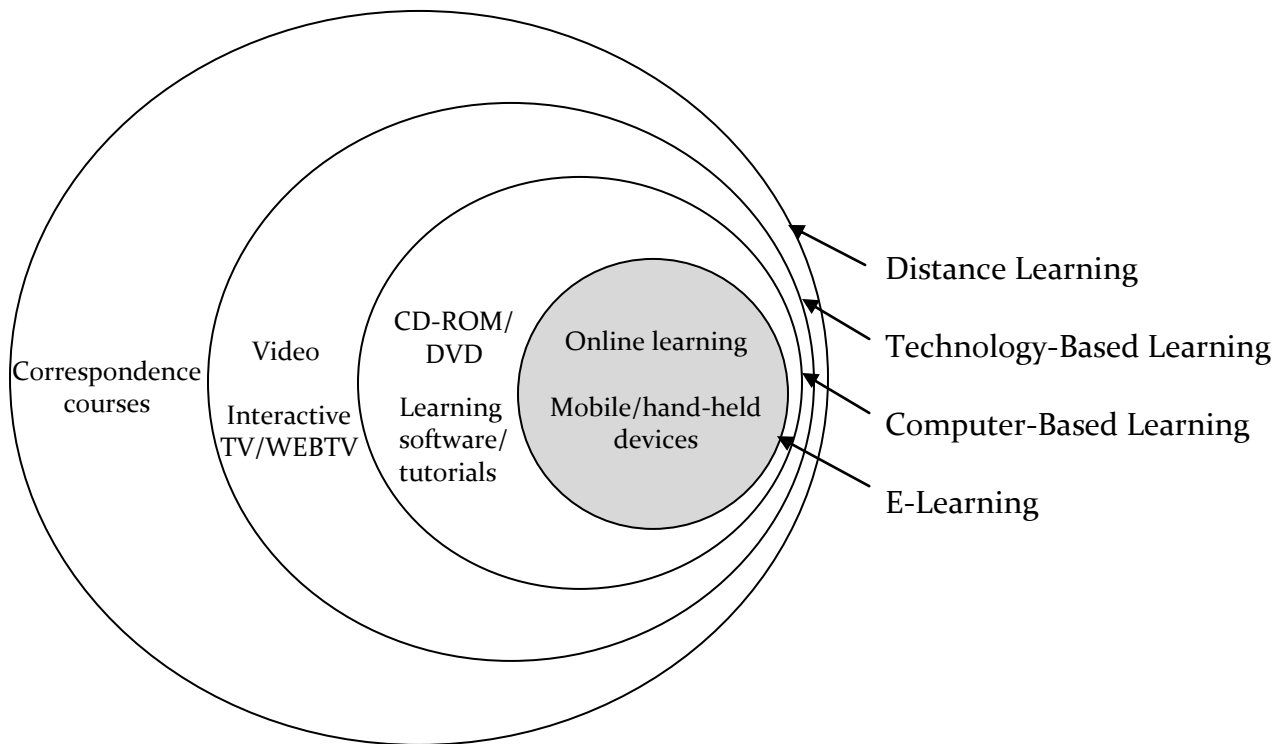


Figure 1. Relationships between and examples of distance education, technology-based learning, computer-based learning and e-learning (adapted from Urdan & Weggen, as cited in Pollard & Hillage, 2001).

Rosenberg’s definition of e-learning, and the one subscribed to in this study, is broader than the narrow definition, given above, but narrower than the big tent view. His definition includes three criteria: E-learning is networked, capable of instantaneous updates, storage and retrieval, distribution and sharing of information; E-learning is delivered to the learner via a computer using standard Internet technology; E-learning goes beyond the traditional paradigms of education and training to include formal instruction and informal learning.

E-Learning and Andragogy

“Distance educators need a sophisticated learner-centered view of learning and teaching that shows a critical integration of knowledge from various disciplines and fields of practice, including adult education” (Burge, 1988, p. 7).

Pollard & Hillage (2001) describe e-learning as a subset of distance learning, or distance education. In the context of job training, however, it is also a subset of adult education. Probably the most well-known theory of adult education is andragogy, which Holton, Swanson, & Naquin (2001, p. 119-120) assert “is applicable to any adult learning transaction, from community education to human resource development in organizations.” Knowles’ (Knowles, Holton, & Swanson, 1998) original theory was developed in 1968, published in 1980, and has been subsequently revised to include six core assumptions or principles:

1. Adults need to know why they need to learn something before learning it.
2. Adult self-concept is heavily rooted in the move from dependency toward self-directedness.
3. Prior experiences provide an increasingly rich resource for learning.
4. Adult learning is task oriented, with learners becoming ready to learn when they experience a need to cope with a life situation.
5. Adults see learning as a process of developing increased competence to achieve their full potential in life.
6. Adults are internally rather than externally motivated to learn.

Probably the most important of these assumptions or principles to distance education and e-learning is point two, and a variety of research has explored self-directed, or self-centered, learning. Merriam & Caffarella (1999, p. 110) define self-directed learning as "a process of learning, in which people take the primary initiative for planning, carrying out, and evaluating their own learning experiences." In their research on self-directed learning in business and industry, Guglielmino & Guglielmino (1988) developed the self-directed learning readiness scale designed to measure the presence of attitudes, abilities, and personality characteristics that are

important for successful self-directed learning. Higher scores for the following eight factors predict success in self-directed learning environments: enjoyment of learning; self-concept as an effective independent learner; tolerance of risk, ambiguity, and complexity; creativity; view of learning as a lifelong, beneficial process; initiative and self-discipline in learning; awareness of learning needs and progress; and acceptance of responsibility for one's own learning.

In e-learning, however, instructors, facilitators, and course designers—not just learners—share responsibility for student success in self-directed learning courses. Various protocols, strategies, or guidelines serve as recommendations for the successful implementation self-directed learning in e-learning. Burge (1988) created a simple set of facilitator guidelines—Responsibility, Relevance, Relationships and Rewards—to help educators assess the quality of course designs. Responsible educators help learners clarify learning goals; use learning contracts; give learners real choices regarding sequence, pacing, content, process and assessment; legitimize learners experiences, acknowledging that ambiguity and doubt are integral to learning; support risk-taking; help learners broaden their repertoire of cognitive and learning styles; give guidance that promotes independence; and use real-life situations and experiential techniques. Relevant educators help learners deal with potential conflicts between personal learning needs and occasional or professional demands, help learners make connections between practice and theory, promote reflective learning, help learners find useful applications of learning, and help learners look for unintended learning outcomes as well as intended ones. Relational educators help learners understand self, specifically their own experiences and needs as learners, facilitate productive group-based learning strategies, promote learning partnerships, and connect concrete to abstract within learning materials. Rewarding educators discuss with learners potential rewards including increased mastery and goal achievement, sense of connectedness to a greater

universe, sense of real expertise in an area of knowledge or skill, the discomfort of significant learning being outweighed by the gains, and an enlarged or transformed personal view of the world.

General Trends in E-Learning Adoption

“Recent advances in technology coupled with the need to provide cost-effective, timely learning to a large distributed workforce has encouraged...organizations to adopt technology-enabled methods for learning delivery” (Combs, 2002, p. 3).

In recent years, educational, commercial, and government organizations have embraced adult learning in the form of e-learning. The National Center for Education Statistics (Waits & Lewis, 2003) reported that fifty-six percent of 2- and 4-year degree-granting higher education institutions were offering distance education courses. Of these, ninety percent reported offering asynchronous, self-paced, Web-based courses; forty-three percent reported offering synchronous Web-based courses; and fifty-one percent reported using two-way video and audio instruction.

Although adoption by commercial organizations for job training is less pronounced, *Training* magazine’s 2003 Industry Report found that twenty-six percent of all training conducted that year by industries including healthcare, real estate, communications, and manufacturing was delivered electronically (Galvin, 2003). Between 2002 and 2003, self-paced, Web-based courses had risen from forty-eight to sixty-one percent of all electronically-delivered courses, while the use of CD-ROM and DVD discs as training delivery media had dropped from forty-one to thirty-two percent (Galvin). By 2007, the magazine reported that self-paced online courses constituted sixty-seven percent of all electronically-delivered training and, when combined with virtual classroom training, e-learning accounted for thirty percent of all formal trainings offered (Training, 2007). Josh Bersin, founder of the leading industry research firm that

conducted these studies concluded that the continuing increases in training via self-paced online courses and virtual classrooms illustrate a “maturing of investments in e-learning” (Training, 2006 p. 21).

Recent increases in the adoption of e-learning within the federal government, more generally, were initiated by President Clinton’s (1999) Executive Order 13111, which suggested that a “...coordinated federal effort is needed to provide flexible training opportunities to employees and to explore how federal training programs, initiatives and policies can better support lifelong learning through the use of learning technology.” The incorporation of learning technologies into government has expanded under the Obama administration through initiatives negotiating and sanctioning the use of various private-sector online social media tools (Federal Web Managers Council, 2009). While many institutions in all three branches of government have followed the intent of Clinton’s directive and Obama’s initiatives, the technologies used have, until recently, lagged somewhat behind those implemented by educational and private sector institutions. A 2002 study of ten federal government institutions found that, while self-paced Web-based courses were the dominant form of e-learning adopted by educational and private sector institutions, these government institutions more heavily emphasized video-based training methods (Combs, 2002). This study, however, showed that three of the ten government institutions surveyed each included Web-based instruction within its e-learning suite. By 2007, however, the Department of Agriculture reported that almost half of courses available to its employees through AgLearn, the agency’s learning management system, were taught completely or partially online, with SkillSoft being one of its largest training contractors (M. Wood, AgLearn Instructional Systems Specialist, Forest Service, personal communication, March 14, 2007).

Overall, increasing trends in adoption of e-learning with the private sector, education, and government appear to show no signs of slowing. As technological infrastructure improves throughout all sectors and these trends continue, e-learning may, quite possibly, represent the future of education and training.

Benefits of E-Learning

“The true power of e-learning lies not in the anyone, anyplace, anytime model, but rather in its potential to provide the right information to the right people at the right time and places.”
(Ruttenbur, Spinkler & Lurie, as cited in Pollard & Hillage, 2001, p. 23)

Given increasing trends in the adoption of e-learning in the private sector, education, and government, it's not surprising that e-learning has many appealing benefits:

- Convenience—Learners engage in “just-in-time” learning by scheduling and pacing learning according to their own schedules.
- Accessibility—Learners can participate in learning from home, work, or while on the road, expanding access to learning opportunities for unlimited numbers of people, including dispersed populations.
- Reliability and Universality—Learning materials are consistent, use standard technology protocols, and are consistently delivered, ensuring that all learners receive the same message.
- Accuracy—Learning materials can be updated easily and frequently, making information more accurate and useful for longer periods of time.
- Scalability—Learning materials can easily be scaled to educate small numbers of users or large numbers of users with little effort or incremental cost.
- Easy to Learn—With continuing increases in computer and Internet self-efficacy worldwide, “ramp-up” associated with accessing e-learning materials is diminishing.
- Risk-Free—Learning is conducted in a safe environment, allowing learners to practice tasks without the risks or costs of real-life simulation.
- Equality of Participation—Decision-making and knowledge building are distributed, increasing participation by shyer individuals and people who prefer or require more time to formulate ideas.
- Efficiency—Learning is cost-effective in many ways including reducing the time learners use to complete training (i.e. travel and waiting eliminated), allowing more effective scheduling of training (i.e. training scheduled more conveniently in relation to overall company or institution workload), and reducing or eliminating travel costs for both trainers and learners.

(Chu, 2002; Harasim, 1993; Pollard & Hillage, 2001; Rosenberg, 2000; White, Roberts & Brannan, 2003)

Although all of these benefits are important, it is perhaps the first and last points that are most significant. Strazzo and Wentling (2001) found that the implementation of e-learning in the private sector was driven by the need to provide immediate access to information while reducing travel time and cost and numbers of cancelled courses, needs that are echoed within educational and federal government institutions.

E-Learning Effectiveness and Satisfaction

“E-learning is taking root in organizations of all sizes – and, so far, the people responsible for its implementation are pleased with the results” (Kiser, 2001, p. 17)

Despite its increasing popularity and obvious benefits, the majority of the research that exists on e-learning consists of studies evaluating the effectiveness of academic e-learning courses or programs. Reports, including two highly-cited research syntheses, suggest that learners in academic e-learning courses learn as effectively as they do in the classroom (Institute for Higher Education Policy, 1999; Russell, 1999) and that attitudes and satisfaction regarding e-learning are generally positive (Institute for Higher Education Policy). The only evaluation conducted on academic educational efforts in wilderness management, a study of the University of Montana’s Wilderness Management Distance Education Program, supports these findings (Peel, 1999).

Private-sector and government institutions have extrapolated academia’s conclusions, and as such, e-learning job training has been adopted and evaluated, albeit less rigorously, by a variety of industries including aviation, healthcare, agriculture, manufacturing, information

technology, and the military (Horney et al., 2005; Jacoby, 2004; Lippert & Plank, 1999; Lippert, Plank & Radhakrishna, 2000; Mungania, 2004; Raisinghani et al., 2005; Roberts, 2004; Sawchuk, 2001; Wickersham & Dooley, 2001; White, Roberts & Brannan, 2003). Although much of the evidence as to effectiveness and satisfaction in e-learning job training courses is anecdotal, the conclusions are the same as those reported in the academic literature.

E-learning Attrition

“Drawing people to technology-based learning programs is but the first step; ensuring that they see the programs through to completion is perhaps an even greater challenge...” (Bassi & Lewis, 1999, p. 36)

Despite the fact that e-learning courses are both effective and satisfying for learners, attrition rates in e-learning courses are significantly higher, in some cases, two to three times higher than attrition rates in traditional classroom courses (Valasek, 2001). Attrition in distance education, in general, has received extensive attention within the research community (Garrison, 1987). Although Spady is often credited with the first descriptive attrition model (Brindley, 1988), many studies build on Tinto’s (1975) well-known predictive model that applies psychological suicide theory and economic-based cost-benefits decision analysis to student dropout within traditional higher education institutions. Tinto’s model predicts dropout based on changes in individual characteristics, such as goals, as a result of social and academic interactions and levels of integration within the educational environment. Subsequent studies have applied Tinto's model, and others, to full- and part-time distance education students (Brindley; Sweet, 1986). Still other studies have pursued multivariate approaches to isolate and measure the importance of various factors that contribute to dropout, including computer and Internet skills and confidence, study environment and time management skills, locus of control,

motivation, expectations, pre-requisite knowledge and class participation (Gibson & Graff, 1992; Muse, 2003; Valasek).

Although no broad-based quantitative studies have been conducted on attrition in professional development, "...accumulating anecdotal reports and consistent rumblings at industry gatherings..." (Zelinski, 2000, p. 66) suggest that dropout in e-learning job training courses also exceeds that in classroom-based training courses. Factors contributing to dropout in job training courses, however, are somewhat different from those identified in studies of academic institutions. Zelinski and Osberg (2002) suggest the following reasons for dropout from e-learning job training courses: Lack of incentives; isolation from fellow learners and the instructor; preference for classroom-style learning; poor course design; the need to learn only specific skills taught in a course, rather than the information presented in the entire course; inability to find specific needed information quickly; and preference for networking and other perks associated with off-site classroom-based trainings or conferences. Regardless, both academic and industry information suggests that attrition is both complex and multi-faceted.

Barriers in E-Learning

"An increasing number of companies are adopting e-learning. But in their rush to take advantage of e-learning's benefits and promises, companies are finding that there are significant barriers..." (Simmons, 2002, p. 19)

While overarching attrition theories have often tried to narrow the causes of attrition down to a few key predictive factors, research shows that persisting and non-persisting learners enrolled in both classroom and distance education courses experience the same obstacles hindering their learning (Brindley, 1988; Garland, 1993a). This is a key finding suggesting that commonalities exist between persisting and withdrawing students regarding the barriers they

experience. As such, increasing numbers of studies have begun to classify factors into more complex systems of barriers that hinder learning and characterize "...the complex interaction among the social, behavioral, and psychological factors surrounding the introduction of technology—the people factors—and the technology itself" (Bassi & Lewis, 1999, p. 4)

Although various researchers have classified barriers in different ways (see Mungania, 2004, Appendix M, p. 284, for a table of other classification systems) the framework for this study is attributed to a handful of authors who have contributed to the model of e-learning barriers shown in Figure 2. The five barriers are described in Table 1.

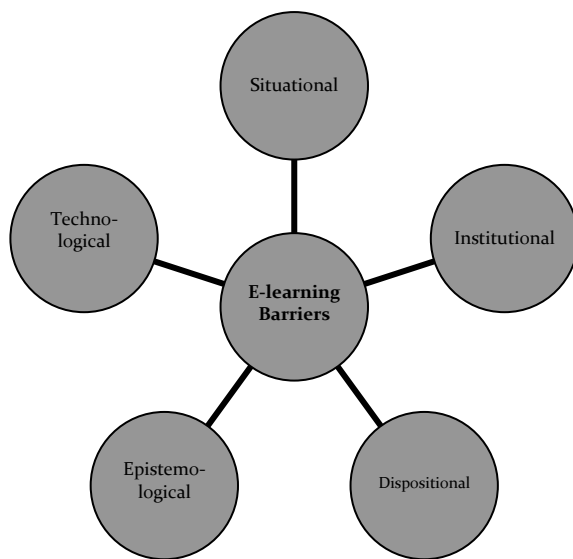


Figure 2. Graphical model of e-learning barriers.

Table 1

Barriers experienced by learners in e-learning courses

Barrier	Description
Situational	Barriers that stem from a learner's life situation, such as time constraints and study environment.
Institutional	Barriers learners experience related to the learning institution, such as registration procedures and requirements, cost and availability of support services.
Dispositional	Barriers related to a learner's personality or nature, such as attitudes, motivation, learning style, self-efficacy, and confidence.
Epistemological	Barriers associated with course content, structure and design, such as organization of learning materials, perceived difficulty, relevance and the role of prerequisite knowledge.
Technological	Barriers caused by computer-related problems, such as computer and Internet access and downtime, page load times, and resource availability.

In 1986, Rubenson suggested three classifications of barriers significant to distance education: situational, institutional and dispositional barriers. Garland (1992) updated this model to include epistemological barriers during her doctoral research on distance education natural resource science students at the University of British Columbia. Her qualitative study of the effects of these four barriers on persistence provided the foundation and motivation for her continued ethnographic research into the deeper reasons behind both persistence and dropout,

and for several later studies (Garland, 1993a; Garland, 1993b; Morgan & Tam, 1999; Mungania, 2003; Mungania, 2004; Schilke, 2001; Roberts, 2004). In 2001, Schilke further updated Garland's model to be specific to e-learning by adding technological barriers.

As described in the upcoming chapter, this framework was used to guide this research. This research did not include a true framework test, however. Broadly, the framework provided an inclusive, literature-grounded, way to think about, describe, and categorize barriers experienced by learners. Specifically, the qualitative interviews used in this study proceeded using guidance from the framework. The questions, informed by the framework, were designed both to bring out barriers students faced related to the framework's five barrier categories and to reveal barriers that fell outside the framework or were inconsistent with the framework.

Summary

Although the "big tent" view of e-learning provides a broad and inclusive definition, the definition of e-learning used in this study describes it as networked, formal or informal, learning delivered via a computer and standard Internet technology. The principles of andragogy are intertwined within e-learning, specifically the notion of self-directed learning that describes many self-paced, asynchronous courses. The delivery of both academic and job training courses via e-learning delivery methods has distinct advantages including convenience, accessibility, reliability, lack of risk, and efficiency, and research shows that learners in e-learning courses perform equally well when compared to their classroom counterparts and are generally satisfied with their educational experiences. As such, educational, commercial, and government institutions are adopting e-learning at astounding rates. Attrition in e-learning, however, is extremely high and, thus, is receiving increased attention. While research on factors causing

attrition has produced some predictive measures, researchers are increasingly aware that the causes of attrition are complex and multi-faceted and that defining barriers more holistically can provide a better understanding of learner experiences. Additionally, since learners who dropout and persist often experience the same types of barriers, attrition frameworks describing barriers to persistence may also be applicable to persisting students. One attrition framework, the one used in this study, characterizes e-learning barriers as being situational, institutional, dispositional, epistemological, or technological in nature.

Methodology

Introduction

This study's research questions were as follows: 1) What are the barriers to successful e-learning experiences in a wilderness management course? 2) How applicable is the five-pronged attrition framework in describing these barriers? To answer these questions, a qualitative study was conducted with students who completed the Carhart Center's Wilderness Stewardship Planning Framework self-paced e-learning course. This study was conducted according to the project timeline in Appendix B. Semi-structured interviews were conducted in which participants were asked to recount their experiences in the course. What follows is a detailed description of the study methodology including information about the Carhart Center, the Wilderness Stewardship Planning Framework, its registrants, the interviewees and sample, the interview process, and the interview instrument.

Arthur Carhart National Wilderness Training Center

The Carhart Center was established in 1993 and remains the federal government's only wilderness education and training body. The Carhart Center was named in commemoration of Arthur Carhart, a pivotal figure in the wilderness preservation movement. Until 1999 the Carhart Center was located at the Ninemile Ranger Station and Remount Depot, outside Missoula, Montana, and consisted of one and a half Forest Service employees. Today, it is housed on the University of Montana campus and has grown to include a full-time interagency staff of seven with representatives from the four wilderness management agencies: Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), Forest Service (FS), and National Park Service (NPS).

The Carhart Center's mission is "...to preserve the values and benefits of wilderness for present and future generations by connecting agency employees and the public with their wilderness heritage through training, information, and education" (Arthur Carhart National Wilderness Training Center, 2007). Although its primary purpose is to conduct training courses for federal government employees with both direct and indirect wilderness-related responsibilities, the Carhart Center also funds various educational initiatives and disseminates wilderness information through <http://www.wilderness.net>.

Since 1994, the Carhart Center has trained over 4,000 wilderness professionals, with 1,025 trained in 2006 (C. G. Myers, Director, Arthur Carhart National Wilderness Training Center, personal communication, March 12, 2007). The BLM, FWS, FS and NPS accounted for seventeen, six, thirty-six and thirty-seven percent of those trained, respectively. During fiscal year 2007, the Carhart Center conducted 29 classroom courses, including one National Wilderness Stewardship Training course, four Regional Wilderness Stewardship Training

courses, three Wilderness Fire Resource Advisor courses, 15 Unit Wilderness Workshops and six Interim Management Policy courses (specific to BLM employees managing wilderness study areas). The Carhart Center currently requires attendees of its national and regional stewardship training courses to complete one self-paced, Web-based course, the Wilderness Act and Minimum Requirements Decisions. In 2008, the Carhart Center released its first two comprehensive stand-alone e-learning courses (those not required as pre-work for classroom trainings), the Wilderness Stewardship Planning Framework course (spring 2008) and the Visitor Use Management course (fall 2008).

Wilderness Stewardship Planning Framework

This study was conducted to understand barriers experienced by employees enrolled in the Carhart Center's Wilderness Stewardship Planning Framework online job-training course that began in 2008. This course was developed in cooperation with Virginia Tech, with content being provided by the Carhart Center's four wilderness management agency representatives and instructional design and development being performed by IDDL. The course was delivered on the Internet through Virginia Tech's BlackBoard website and access was available from January 21 to June 30, 2008. The course was advertised, both at course launch and again in early April, by the Carhart Center agency representatives, who distributed a one-page flyer through various agency e-mail channels. Registration was free for all federal government employees and was open from January 21 until two weeks before the course end date. Students registered online by completing a short form that asked for biographical information (name, e-mail address, physical address, and phone number) and employment information (agency, title, position, appointment type, supervisor's name and supervisor's e-mail). Registration information was processed

manually by IDDL and each student was e-mailed their login information, usually within 1-2 business days of filling out the registration form.

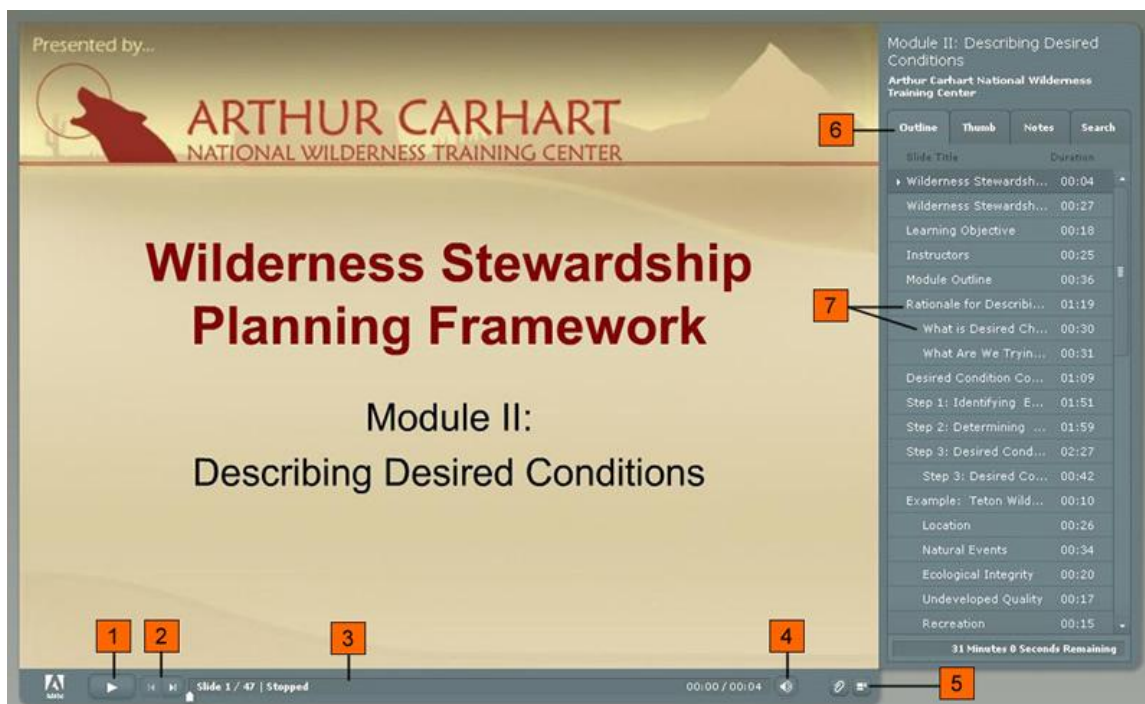
When students logged into the course they were first shown a welcome message and course announcements. A left-hand navigation menu allowed students to view a map of the course, study guide, course materials (termed Module Materials), and their grades. The course map was essentially an outline of the course, showing the modules, practice tests and final exam. The study guide contained study tips, information on the available course material formats and computer system requirements. The course materials were divided, or chunked into, short segments, a common and recommended epistemological practice. Chunking yielded eight modules on the following topics, preceded by a short course introduction:

1. Building a Foundation for Success
2. Describing Desired Conditions
3. Gathering Information
4. Identifying and Selecting Indicators
5. Specifying Standards
6. Zoning Wilderness
7. Developing and Selecting Management Action Alternatives
8. Implementing the Wilderness Stewardship Planning Framework

The introduction provided the course objectives and course structure, gave an outline of the modules, and recommended that students set goals of completing at least one module per week, thereby ensuring completion of the entire course in approximately eight-nine weeks.

The modules listed above were self-paced and delivered asynchronously, allowing students to access them anytime following registration until the original course end date of May 13. This original end date was extended twice, first to May 30, then again to June 30, to accommodate several students whose registration information had been lost by IDDL. Each module was offered in two formats, PDF and a 30-60 minute lecture-style, Flash-based, streamed

presentation, closely resembling a PowerPoint presentation that included audio and visual information. In this presentation format, visual information including text, bulleted lists, and pictures, was synchronized with audio from three different speakers—a narrator, and two instructors: experienced agency managers Jim Hammett (Superintendent, John Day Fossil Beds National Monument) and Linda Merigliano (Wilderness Program Manager, Bridger-Teton National Forest). The presentation format included various controls through which students could customize viewing. A screen snap of the presentation format is shown below in Figure 3, an excerpt from the course study guide.



1. The **play/pause button** used to stop and resume the presentation.
2. The **next and previous slide buttons** used to navigate quickly between adjacent slides.
3. This is the **slide progress bar** and it informs you how far you are through the current slide, whether it is stopped or playing, and the slide's total time. The slider can also be used to move forward and backward through the slide quickly.
4. The **volume control button** allows you to select the desired volume for the presentation.

5. This button collapses the presentation navigation area to the right and also the progress bar on the bottom to allow a full screen presentation.

6. Navigation Tabs

Outline - The outline tab list all the slides within the presentation and allows quick navigation to the desired slide.

Thumb - The thumb tab also lists all the slides but it includes a small image preview of what the slide looks like. This may help locating a slide that you visually can remember but may not remember the title.

Notes - The notes tab simply shows all the text that the slide contains.

Search - The search tab allows you to search for specific keyword(s) throughout the presentation and then lists the slides that contain the keyword(s).

7. Take note of the slight indentations under the outline tab. When slide titles are indented slightly under others that means they are part of the same topic and contain information about a common subject.

Figure 3. Screen snap of presentation format and key.

The presentation format was also available for download and viewing locally (offline) in the form of a zip file, to accommodate students with slower or intermittent Internet connections. Unfortunately, during the first month that the course was available, it was discovered that some Forest Service students were unable to access the narrated format due to an unknown network permission issue. Although this was ultimately corrected, some of the initial registrants completed part or all of the course materials using the PDF format due to this technical difficulty. As such, access to the narrated format, and thus the choice of using it, was used as a criteria for eliminating interviewees from the sample, described later. The course modules, regardless of delivery format, were designed according to a standard template. Each module began with the introduction of the learning objectives, module outline, and the instructor or instructors, since both Jim and Linda did not appear in all modules. Each module concluded with key points from the instructor(s), a short review by the narrator and an optional exercise, termed a “work product,” that asked students to apply what they had learned locally within their workplace. The work product exercise at the end of Module II, for example, asked each student to complete the following steps: 1) Draft a desired condition statement for your wilderness 2)

Analyze your wilderness and verify your decision to zone or not. After each module, students could complete an optional 5-10 question practice test consisting of true/false, fill-in-the-blank, multiple-choice and multiple-answer questions. Students could take the practice tests as many times as necessary. After completing the eight modules, students were required to take a 40-question final exam. The 40 questions in the final exam were randomly chosen from a pool of the practice test questions, and a downloadable exam study guide containing all possible questions was available. The final exam was not timed, however, students could only complete the final exam once. Those who completed the final exam with a passing grade of eighty percent or greater received an electronic certificate and credit in their Human Resources profile in either DOILearn, the Department of Interior's learning management system, or AgLearn.

Information about the interviews conducted for this study, in the form of the brief statement below, was posted following information about the final exam.

The Arthur Carhart National Wilderness Training Center needs your help in making this course better! The Carhart Center wants to more fully understand your experiences while taking this e-learning course by conducting a 1-hour exit interview with you. Following completion of the final exam, Lisa Eidson, the Carhart Center's e-learning specialist, will contact you to schedule an interview at your convenience. Thank you for participating in our efforts to make this course more enjoyable and fulfilling for future wilderness management professionals!

Registrants, Interviewees, Sample

Although distinct differences in agency culture and policy related to wilderness management exist, the Wilderness Act unifies management across the federal agencies. As such, wilderness professionals from different agencies have similar roles and registrants across agencies were fairly homogenous. Additionally, although registration was first-come-first-serve, differences between early and later registrants were minimal. Since the winter months represent

the best time in which to offer training opportunities to the wilderness management workforce, registration for the Wilderness Planning Stewardship Framework capitalized on this time of year when the workforce spends most of its time in the office (as opposed to working out in the field from May to October, yearly) and can dedicate the most time to training.

Overall, 83 students registered for the Wilderness Stewardship Planning Framework: 18 students registered in January; 11 in February; 17 in March; 15 in April; 17 in May and four in June. Three student's registration information was lost, although only one of these students was part of the sample. This meant that biographical information including position title, address, phone number, email etc. was not recorded after the student filled out the online registration form. Overall, three students were Bureau of Land Management employees; two were Fish and Wildlife Service employees; 40 were Forest Service employees; and 38 were National Park Service employees. Typically, more Forest Service and National Park Service employees attend the Carhart Center's classroom courses, so the fact that few employees from the other two agencies registered was not unexpected. Of these 83 students who registered, only 43 (52%) completed the course. Another nine students completed only part of the course: Four students completed one module each; two students completed two modules each; and three students completed three, four and six modules each.

Since research suggests that persisting and non-persisting learners enrolled in both classroom and distance education courses experience the same obstacles hindering their learning (Brindley, 1988; Garland, 1993a), the focus of this study was on those students who completed the course rather than those who didn't. This was also a practical convention to ensure that any barriers related to epistemology could be revealed (i.e. if a student didn't complete any of the course requirements, it stands to reason that this student cannot identify barriers related to the

course itself). Thus, of the 43 who completed the course, the first 35 to finish were interviewed according to the interview process and using the interview instrument described in the next sections. Although registration was first-come-first-serve, those who registered first didn't necessarily finish first (or at all, for that matter). As such, selection by finish date was an appropriate and practical method of selecting interviewees and ensuring an adequate sample size. Five of the total 35 interviews were discarded due to: recording error (1), inability of the student to initially access the narrated course materials (4). This yielded a study sample of 30 students, seventy percent of the total number who completed the course. This sample provided a nationwide cross-section of the wilderness management workforce that represented different wilderness management agencies, different geographical regions, and varying levels of wilderness management responsibility and involvement. The sample also included two students who, although they completed all the course materials, failed. Failure was not determined to be a factor affecting experience since the students completed the same requirements as those who passed; they simply scored a grade lower than 80% on the final exam.

Interview Process

Kvale (1983) describes interviewing as a method that is centered on the interviewee's life-world, seeks to understand meanings in this life-world, and is focused on central systematic problems yet open for ambiguities and change. In essence, interviewing is an effective process for understanding the circumstances driving or resulting in a particular phenomenon; interviewing reveals the story behind the facts. As such, semi-structured interviews were the qualitative method used to collect information on barriers to successful e-learning experiences and assess the applicability of the five-pronged attrition framework, described earlier.

According to the timeline in Appendix B, pre-testing of the interview guide occurred prior to the start of the course in order to refine the interview guide, found in Appendix C. More information about the development of the questions in the interview guide and their relation to the five-pronged attrition framework is given in the next section. Pre-testing interviews were conducted in the fall of 2007 with three students who had completed the Carhart Center's online pre-work short courses the previous spring. Two of the pre-testing interviews were conducted in person and one was conducted over the phone. In addition to refining the interview guide and the recording process, these pre-testing interviews revealed how quickly students forgot details about their e-learning experiences. As such, students in this study were interviewed as quickly as possible once they had completed the final exam.

All interviews were conducted according to Kvale's (1996) guidelines by a single interviewer, the author. The author monitored student progress through the course and contacted each student to schedule the interview. Since none of those interviewed resided locally, all interviews were conducted via telephone, most within days of final exam completion. Interviews were not mandatory, however, no student declined to be interviewed. Each interview, most lasting approximately 60 minutes, began with the author reading the consent statement in Appendix D, then asking the questions from the interview guide in Appendix C. Once a student gave consent to the interview, the call was recorded using a digital recording device. The recordings were converted to mp3 format and professionally transcribed. The author proofed all of the transcriptions prior to analysis.

Interview Instrument

The interview guide in Appendix C was developed using guidance from the five-pronged attrition framework authors, Rubenson (1986), Garland (1992), and Schilke (2001), and two subsequent quantitative studies from Mungania (2004) and Roberts (2004) based on their work. The questions were designed both to elicit challenges students faced related to the five barrier categories identified in the five-pronged attrition framework and to reveal barriers that fell outside the framework or were inconsistent with the framework. As such, interviews generally began with broad, open questions like the following: Can you tell me about your experience in this course? What was challenging or difficult about the course? These types of initial questions allowed interviewees to speak freely and describe problems they experienced in their own terms, independent of the five-pronged framework and without suggestions from the interviewer.

To evaluate whether students experienced the barriers identified in the five-pronged attrition framework, interviews generally continued with specific questions about each type of barrier. For example, from Table 1, situational barriers were defined as barriers that stem from a learner's life situation, such as time constraints and study environment. Interviewees were asked the following questions to reveal possible situational barriers: Did you take the course at work or at home? Did you complete the course materials on company time? How did you orchestrate this arrangement with your supervisor? How supportive is your supervisor of job training? How easy was it to learn at work/home? What aspects of your work/home environment made learning easy? What aspects of your work/home environment hindered your learning? What types of distractions or interruptions that made it difficult to learn? What did you do to minimize or alleviate these distractions? How did you prioritize the online course relative to your regular job

duties/responsibilities at home? How does learning rank compared to your other job

duties/responsibilities at home? Did you try to do other tasks, such as e-mail, at the same time?

As another example, again from Table 1, dispositional barriers were defined as barriers related to a learner's personality or nature, such as attitudes, motivation, learning style, self-efficacy, and confidence. Interviewees were asked the following questions to reveal possible dispositional barriers: What motivated you to take this course? What were your expectations prior to taking the course? How did previous online trainings you've taken influence your expectations? What other things do you think influenced your expectations? How comfortable are you, in general, using computers and Internet? Do you prefer learning alone or with a group? Why? Did you prefer viewing the presentation-style format with audio or the printable PDF? Why? How did you pace your work for the course? If course records showed a large amount of time between registration and final exam completion, this last question was often followed with probes to understand the student's learning sequence and often revealed information about procrastination and cramming.

Interviews were semi-structure, meaning that the interviewer did not necessarily ask all questions in the interview guide in sequence, and sequence was, in fact, often determined by the interviewee according to what information the interviewee mentioned first or alluded to being most important. The interviewer also used a variety of probes to clarify interviewee statements or to get an interviewee to reveal more detail about a particular problem. While the interview guide did not prescribe question sequence, all topics were covered during every interview, allowing comparison across interviews. Additionally, interviews were informal, meaning that the interviewer welcomed questions from the interviewee at any time during the interview process and expressed the desire for the entire interaction to be conversational and comfortable. The

semi-structured nature of the interview itself and a relaxed, informal environment provided interviewees with opportunities to describe emergent phenomena, revealing things outside of the scope of the interview questions.

Data Analysis

Although many methods of analysis exist, meaning categorization was the organizing system used. Meaning categorization is the aggregation of meanings expressed by interviewees into categories and subcategories (Kvale, 1996). Patterson and Williams (unpub.) further define this type of analysis as the grouping of meaning units under multiple, inter-related, thematic labels. Such grouping allows for interpretation of the meaning of these units and the drawing of greater and broader conclusions that take into account relationships between meanings. The steps in meaning categorization that were performed during the study are described below:

1. After transcription and proofing, each interview was read (and re-read, if necessary) and meaning units identified through recognition and aggregation of significant thoughts articulated by the interviewees. This process is often called coding. QRS Nvivo, software designed to attach codes to specific passages within an interview, was used to organize the data.
2. From these codes, thematic labels (and sub-labels) were developed to understand the broader relationships and patterns that existed between meaning units. Detailed descriptions of codes and thematic labels were articulated, in the form of memos, including relationships between thematic labels.
3. To better understand and describe the relationships between codes and systemic problems, a visual diagram was created and repeatedly refined.
4. External and committee review of codes and thematic structures was sought to ensure that the initial conclusions reached were logical, insightful, and merited by the data. Early in the coding process, external review was performed by two University of Montana graduate students and one representative from the Carhart Center. The two students were selected through recommendations from the committee and each provided different insights into how best to approach the coding process. The Carhart Center representative was selected to ensure that relevant and important insights were identified from an agency perspective. Each person was asked to code one interview and provide additional interpretation about relationships between codes. Internally, the committee chairman and departmental committee representative were engaged separately in the same process.

5. Later, after the data was entirely coded, thematic structures were developed, and the first chapter of the thesis discussion section existed in draft form, the entire committee met collectively to discuss interpretations drawn from the data and to ensure that these interpretations were supported by the data.
6. Throughout this process, conclusions, as they related to the research questions, were drawn, redrawn and revised.

Reliability and Validity of Interview Research

Kvale (1996) identifies reliability and validity as two in a list of the ten most common negative reactions to qualitative research interviewing. Although both concepts can and should be addressed in all aspects of research, from concept to implementation and analysis, critics mainly question the reliability of qualitative research interviewing because they suggest that results are the product of leading questions. Kvale argues, however, that leading questions can and do produce credible information and, when properly used, test the reliability of an interviewee's answers. He proposes an alternative view of interview research in which "...the interview is a conversation in which the data arise in an interpersonal relationship, coauthored and coproduced by interviewer and interviewee. The decision issue is then not whether to lead or not to lead, but where the interview questions should lead and whether they will lead in important directions, producing new, trustworthy, and interesting information" (Kvale, p. 159).

Critics also suggest that research interviews are not valid because they depend on subjective impressions (Kvale, 1996). While narrow definitions of validity may consider qualitative research to be invalid because it often doesn't result in numbers, in a broader concept, "...validity pertains to the degree that a method investigates what it is intended to investigate" (Kvale, p. 238) or "...the extent to which our observations indeed reflect the phenomena or variables of interest to us" (Pervin, 1984, p. 48, as cited in Kvale). Within this broader definition, Kvale argues that "truth is constituted through dialogue" (p. 239) and that valid or

accurate knowledge, then, often takes the form of conflicting interpretations. It is under this broader definition that this study assumed that qualitative interview research is both valid and reliable, and ultimately the most valuable and appropriate technique to describe the phenomena the study aimed to capture.

Results

Introduction

The results will be described in two different ways. In this short chapter, characterization and quantification of the sample, to the extent possible, will occur. Since a variety of biographical and employment information was collected during registration, and since many of the interview questions solicited short, or one-word, answers, quantification of selected aspects of the sample was possible. In the discussion and analysis chapter that follows, the qualitative aspects of the study and resulting systemic problems--the illusion of convenience, absence of deeper learning, and lack of an organizational culture of learning--will be described and discussed in detail. Although many of the facts presented in this chapter support or underlie one or more of the systemic problems, their significance will not be discussed here but will be discussed in context in the next chapter.

Throughout the rest of this chapter and the next, the words student and employee are used to refer to the people that participated in this study, rather than more impersonal and non-descriptive terms such as respondent, interviewee, participant, or subject. Additionally, all students who were interviewed received a number, representing the order in which they were interviewed. All quotes, found mainly in the next chapter, are followed by the student's number, "(Student 2)" for example. As described in the previous section, 35 interviews were conducted,

but five were discarded due to: recording error (1), inability of the student to initially access the narrated course materials (4). Students 1, 3, 6, 8, and 11 were discarded, so no quotes from these students will appear in this thesis. This yielded a sample of 30 students.

Sample Characterization and Quantification

This study's sample consisted of 30 students, seventy-percent of the total number who completed the Wilderness Stewardship Planning Framework. The sample consisted of 30 of the first 35 students who completed the course, and included two students who failed. As previously described, research suggests that persisting and withdrawing students experience the same barriers to learning (Brindley, 1988; Garland, 1993a). As such, the sample consisted strictly of students who completed the course. This practical convention also ensured description of epistemological barriers, which would not have been experienced by almost eighty percent of withdrawing students who completed no amount of coursework. This sample provided a cross-section of the wilderness management workforce and represented: two of the four wilderness management agencies; 19 of 50 states; both sexes; managers and subordinates; low- and high-ranking employees (ex. seasonal employee vs. park superintendent) with varying levels of authority and autonomy; recently-hired and long-term employees; and a plethora of positions with varying levels of wilderness management responsibility and involvement. What follows is a summary of some of the aggregated raw data presented in Appendix E.

Sixty percent of the sample was male. Fifty-six percent worked for the Forest Service, while the remaining forty-four percent worked for the National Park Service. While three Bureau of Land Management and two Fish and Wildlife Service employees registered for the course, none of these students finished. Students were distributed across 19 states with two

distinct cohorts occurring, six students working in Arizona, and five working in New Hampshire. As will be discussed later in the next chapter, some members of the New Hampshire cohort knew each other and worked in the same office, however the six students working in Arizona did not share this attribute. Most students (70%) were permanent employees. However, although titles and positions varied greatly, encompassing scientists, front desk workers, field-going personnel, and wilderness managers, only three students worked in jobs with no wilderness-related responsibility. Fifty-three percent had wilderness as a primary job responsibility, and thirty-six percent had it as a secondary responsibility. Not surprisingly, then, the most common motivation for enrollment was job-related (60%). Twenty and thirty percent enrolled for personal/continuing education and career advancement reasons, respectively. Only twenty-six percent could be considered truly long-term employees, having worked for their agency for more than 10 years. The remaining majority had worked for their agency for 10 or fewer years.

Prior learning experiences were quantified in several different ways. Forty percent had attended a prior Carhart Center classroom course. Although all 30 students had prior online experience in the agencies required AgLearn or DOI Learn courses, far fewer had experience with other types of e-learning. Forty-three percent had experience in professional development, technical development, or university online courses, with the vast majority having had experience with university online courses only. Almost half of the students characterized their prior e-learning experiences as being generally negative. Additionally, in several cases in which students had multiple and different prior experiences, they distinguished between prior experience related to the required agency courses (negative) and prior experience related to other types of courses (positive).

Information on pacing—how and when students completed the course materials—was collected. Two-thirds of the sample completed the course materials in a crammed, rather than extended fashion. Cramming was defined as completion of multiple modules per day and completion of the entire course in one to four days. Those who completed the course in an extended fashion tended to complete one module at a time and spaced the coursework out over several weeks to several months. Only two students started the course materials within days of registering, with most waiting one to three weeks (46%) or longer (43%) to begin.

The majority of the sample, 26 students (85%), did not complete any of the optional work product exercises; one student didn't but intended to do so in the future; completion was unknown for two students. In essence, only one student admitted to completing the exercises.

Several important pieces of information regarding study environment were collected. Sixty percent of the sample completed the coursework at the office; twenty-three percent completed the coursework at home; seventeen percent completed part of the coursework in both locations. Regardless of where students completed the coursework, the majority (63%) used work hours to complete the coursework. One student used comp time. Four students (13%) completed the coursework completely on personal time. The remaining six students (20%) completed part of coursework on company time and part on personal time. When asked whether their work environment was distracting to study in, seventy percent of the sample responded affirmatively. Three students indicated that their work environment was somewhat distracting, while six students indicated that their work environment was not at all distracting.

Students were asked several questions relating to learning style preferences and self-efficacy. Over half of the sample, 18 students (60%), preferred viewing the course materials using the narrated PowerPoint-style presentation format. Sixteen of these students viewed the

streaming version of the presentation, while only two students acknowledged downloading the presentation for local viewing. The remaining 12 students (40%) preferred viewing the course materials in PDF format. Seven of these 12 students viewed the PDF digitally (i.e. they read the PDF on their computer); four students printed the PDF and read the hard copy; one student did not specify. Eighteen students (60%) also indicated that, if given the choice, they preferred learning in a group setting, rather than alone; eight students preferred learning alone; four students were undecided, indicating that their preference for group versus solitary learning depended on the topic. Finally, 23 students (76%) felt comfortable using computers and Internet, while seven students were uncomfortable using computers and Internet.

Discussion and Analysis

Introduction

The research questions guiding this study were 1) What are the barriers to successful e-learning experiences in a wilderness management course? 2) How applicable is the five-pronged attrition framework in describing these barriers? The barriers to successful e-learning experiences identified in this study generally fell under four categories—work environment, personality traits and preferences, course structure/design, and technology—and three systemic problems—illusion of convenience, absence of deeper learning, and lack of an organizational culture of learning. This organizational system of viewing barriers to successful e-learning experiences as both barrier categories and systemic problems is illustrated in the following diagram.

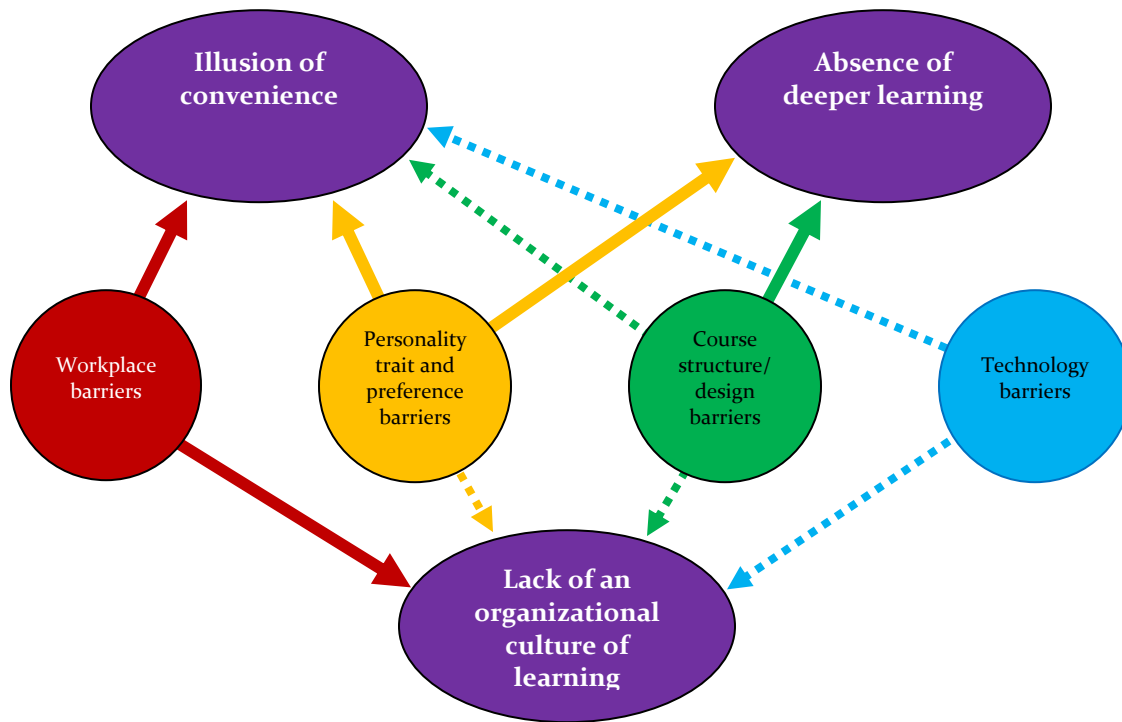


Figure 4. Diagram of relationships between categories and systemic problem. Systemic problems are purple, barrier categories are red, orange, green and blue. Arrows represent how each barrier category contributes to each problem (solid arrows represent strong contributions; dashed arrows represent weak contributions).

It's important to note in Figure 4 that while all individual barriers fit under one of the four categories, not all categories, or all barriers in a category, support all systemic problems.

Additionally important is that the influence of all categories, and thus individual barriers, is not uniform. Based on which barriers contribute to form each systemic problem, the diagram above therefore shows how strongly each of the four categories contributes to the systemic problems.

Figure 4 was derived in the following way. According to the data analysis chapter, interview data was coded. Relationships between individual codes were determined and like codes were grouped together to form the categories shown in the figure. Interactions between barriers, however, were discovered (as articulated or alluded to by students) and the systemic problems were developed and revised multiple times as more and different relationships between

barriers were revealed. Continued work with the data exposed how barriers within multiple categories contributed to the systemic problems—some strongly, others weakly—and that contributions to the problems were not necessarily additive, but were often synergistic. It is in this way that the barriers in this study will be described and analyzed in the remainder of this chapter.

The terminology used to reference different areas within this thesis includes chapter, section, and subsection. Four sections within this chapter describe in detail the barriers aggregated under each category. Within each section, each individual barrier is discussed in its own subsection. As part of the analysis, the contributions each individual barrier makes to one or more systemic problem is discussed. Additionally, each section concludes with a summary of how the barriers in the category support the systemic problems. The final section within this chapter is devoted to further analysis of the synergistic nature of barriers by presenting all barriers contributing to each systemic problem collectively and analyzing significance and degree of contribution in relation to relevant supporting literature. Before proceeding to describe the barriers in each category, however, sections describing what a successful e-learning experience entails and how consistently this study's findings mirror the framework used are presented to frame the subsequent analysis.

Successful E-Learning Experience Defined

Although the literature indicates that attitudes and satisfaction regarding e-learning are generally positive in academia, the private-sector and government (Horney et al., 2005; Institute for Higher Education Policy, 1999; Jacoby, 2004; Lippert & Plank, 1999; Lippert, Plank & Radhakrishna, 2000; Mungania, 2004; Peel, 1999; Raisinghani et al., 2005; Roberts, 2004;

Sawchuk, 2001; Wickersham & Dooley, 2001; White, Roberts & Brannan, 2003), this is likely the result of the implementation of e-learning best practices. Not surprisingly, e-learning best practices marry andragogy with effective website development. As such, attributes of a successful e-learning course generally include: ensuring that learning materials match learning objectives and are consistent with evaluation; organizing, prioritizing, and chunking information appropriately and providing logical flow between related concepts; providing materials in multiple formats to accommodate different learning styles and preferences; choosing consistent, straightforward navigation; incorporating interactivity where feasible and appropriate; and maximizing accessibility by minimizing technical problems (Horton, 2000).

This study proposed that the sample would define what entailed a successful e-learning experience. Students described an effective e-learning experience as having the following characteristics:

“I think regardless of what the format of a training or a course is, I think the signs of effectiveness are going to be the same, and that’s if the learning objectives are met.” (student 2)

“follow-up tests match the information you’ve been given” (student 5)

“well-thought-out course material” (student 14)

“organized...easy to follow” (student 12)

“being very conscious of the specific blocks of time” (student 10)

“something that can be pretty dynamic and hold your attention” (student 15)

“interactive” (student 35)

“trying to tag every learning style that’s out there” (student 16)

“presenting the material in a variety of ways” (student 18)

“user-friendly” (student 13)

“...the basic technical aspects of delivery of such a course in an online setting have to be very smooth and functional. If you can’t get past that, I don’t care how

high quality the material and the information is, you can't absorb it as quickly or as well." (student 27)

Clearly this study's students echoed many of the best practices listed above, and as such, an effective e-learning experience as defined by this study is consistent with the literature.

Comparison To The Five-Pronged Attrition Framework

This study's second research question looked at how applicable the five-pronged attrition framework was in describing barriers to effective e-learning job training, although assessment did not include a true framework test. As described in the literature review, the framework used is the result of contributions by three authors, Rubenson, Garland and Schilke, and categorizes barriers as situational, institutional, dispositional, epistemological, or technical in nature. In 1986, Rubenson suggested that barriers to distance education included situational, institutional and dispositional components. Garland's 1992 doctoral dissertation and subsequent 1993 paper added epistemology as a relevant barrier category. Finally, in 2001 Schilke adapted and updated Rubenson and Garland's work to e-learning by adding the technology barriers category. Therefore, to compare this study to these previous works, which collectively make up the five-pronged attrition framework, a breakdown of barriers taken from Schilke (p. 52) was used.

Overall, four of the five categories from Schilke's study align with those in this study: situational barriers and workplace barriers; dispositional barriers and personality trait and preference barriers; epistemological barriers and course structure/design barriers; technological barriers and technology barriers. Inconsistencies between this study and Schilke's study exist mainly in the ways in which individual barriers were aggregated under different categories (for a detailed analysis of these discrepancies, see Appendix F). In some cases, academically relevant barriers were absent from this study. In others, barriers relevant to job training were absent from

Schilke's study. Institutional barriers were not present in this study categorically, but emerged within the systemic problems. This is an important difference to note since this study's findings indicate that categorization alone oversimplifies the true nature of employees' struggles to learn on the job. By examining the relationships between barriers that produced the emergence of the systemic problems, this study provides a clearer and more detailed picture of student experience not found in previous studies.

Work Environment Barriers to E-Learning

Introduction

Work environment barriers are those related to the workplace, both the physical setting in which students conducted work-related activities and to other less tangible aspects of the workplace and work life. These barriers included competing priorities, feelings of guilt for using work time to learn, study environment distractions, and hindsight desire for coordinated learning with other staff.

Since working professionals must conduct learning alongside or interspersed with other job requirements, competing priorities—learning vs. work, office work vs. field work, required training vs. optional training etc.—can highly influence when learning occurs, especially for students who struggle to find or make time to learn. Some students expressed guilt for using work time, or what they considered to be excessive amounts of work time, to learn regardless of relevance. Students with too much to do in too little time resorted to learning on personal time or at home or made choices between tasks as coping strategies to be able to learn. Learning is also highly impacted by workplace distractions—personal interruptions, phone calls, emails etc. These also prompted students to vary the timing or location of learning to minimize distractions.

Although self-paced learning is an individual activity, several students also expressed the desire to coordinate learning with others in their offices.

What follows is a discussion of each of the barriers that collectively make up the larger category of work environment barriers followed by a summary that describes how these barriers contribute to two of the three systemic problems—the illusion of convenience and lack of an organizational culture of learning.

Competing Priorities

In today's world of shrinking natural resource budgets it's not surprising that wilderness management professionals often shoulder many and varied responsibilities. As one student said, "...I just have more work than I can handle" (student 34). As such, competing priorities emerged as one of the sample's most important and prevalent barriers and often led to difficulty or inability to fit learning into the workday. In comparison to classroom learning, e-learning in the workplace was never described as a high priority. "...Learning in the workplace," one student said, "it's a very different situation than being a student in a classroom, that [learning] isn't the main priority" (student 9). This student's remark concerning the lack of importance of learning, in general, in the workplace suggests that students perceive that their organizational culture does not value or support learning. The remark also alludes to differences between classroom and e-learning related to a lack sequestration—removal from the work environment entirely—a weakness of the online format also discussed in the subsequent section on course design/structure barriers. Students who attend classroom job training courses are removed from the workplace and its associated priority conflicts, which in turn makes learning the priority task. This is better explained by the following student, who suggested that the lack of sequestration

associated with e-learning was a factor contributing to the existence of competing priorities.

“...When you sign up for classroom courses, you kind of are free from your other [work-related] responsibilities, and you kind of get away and go do it in a classroom” (student 34).

Although not a high priority, some students did acknowledge training as essential or important, but not pressing in nature, thereby making it a middle priority, following other job-related responsibilities like “health and safety” (students 5, 33), “law enforcement” (student 5), and “mandates from the regional office” (student 5). Student 5 said, “Prioritywise...it was something I definitely needed to get done, but it wasn’t the most urgent alligator that was about to bite me...”

Several students described situations in which they intended to engage in learning, but were sidetracked by “the problem of the day” (student 30) and resulting priority shifts or fluidity. “...So it’s almost like triage,” one student said, “You come in the office expecting to get stuff done and it just doesn’t happen. Other things pop up” (student 10). Student 21 said:

“More important things came up that were more spur of the moment things that kind of needed to get done or problems developed...that I needed to take care of and you just kind of keep pushing some things back and back until you realize [learning is] now a priority instead of one of the kind of the extra things.” (student 21)

This student described priority conflict-related procrastination (discussed in more detail in the next section) in which higher priority tasks constantly usurped learning until the deadline approached, triggering an upward shift in priority in order to displace other higher priority tasks. For some students, priority triggers may be necessary for the learning process to commence, since without them, no compelling reason exists to make learning a priority over other work tasks.

Overall, however, these remarks describe how learning took a consistent planned or spontaneous backseat to other responsibilities, creating perceptions of an organizational culture

that devalues learning. Students with little autonomy may have little choice over when they can engage in learning. Since one of the most heavily touted benefits of e-learning is convenience, or complete learner control over the timing, duration, and pace of learning, the removal or absence of choice can make convenience illusory. In essence, students who feel they have little control over when they can learn may not be able to take advantage of this key benefit.

Some employees had responsibilities that included high levels of visitor contact, such as student 22, who worked at the front desk in a backcountry office issuing permits and educating visitors, and said that “[online learning] kind of became a priority at work whenever the public wasn’t around...” It’s clear that these students are also not in control of when learning can occur, but additionally that their work culture mandates serving visitors first and foremost, regardless of the fact that learning certainly improves the quality of those visitor contacts. Other students described e-learning as being almost optional, or a “privilege” (student 29), in that it came very low on or at the end of the priority list. Student 4 described it this way:

“... my supervisor said, ‘Yes, you can use work time.’ But I was pretty sure without asking for any clarification that I could use work time as long as I didn’t have anything else that he expected me to do. So it was like this, ‘You can do this, you’re not gonna get criticized if you get caught doing this on the job. But all the things I have for you to do or all the things you know you better be doing have to come first.’” (student 4)

Interestingly, this remark contains mixed institutional messages about learning: that management sanctions learning, yet sanctioning, or allowing, learning is very different from recommending, supporting, or fostering learning. Essentially, the result is that employees infer that doing the job is more important than learning how to do the job better. It is important to note, however, that students often did not ask for clarification or support for their learning from managers or coworkers, suggesting that the employer does not bear all of the responsibility for facilitating employee learning.

In weighing learning against other job duties, students used phrases like "fit it in" (students 2, 5, 14, 21, 28, 32), "work it around my obligations" (student 4), or "shoe horn it in" (student 7) to describe how they found time to learn. These phrases, especially the latter two, suggest that the time identification process was challenging. In order to fit learning into the work day, students searched for a hole in a predefined schedule of required duties that they termed "a lull" (student 7), "spare time" (students 2, 12), "free time" (students 7, 12, 21), "discretionary time" (student 2), or "down time" (student 9). One student described it this way: "I'd say oh, that afternoon I'll have some free time, because I have the morning blocked off to do something else, and that's not enough time for me to get out in the field, so that'd be perfect" (student 12).

Some students would break up the course into "little blocks of time" and fit it in when time was available (student 21). Others described rearranging the holes to create larger blocks of time.

"I kind of just moved my schedule, because I knew I was going to have say four half days of free time in the next two weeks...And so rather than having a whole bunch of little half days, I just pushed a couple of things and got them done to make whole days of availability." (student 7)

Several students instead saved learning for times when they felt they couldn't otherwise be productive, like during office closures, bad weather, or illness. Unfortunately, due to perceived low priority status of learning and competition between other higher priorities, learning was often relegated to occupying left-over time within the work day.

Despite the creative scheduling efforts to fit learning in described above, many students perceived a lack of available time to learn. "I used a little bit of work time, but it turned out, I'm being serious here, it turned out I didn't have much time at work," said this student (student 4). "So I had a limited opportunity to do it, and I had to try to find a time here or there where I

could...work on the course. And it just didn't happen...," said another student (student 33).

Student 29 said:

"[My supervisor and I] were kind of going through my things I was doing and all the projects and stuff I had on the line, [the Wilderness Stewardship Planning Framework] was kind of one of those things. 'Well, have you been able to do this?' And I got pale. No, I didn't get pale. But I'm like, 'Oh, no, I don't have time.'" (student 29)

In an extreme case, one student even said that his ability to complete the course hinged purely on an unexpected occurrence of empty time at the end of his shift during which he didn't have any higher priority duties. "If that chunk of time hadn't have come up," he said, "I probably wouldn't have done the course at all" (student 25).

Students who wanted to learn, yet had trouble fitting learning in, described having to make choices when priorities were in conflict. "I had to decide what's more important. And some things didn't get done," said one student (student 4). This particular student was required to patrol closed portions of a wilderness regularly and chose to reduce the frequency of the patrols in order to complete the coursework, a compromise that appeared to resolve the conflicting direction he received (i.e. it's ok to learn, but important work comes first). Another student "almost didn't take the final because of work-related other issues" (student 28).

Rather than make choices between learning and performing job-related responsibilities, some students chose to complete some or all of the coursework on personal time, either at home or in the office.

"I have so much other work that I was hoping that I could still do my backcountry [work] and somehow after work find time to do two hours each day and then go home late. And that just did not work. I just got too much going on. And then I said, well, I'll have to do it on my day off." (student 26)

In fact, 10 students completed part or all of the coursework on personal time, and 12 students completed part or all of the coursework at home. "...If I found that I had something to do at work

and I couldn't get to it, I could always do it at my home....," one student said (student 24).

Another student described this choice in more detail:

"So I definitely was finding myself sort of in that mode so the only time I could really get around to it was when I got away [from the office]. And of course, when you're sitting in the office, it's easy to get stuff thrown on your desk whereas if you're at home, it's a little bit easier to cordon off a block of time and say, '[Completing coursework] is what I'm going to do.'" (student 10)

Student 10 indicated that learning at home was easier because competing priorities in that environment were minimized. The inability to engage in learning during traditional work hours, however, significantly reduces a student's ability to engage in on-demand learning at times when job-related learning is convenient. The students who worked at home on personal time make this choice sound rather inconsequential, and in fact, it may be an expected outcome in a work culture perceived to consistently devalue learning. The fact that these students made the choice to work at home with what appears to be such little angst suggests that the perceived lack of support for learning promoted by the federal government is highly ingrained in both employee beliefs and resulting behaviors, yet that employees also feel they have little responsibility for facilitating learning. Accordingly, the quotes above imply acceptance of, rather than being resigned to, learning at home on personal time. This net result suggests institutionalization in which employees may believe that this type of personal sacrifice is simply a requirement of or pre-requisite to learning on the job.

Not only did students describe conflicts between e-learning and work-related responsibilities, conflicts also existed between required and optional learning. One student said, "...if a course is not required, it's the lowest priority" (student 28). Another student put it this way:

"I mean, if it's a law enforcement refresher,...if we don't go, then we can't write tickets. If it's a wilderness first-aid and CPR,...we really should be, if we're in the backcountry, have that...Chainsaw refresher,...we have to do it. [The

Wilderness Stewardship Planning Framework] definitely was not higher up there. It was just a side thing for me. You know, we got so much darn training I haven't been in the backcountry this year it feels like." (student 26)

This required/optional training priority conflict mirrors the learning/work priority conflicts described earlier in that optional training consistently ranked as a much lower priority than required training. Additionally, if optional training consistently falls behind required training, this reduces the amount of control students have over when they can engage in optional training.

In fact, federal government employees are regularly required to complete a suite of training courses from short online courses on privacy and computer security to the skill-based training described by student 26. Although the Arthur Carhart National Wilderness Training Center has developed wilderness core competencies (<http://carhart.wilderness.net/index.cfm?fuse=competencies>) that correlate skill level with necessary information and training, at present, all training in wilderness management is purely optional and thus non-critical for job performance evaluation or advancement. Wilderness management is one of the few disciplines in which this is the case. For example, employees who fight fire must complete certain training courses to hold, say the position of Fire Resource Adviser, in the hierarchy of fire command. The following student explains this difference:

"[The] Fire Resource Advisory class isn't something off the wall. That's something that a lot of people take. And it's recognized as something necessary for our mission in fire suppression. So no one would question that, whereas wilderness management, they shouldn't question that either. But it's not as widely accepted, maybe, as the fire course." (student 4)

The fact that the Wilderness Stewardship Planning Framework is both optional and less widely-known and accepted contributed to its low priority status when compared to other types of training. Unfortunately, the same organizational culture that appears to prioritize getting the job done over learning how to do the job better, also appears to prioritize skill-based trainings that

maintain status quo skills (like those described by student 26) rather than optional, more intellectual training, that would increase institutional capacity.

Competition between field work and office work. In addition to generally conflicting priorities, some students described conflicts as being more prominent at specific times of the year, typically during the field season. "...[If] I had to start [the Wilderness Stewardship Planning Framework] in May...I probably wouldn't have signed up for it, because I know my summers are too busy, and I really couldn't have taken time away from the field season to do correspondence courses sitting in the office," one student said (student 5). Another student described it this way:

"As far as my job responsibilities,...most of my time is supposed to be spent out in the field...You know, making the commitment from, let's say, January or February until April or May was easy. But once we got past May and into June, I knew the demands on my time were going to be increasing, so the opportunity to take the course or commit to it in June, July and August were extremely limited." (student 10)

Most students described their jobs as having some sort of seasonal component, with winter being the best time for completing coursework. This seasonal aspect of competing priorities also reduces student control over when learning can take place.

In addition to seasonal conflicts, some students also described personal conflicts between field work and office work. These personal conflicts were a result of personal preference for performing field work instead of office work rather than management mandates for how time should be spent. "...I'd rather be out in the field doing something than in the office during work time working on a course," one student said (student 35). Another student said, "...I've been more of a field person up until recently, so sometimes I get restless. And so it can be somewhat of a challenge just to like sit still and focus for a little while on a module" (student 12). Since

many wilderness management professionals spend considerable time out in the field and their motivations for joining the workforce include spending time outside, remarks describing a preference for spending work time outdoors are not surprising. Another student who also described prioritizing preferred work over coursework had mixed feelings about learning.

“...If it was something I really wanted to do, then, of course, the module would come second. But if it was not something that I couldn't do some other time, then I'd just force myself to do the module. You know, I use the term force myself, as if I didn't want to do it. I did and I didn't. You know, I wanted this education, but it wasn't like reading a novel. It was like study. It was like school.” (student 4)

Although enhancing job performance was the most cited reason for enrollment in the Wilderness Stewardship Planning Framework, six students were motivated, fully or partially, by personal growth, or an ethic of continuing education. “I have a continual interest in learning new things,” one student said (student 14). “You can always learn,” said another student. “You can always try to get better. And you should be taking classes. You should be trying to learn” (student 26). The steadfast belief in learning these students exhibited is inspiring, especially since it exists despite the challenges associated with operating within an organizational culture perceived to devalue learning. Additionally, student 4 above revealed that while one can believe generally in learning, another challenge can be that the specific acts of learning can be distasteful and less preferable in comparison to other job requirements, and that the ends of learning are desirable while the means to that end are less so.

Feelings of Guilt for Using Work Time to Learn

Some students expressed feelings of guilt or reluctance to use work time for the purposes of learning. One student said, “I kind of felt guilty doing [coursework] at work even though my boss said I could” (student 7). This reaction reveals that, in an organizational culture perceived

to devalue learning, students may be conditioned to believe that learning in the workplace is inappropriate and that they bear little responsibility for learning. No other student articulated this quite as succinctly as student 7, but students who described these feelings did so because, like student 7, they "...felt like [taking this course] was kind of a personal gain as much as anything" or they felt learning was taking more time than they thought it should have. Another student, who engaged in learning as much for personal growth as for professional responsibility, described it this way:

"The way I looked at it was it was a continuing education opportunity as far as learning more about wilderness stewardship and the planning component of wilderness management. And basically, the way I looked at it was I was going to meet half-way, because my benefit is relating to an increased level of education. So I was more than happy to say, 'Okay, if the government will give me one hour a week, then if I need to, I'll spend an hour on my own time to make sure that I complete the course.' So that just sort of for me is a personal thing as far as my commitment to continuing education and continuing to improve my professional aspirations and career goals. So I didn't necessarily see this as strictly a part of my job responsibilities." (student 10)

Since student 10 supervised a wilderness of substantial size that he thought would have its wilderness management plan revised within four-five years, completion of the Wilderness Stewardship Planning Framework was, in fact, highly relevant. His view, however, that the course was not strictly a part of his job, despite its relevance, further implies institutionalization of devalued learning beliefs. Another student brought up a different concern, that the coursework was not relevant enough to warrant any substantial time commitment.

"...I had a chunk of time that I could use that I thought would be all right, but I wasn't, this isn't relevant to my job that much except to kind of understand why things are managed the way they are and the process that they go through to come up with a wilderness management plan and all that... But it wasn't really relevant to my job, so I didn't really feel like I could take the time to do it properly." (student 25)

For this student, wilderness occupied a secondary (as opposed to primary or no) responsibility. So while the course was thus relevant, it appears that this student was conditioned

to believe that learning is appropriate only if it is directly related to job responsibilities. A culture that supports learning in the workplace, however, would find value in not just skill-based training but in learning that fosters personal mastery and a more systems understanding of one's job (Senge, 1990).

Other students were also reluctant to learn on work time because completion of the coursework took longer than they felt it should. One student said:

“I had a split screen and I was typing notes at the same time. And I felt like I probably was taking longer than I should have so I would charge government time for the time that [the course] said that it would probably take me, and then the rest was [me]-time.” (student 29)

Student 29 alluded to discomfort in “charging” the government for what might be considered study time, time spent engaged in application-type learning rather than ingestion-type learning. Student 4 echoed this concern by saying, “...the study time...is so nebulous...I'd feel reluctant to say along with [time needed to complete the coursework] I need, you know, 15 hours to study...” In a culture that supports learning in the workplace, however, students would recognize that both course time and study time, formal and informal learning, are integral to the overall learning process.

Study Environment Distractions

Another major component of the work environment barrier category is distractions students experienced in their study environment. Most students (60%) completed the coursework in the office, yet seventy percent indicated that their work environment was distracting to study in. Although competing priorities and an inability to fit learning in at work certainly factored into some students' decisions to work at home, others chose to do so, through a “work-at-home agreement” (student 12) or “flex schedule” (student 14), for example, to escape

distractions at work. “The home environment for me I think is a little more conducive to learning, because I have fewer distractions,” one student said (student 2). Refusing to engage in learning in the work environment altogether is an important strategy some students used to mitigate workplace distractions. In this study, working at home varied both the location and timing of learning, as competing priorities dictated when students could escape the office to learn at home. Overall, this type of displacement response to workplace distraction reduced the amount of control these students had over the convenience of their e-learning experience.

Students described distractions in the office as “continuous interruptions” (student 16). “I don’t have a lot of time to sit down and concentrate on any one thing for any length of time without being interrupted or disrupted,” said another student (student 27). Some of these continuous interruptions are artifacts of the way some federal government work environments are physically built or structured, while others are a result of a “right now” workplace. This “right now” workplace is part of an organizational culture in which there is little privacy and respect for other coworkers’ or employees’ time or priorities and the emphasis on multi-tasking is tremendous. In this culture, all requests require an employee's immediate attention, so larger tasks, such as learning, are consistently interrupted by smaller tasks. Collectively, these interruptions interfere with the student's ability to learn, may cause employees to blame the workplace for difficulty learning, and contribute to perceptions of the devaluation and de-prioritization of learning in the workplace.

The types of continuous distractions students described were varied. Numerous students identified the phone or “phone calls” (students 2, 4, 5, 16, 24, 26, 28, 31, 34) and one student mentioned the “email new message signal” (student 12), indicating the presence of new email messages. Another student categorized these types of technology-related distractions as “other

competing technological advances that are out there and are competing for our time” (student 16). Again, there is considerable emphasis on multitasking here in which the expectation is that employees will be constantly available to receive phone calls and answer e-mails regardless of what other tasks may be monopolizing their time.

Many students also identified people-related distractions, such as the following, as being most problematic: “peripheral noise” (student 7), “multiple conversations” (student 10), “interaction amongst employees” (student 12), “people talking” (student 23), “visitor contact” (student 22), “visitor questions” (student 9), “people coming and going” (student 10), “a lot of come and go” (student 12), “people...busting in” (student 14). Student 7 described coworker interruptions in more depth:

“Everybody coming by and correcting me to be doing what I’m supposed to be doing. Coming by and ‘hey, I need you to go do this,’ and ‘hey, what’s the story with this?’ And, you know, I mean, someone would swing by and drop 5 words, it might be 30 minutes of my day going to do something real quick.” (student 7)

In this quote, student 7 not only described the problems associated with unannounced or casual interruptions from coworkers but also pinpointed competing priorities, or sudden shifts in priority, as being distractive. This was echoed, particularly by student 27, who described the following instances of competing priorities as distractions: “law enforcement and emergency medical search and rescue type incidents,” “brush fires,” “pressures of the day,” “the latest emergency of the minute” (student 14). In this study, competition between priorities played an important enough role to warrant more in-depth analysis previously as its own subsection, but it is important to recognize that some students viewed competition between priorities instead as a distraction.

The prevalence of interruptions reveals several things about the organizational culture of the “right now” workplace: First, that learning is not viewed differently from other tasks that

might be less affected by interruption; second, that coworkers demonstrate a profound disrespect of others' time by not differentiating between casual interruptions, in which the interruption is unwarranted, and genuine emergencies, when interruption is warranted (i.e. Every request in the "right now" workplace is an emergency); third, and finally, that the worker being distracted is unwilling or feels unable to exert control over the distraction (i.e. Simply tell the interrupting coworker, "I'm busy learning. Can you come back later?"). Some employees may be passive consumers of learning, making them less likely to assume responsibility and actively participate in structuring their own learning. Since only three students specifically told others to "be quiet" (student 17) and "not bother me" (student 15), other employees in the "right now" workplace may feel unable to actively put off the requests of others, like student 28 who said he was hesitant to close his door and be unavailable to coworkers or subordinates. Even students who made it known that they did not want to be disturbed when learning were interrupted, like student 14 who said, "I let people know, but still it's like 'Sorry to bug you, but I really need this taken care of or need this information.'" Most students instead choose to evoke more passive, evasive, or avoidance coping strategies. Multiple students closed their doors (students 14, 20, 21, 27) or used headphones (students 9, 18, 23, 33) to cope with distractions. Other students employed strategies related to internal locus of control including "pick[ing] when I'm in a good frame of mind" (student 12), trying to "focus" (students 2, 10, 13, 17, 19, 26), or to simply "slog through" (student 2). Also, while some students employed spatial displacement (working at home), which also temporally affected learning, some students instead varied only the timing of learning by learning at work during "off hours for the office" (student 33). Student 10 elaborated on what exactly "off hours" meant:

"Basically, I try to come in relatively early...the first hour or so is usually a good time to focus...the other flipside of that was late in the day was a good time to

work on it. So basically, finding time that the physical noise and physical presence of folks in the office was limited, that was basically the only strategy I had.” (student 10)

As with varying the location of learning, choosing to vary the timing of learning according to when distractions in the office are minimal also limits when learning can occur. In both of these situations, attributes of the location dictate the availability of time and appropriateness of learning. The use of both of these coping strategies contributes to convenience as an illusion of e-learning in the workplace, because students lack control over when learning can occur.

In some cases, and as mentioned previously, the types of distractions described above were compounded by inadequate physical space or privacy. Some students “share an office and workspace” (student 10), or work in a “cube farm environment” (student 2) where “everything others do or I do is shared by all” (student 32). Still other students didn’t actually have offices but instead worked in “a big open squad bay...with little tiny half walls” (student 7). Student 7 described shared work space as a “very noisy environment so it makes it difficult to focus at times.” Another student who shared an office said it was difficult in this environment to “drown everything else out and work on one particular task” (student 10). “I’m not a super strong multi-tasker,” said still another student. “For someone who was or someone who is really good at focusing and blocking things out, [being in a cubicle environment] might not be an issue. But for me, it’s a distraction” (student 2). Clearly, the adoption of cubicle-style or open offices is not conducive to learning, despite the fact that it may encourage interoffice cooperation and coordination. Many institutions today are building or structuring offices in this way, and the federal government is certainly no exception. Unfortunately, however, this choice, likely made for monetary reasons, is detrimental for students engaged in self-paced, or self-directed, learning, like the students in this study. By refusing to provide a physical work environment that

facilitates learning, however, perceptions of an organizational culture that devalues learning are perpetuated.

Hindsight Desire for Coordinated Learning with Other Staff

Although the Wilderness Stewardship Planning Framework was structured as a self-paced e-learning experience, four students expressed the desire to coordinate learning with others in their offices. Two of these four students were part of a group of five from two different districts on the White Mountain National Forest in New Hampshire that included one set of supervisor/employee and another set of supervisor/employee/coworker. None of these five students coordinated learning with the others during the course. The desire for coordinated learning articulated by the following two was expressed in hindsight.

“What was good to know is that other folks in the office were taking the same course. Had we been smart about it, we would have tried to do it all at the same time so we could have had some of that interaction...it would have been great to have kind of done it within the same month of each other so that we would have all been kind of on the same page and to talk about it a little bit, or even to have shared work products, doing a module and doing a little bit more of an extensive work product together. That would have been great for me, actually, because everybody here that would have taken the course was in more management positions, so I probably would have gained a lot from that.” (student 29)

“...what I would have rather done is actually take the course...with the folks in my program as one group where we could actually have discussion as we move through it.” (student 33)

The other two students who expressed a desire for coordinated learning were the only employees in their immediate offices who took the course. Their desires for coordination were also expressed in hindsight, but are less concrete in nature.

“I guess maybe just having them suggest to do it in like a group format. I think that would be really helpful and still having it online but having the agency or organization set up, just suggesting that each of them set up a time where people can go and do the online courses together...if there were a bunch of people taking it at this particular park or something and we set up a time where every day you'd

go to the course or watch the first section and then take the test and maybe a group effort...I think that would be beneficial.” (student 19)

“If there were two or three people taking the same class, we could have actually discussed it. It would have been a little more interesting that way...I would have loved to have had...our whole body of employees take [the Wilderness Stewardship Planning Framework], because we learned the whys of what we’re doing out there...But by the time I told a couple people, ‘Oh, take this class.’ And they got online to do it, and it was too late to register.” (student 17)

Summary

Work environment barriers identified in this study included competing priorities, competition between field work and office work, feelings of guilt for using work time to learn, study environment distractions, and hindsight desire for coordinated learning with other staff. As depicted in Figure 4, earlier, the workplace barrier category contributed significantly to two of the three systemic problems, the illusion of convenience, and lack of an organizational culture of learning.

As opposed to learning in a classroom, where the instructor controls both the timing and pace of learning, e-learning students enjoy the ability to instead be in control of these aspects of the learning environment. In the workplace, this means that employees control when during the workday learning occurs and, during times of learning, the speed, continuity, and duration of that learning. Competing priorities, either between learning and other work tasks (field work included) or between required versus optional training, heavily influenced when learning could occur within the workday for students in this study. Many of these students told tales of repeated efforts to engage in learning when it was convenient, only to be sidetracked by higher priority tasks. This repeated cycle of competing priorities always usurping learning resulted in difficulty or an inability to fit learning into the traditional workday by a significant number of students. The existence of these competing priorities was, in many cases, exacerbated by numerous and

repeated workplace distractions, leading students to adopt a variety of coping strategies to minimize their influence on learning. Whether to escape competing priorities or distractions, a number of students chose to vary the location and/or timing of learning. Some students learned at home on personal time; others engaged in learning in their offices early or late in the day, on days off or during planned or unexpected quiet periods. In some cases, feelings of guilt for using work time to learn factored into these choices of when to learn and how much work time to use. Collectively, these events suggest that employees engaged in self-paced, on-the-job e-learning have little control over when learning can occur. The competitive, multitasking, interruptive aspects of the workplace control the timing of learning, meaning that employees may likely engage in learning when it is neither convenient, preferred, nor efficient. Although the literature suggests that convenience, the flexibility to control when to learn, how quickly, and for how long, is a benefit of e-learning (Chu, 2002), many aspects of the workplace appear to be incompatible with learning (e-learning or otherwise) and made convenience an illusion for the students in the study.

Many of the individual barriers that support the illusion of convenience also support the lack of existence of an organizational culture of learning. According to the students in this study, learning was consistently rated as a low priority, behind all manner of other work tasks and required trainings, regardless of relevance. As described above, learning's low status often meant that employees had difficulties or were unable to fit learning into the workday. In some cases, employees described receiving conflicting institutional messages about learning, that learning was sanctioned but not supported or encouraged. These messages elevated getting the job done or completing required trainings that maintain status-quo skills, over learning how to do the job better and, thus, increasing institutional capacity. Additionally, employees' physical study

environments were often structured in a way that maximized the prevalence and influence of distractions that hindered learning. The indoctrination of employees working in an unacceptable physical and philosophical learning environment surfaced through the existence of beliefs and behaviors including: learning at home on personal time and the ungrudging acceptance of this; adherence to the “right now” workplace philosophy that espouses immediate and simultaneous attention to all requests; prevalence of unwarranted, non-emergency, coworker interruptions; adoption of passive, rather than active, coping strategies to minimize distractions; inadequate physical space or privacy; and feelings of guilt for using work time, or a perceived excess of work time, for learning. The presence of these aspects of the workplace suggests the lack of an organizational culture of learning within the wilderness management workplace.

Personality Trait and Preference Barriers to E-Learning

Introduction

Personality trait and preference barriers are those student attitudes, assumptions, beliefs, habits, and preferences related to learning and are important because, as predisposing conditions, they often amplify other types of barriers. Personality trait and preference barriers, in this study, included procrastination and cramming, expectations, learning style preferences, and technical aptitude.

Time management skills are particularly important for learning. Poor time management often takes the form of procrastination and is, many times, followed by cramming. Crammed learning is often perceived by learners as less enjoyable and the quality of learning—how much the student learned and retained—suffers.

Expectations also affect the learning experience. While many things can contribute to expectations, prior learning experiences are often significant. Prior experiences, specifically negative ones, can influence how pleasant students anticipate the current learning experience to be, overall, and can influence their willingness to engage in learning. Additionally, bias related to e-learning versus classroom learning can also affect expectations of difficulty and the level of personalization of instruction.

Unlike expectations, students don't typically describe learning style preferences directly, yet the problems or needs they express often reveal their varying approaches to learning. Students have preferences related to learning solitarily vs. with others, for example. They also have preferences related to visual and oral instruction, which can lead to choices that replicate aspects of face-to-face learning when learning alone.

Aptitude for and comfort with technology are important factors when learning alone on a computer. Students who dislike using computers often feel uncomfortable using them and may choose to use them in limited capacity. They may also experience frustration when online experiences do not go as planned, yet lack the skills to deal adequately with difficult situations.

Overall, these barriers collectively make up the larger category of personality trait and preference barriers and will be discussed in more detail as follows. A concluding summary describes how these barriers contribute to the three systemic problems—the illusion of convenience, absence of deeper learning, and the lack of an organizational culture of learning.

Procrastination and Cramming

As described in the previous section, most students in the sample experienced conflicting priorities between either work and learning or optional and required training. In many cases, the

existence of conflicting priorities led to difficulties fitting learning into the workday and procrastination, sometimes followed by cramming, although it's unclear whether procrastination is a cause or effect of difficulty or inability to fit learning in. Procrastination, here, is defined as the delay, or putting off, of a task one intends to perform within a desired or expected timeframe (Ackerman & Gross, 2005; Steel, 2007). For 11 students in the sample (36%), "...[in] both the registration and the coursework, there was a little bit of procrastination and waiting" (student 33). Only one student was a self-proclaimed chronic procrastinator, and said, "... I'm pretty bad at procrastinating...I'll just put everything off usually to the last minute...that's just the way I operate" (student 35).

Procrastination was described by some students in simple terms:

"It's easy to get behind and say, 'Well, I'll get to it next week. Well, I'll get to it next week.'" (student 10)

"I wanted to get it done sooner...and I just was so busy every day and it was just never convenient to stay at work for another two hours and so I waited and waited." (student 26)

Other students, however, described procrastination in more detail, revealing the complex nature of the phenomenon and its causal factors. Student 15 offered an excellent example:

"Some of it was staffing shortages and so having to do extra work. We start our reservation process for the park in April, and so that was kind of the priority for, almost for the whole month of April was trying to go through that. Then seasonal staff came on, so there's training involved with that. We had one of our long-term seasonals who at the last minute decided not to come, and so I had to kind of go back through the hiring process, and there are deadlines there and scrambling trying to get somebody hired for the summer season. And then just, yeah, and just kind of started the summer season going around to the different offices, getting folks trained up in our permanent offices throughout the park. And then we also...had a couple of big meetings of general backcountry training in the park that I'm a part of as well...[I] head up...a meeting with all of our commercial stock outfitters that I have to organize. So kind of all those things kind of played into the mix of [the coursework] just getting...pushed further and further back." (student 15)

Clearly, in student 15's case, competing priorities and a difficulty fitting learning in drove decisions to continually put learning off, yet this student's tale also reads as a laundry list of excuses, which may suggest a lack of productivity or motivation to learn. The ways in which competing priorities and a difficulty fitting in learning affect both the convenience of learning and contribute to perceptions of an organizational culture that devalues learning were described earlier in the previous section. Procrastination, in relation to the course deadline, diminishes the overall amount of time students have to engage in learning, thereby diminishing student control over when learning can occur, and thus making learning inconvenient. Student 15 procrastinated due to the existence of competing priorities, rather than for other reasons such as fear of failure or a doubt in one's ability to learn, commonly mentioned reasons for procrastination. This supports perceptions of the existence of an organizational culture in which learning is not important. The fact that procrastination is a personal choice, however, also suggests that students bear responsibility for learning and those that are passive participants may allow themselves to be more heavily influenced by workplace circumstances.

In addition to workplace circumstances, several students suggested that procrastination was affected by other factors specific to the e-learning environment. One student said, "...I think with an open-ended, self-paced learning course...it would be really easy for time to get away from me and [the deadline] to sneak up before I had it finished" (student 2). Another student said, "[e-learning courses are] less structured so it's easier to procrastinate and do things like that than it is if you're in an actual classroom where things are more structured" (student 20). Student 34 similarly compared his experience to that in the classroom and attributed his procrastination to the lack of sequestration (removal from the work environment) inherent in e-learning. Another student said, "It really, it's back burnered, because it is something you can do on the computer,

and it is something that you don't have to do right now, although you have these other things that people are standing over you waiting for" (student 30). Collectively, these students suggest that self-paced e-learning can contribute to the tendency to procrastinate because the medium lacks the structure many students are used to in the classroom.

Regardless of the factors contributing to procrastination, putting off learning often results in cramming. According to Sommer's (1968) early, yet widely-accepted definition, cramming is a period of neglect of study followed by a concentrated burst of studying immediately before an exam. Specific to this study, cramming, or completion of the coursework in a short timeframe directly before the course deadline, occurred usually following a period of procrastination that started at some point after registration. In fact, cramming was widespread in this study with fully two-thirds of the sample completing the coursework in a matter of days. In multiple cases, students completed the entire course in a single day encompassing approximately eight hours worth of solid studying. Other students completed multiple modules (typically 2-4) on each of several consecutive days. The remaining one-third of the sample completed the course in accordance with the directions in the course introduction. These students completed the coursework in small chunks spread out over several weeks or several months, depending on how early they registered.

In several cases, cramming was planned, and the literature does recognize purposeful or intentional cramming, compression of a large amount of material into a finite time resulting from a conscious choice by the student rather than from external factors (Sommer, 1968; 1990). Intentional cramming by students who perform this behavior routinely is associated with higher levels of flow state (Brinthaup & Shin, 2001), which may be why students in this study who chose to cram referenced immersion as a key factor in this choice.

“I don’t think I would have gleaned as much from it if I would have done one module a week, because you’re not right there with the material...” (student 18)

“...I forced myself to get this done right away, because if I let it lag on, like the suggested thing was one a week maybe or one a month, I’d never remember what I did, you know, a week ago.” (student 4)

“...I didn’t feel that I could keep the concepts fresh in my mind if I didn’t try to do it in a relatively small timeframe...I thought if I use one hour every week, I don’t think that I would keep everything fresh in my mind. I would almost need to review, just because you do work, and there are a lot of other things that you’re dealing with at work that you do get sidetracked.” (student 9)

These students all felt as though cramming improved retention through immersion in the materials. Students 18, implicitly, and 9, explicitly, also linked their choices to cram as a way to minimize the influence of competing priorities and workplace distractions. While students 18 and 9 completed the coursework relatively close to the course closing date, student 4 completed the coursework relatively early and began the coursework directly after registering. His case is an interesting one because it shows that while intentional cramming can follow procrastination, it can also occur independently. In essence, cramming can occur at any point during the timeframe available to complete a task.

While engaging in intentional cramming may have increased retention for a few students, procrastination clearly caused unintentional cramming in most cases, like student 19 explained:

“At the beginning I started out kind of setting a goal, like I was going to do one per week, and I did start doing that. And then in the middle we got really busy, and so that kind of, I slacked off. And then right at the end I just tried to crunch everything together in one week, because that’s all I had left.” (student 19)

Student 19 alludes to the complex relationship between competing priorities, an inability to fit learning in, procrastination, and cramming. In this student's case, competing priorities led to the inability to adhere to personal goals of spreading out learning, caused the student to “slack off” or choose to procrastinate, and ultimately resulted in cramming as an adaptive response. Not only do these events eliminate convenience by forcing students who cram unintentionally to

learn at an inconvenient, and likely uncomfortable, pace and time, the quality of learning is negatively affected. These students described this as follows:

“... the biggest thing that I felt that detracted from my experience was just that I waited so long...once I procrastinated so long,...I had to force myself to do it all in a very short amount of time. I felt like I would have gotten more out of it if I had done that one module a week or two modules a week or something like that. And if I were to do it again, I would have done it in smaller sections, spread out, and I think that would have been a better learning way for me.” (student 29)

“I took the course over...one full day, so it probably would have been better to space it out...so I’d have more time to process things and think about things rather than trying to do everything all at once.” (student 15)

Students 29 and 15 are, in fact, good illustrations of both procrastination and cramming and their remarks contrast those from students, quoted earlier, who crammed intentionally. Student 29 registered for the course on January 24, only four days after registration opened, but did not begin the coursework until June 5, a Thursday, and completed the final exam on June 10, a Tuesday. Student 15 also registered relatively early, on February 20, but didn’t complete the coursework until June 11. Although only student 29 expressed regret related to procrastination, both students clearly regretted engaging in crammed learning and acknowledged that partitioning learning into smaller chunks distributed over time would have provided a more enjoyable and higher-quality learning experience. Specifically, crammed learning resulted in many students feeling saturated and rushed:

“...I just went pretty much until I felt like I had had enough and was saturated with information at that point.” (student 30)

“When I did my marathon, the big chunk of it, I found that I was planning on getting back on the computer the next morning, and I just couldn’t do it. I overdid myself with online course.” (student 29)

“...[If I take more Carhart Center courses in the future I hope I’ll] have more free time to be able to do it instead of rushing on one day and getting it done.” (student 26)

“...I felt rushed trying to get this deadline out or deadline done. [The Wilderness Stewardship Planning Framework] was important to me. I really wanted to complete it so I was like, okay, I’ll do the bare minimum, hopefully pass this test.” (student 22)

Students 30 and 29 described how crammed learning left them feeling saturated, inundated, and overwhelmed, so much so that student 29 needed to break until she again was mentally ready to continue learning. More importantly, however, students described feeling rushed. Of particular interest are student 22’s remarks. Not only did she feel rushed or hurried, by in fact not completing the coursework until June 21, well after the original course deadline of June 14 but during the first extension that was offered, but she admitted that feeling rushed caused her to perform minimally, implying she actually cared less about and dedicated less energy toward learning.

Additionally, some students who felt rushed chose not to complete the work product exercises at the end of each module, due to “the time constraint” (student 34). One student said, “I didn’t want to take the time. I knew I wanted to get through the class first” (student 13). Another student said, “I...wanted to make sure that I got this finished in a pretty timely manner” (student 2). Yet, another student said that in order “to power through the course, so to speak, I didn’t necessarily try to take advantage of those practical exercises that were presented” (student 10). All of these students perceived a lack of time, which was the most cited reason why only one student in the study completed any of the optional application exercises.

Collectively, students’ tales of procrastination and cramming are significant because they suggest that students who procrastinate also tend to cram and that cramming, if not intentional, causes students to feel overwhelmed and rush through, gloss over, or fail to complete important learning materials as a method for reducing learning time and meeting the deadline. Through

these behaviors, students minimize their academic energy expenditures but also minimize the degree to which they absorb and retain information.

“I think because it was at the end of my shift late at night I wasn’t in the best frame of mind. I was pretty, after I had read through all that stuff, module, one after the other, I was kind of, by the time I got done with that I was kind of, I was just really tired so I wasn’t retaining a whole lot of it.” (student 25)

Student 25 is an extreme example of how procrastination and cramming negatively impact retention. Although he registered fairly early, he completed the entire course in a three-hour block of time at the end of his shift, and, ultimately, was one of two students in the sample who completed the coursework yet failed the final exam (80% was required for achievement). His account of exhaustion and decreased retention, along with those remarks from other students quoted earlier, suggests that procrastination and cramming hinder a student's ability to engage in deeper learning.

The term deeper learning has an implied and intuitive meaning, yet it can be understood as learning that goes beyond surface learning—rote memorization or simple knowing—to comprehension (Marton & Saljo, 1976). Students who engage in deeper learning search for meaning and connectedness in the material they study, leading to more extensive associative memory networks and a greater probability of retention and recall. The fact that procrastination followed by cramming may negatively affect students’ abilities to engage in deeper learning is significant in itself, but may also imply limited retention of knowledge intended for future use by students who engage in these behaviors unintentionally. Although most of the students in this study indicated that the coursework was directly and currently relevant to their jobs, others suggested that what they learned was relevant in the long-term, in some cases exclusively, through future applications during upcoming projects or at subsequent points in their planned careers (nine students, almost one-third of the sample, were motivated to enroll by career

advancement). Since even knowledge learned deeply degrades in memory over time, the absence of deeper learning due to procrastination and cramming may impede long-term retention of relevant knowledge and, more importantly, may thus negatively impact future management decision-making.

Expectations

Another important personality barrier was expectations. Prior experiences, perceptions, and attitudes are all part of expectations and can affect actual experience (Ames & Archer, 1988; Ramsden, 1992). In other words, prior experiences can mold perceptions and attitudes and if a student is expecting a certain type of learning experience, he or she is more likely to have an experience that is consistent with those perceptions and attitudes.

All students in this study had prior learning experiences. Federal government employees complete most online training through their respective agency learning management systems. The Department of Agriculture uses AgLearn; the Department of Interior uses DOI Learn. These platforms are used to deliver a variety of required agency training courses on computer security, literacy, privacy, defensive driving etc. As such, all students in the sample had at least some experience with one of these learning management systems; Forty-three percent had experience in professional development, technical development, or university online courses, with the vast majority of this forty-three percent having had experience with university e-learning courses only. Although students with these types of additional prior experiences distinguished between prior experience related to the required agency courses (negative) and prior experience related to other types of courses (positive), almost half of the sample characterized their prior online learning experiences as being generally negative, due heavily to the influence of required agency

training courses. Students used a variety of powerful and colorful adjectives to describe their prior negative experiences in these required agency e-learning trainings: “Eew!” (student 29), “horrible“ (student 18), “ineffectual” (student 30), “universally frustrating” (student 5), “redundant” (student 31), “Can the monkey jump through the hoop?” (student 16).

Unfortunately, such strong negative prior experiences with e-learning colored students expectations, especially for students who had no other types of e-learning experiences. “Oh, I’m sure [my experience with DOI Learn] influenced it a lot,” said one student. “That was the only background, the only thing I knew about any online course was those that I had taken” (student 30). Although most students who had negative expectations were “pleasantly surprised when [this course] was a little different” (student 23), these students signed up for and began the course expecting that the Wilderness Stewardship Planning Framework would be just “another similar online experience” (student 17)—similar meaning like the required agency training courses student spoke so negatively about.

“The stigma might be strong, but not a very positive perception of some of the mandatory online training that we do right now through AgLearn. And I think there’s some good reasons for that, and I think those are justified feelings. And I think sometimes because of that there can be a bit of a groan when we hear about other online training.” (student 2)

“I guess I had a little lower expectations going into it than what I came away with...Some of the Park Service ones we go through are just requirements you have to take to fulfill a job function or whatever...it’s something you go through and most people just do it to fulfill a requirement rather than trying to learn anything. And they’re very dry and they’re just very administrative. So yeah, I guess that’s kind of what I was hoping it wouldn’t be but what I thought it could be.” (student 15)

These remarks reveal an underlying fear: that the negative experiences students had completing required agency e-learning training courses would be repeated in the Wilderness Stewardship Planning Framework. The negative prior experiences students had also not only biased their expectations related to experience quality, but also biased their expectations related to how much

(in this case, how little) they would learn. Due to these negative prior experiences, and subsequent negative expectations, students may be reluctant to explore other e-learning opportunities, as student 2 implied. Negative prior experiences and subsequent negative expectations concerning e-learning clearly have an organizational source. At a time when the federal government is consistently increasing the amount of training offered online as a way to cut costs, offering trainings that employees perceive as being of poor quality can negatively influence employee acceptance of this trend. Also, employee perceptions of poor quality e-learning suggest that the necessary attention and resources required to adequately educate employees are not being allocated and that organizational development and learning are not cultivated activities.

In addition to prevalent negative prior experiences with e-learning, several students revealed bias related to expectations about e-learning versus classroom learning. “I figured that...it would be a lot easier than a classroom exercise,” said this student. “My expectations weren’t very high” (student 35). “It’s a lower expectation, because I know I’m going to have to learn on my own without the benefit of someone telling me what it means,” another student said (student 17). This student said, “...I didn’t expect that I’m going to be taking an online course and I’m going to be getting very individualized instruction, so, I mean, it does influence expectations” (student 33). Clearly, for some students, the delivery medium influences expectations about the rigor and level of personalization of instruction. These students imply that e-learning courses are easier and deliver impersonalized instruction, which contribute to lower expectations of overall experience quality.

Other students also suggested that the online delivery medium fosters expectations of courses that are broad, general, basic, and cursory in nature. “...My expectation was to get a

basic introduction,” said this student (student 14), while another expected “just general information rather than real detailed specifics” (student 15). Student 35 above who expected the course to be easy said, “...I figured I’d still learn some new stuff...[but] I just thought it would be really good review” (student 35). “...I think I understood that...I was going to get the sense of the concepts and not much more, not as deep an understanding,” said yet another student (student 9). Some students, like the following, linked these types of negative expectations to a lack of interaction. “I knew it was an online course so I knew those interactions weren’t going to happen. So I was basically looking at it as just as you would take a correspondence course, and...I knew that the focus of the learning was going to be pretty narrow,” said one student (student 10).

Collectively, these remarks, and those above, suggest that students expected the course to be easy, distant, brief, passing, and shallow because it was online. Students also linked shallowness with lack of interaction, a key weakness of the e-learning format discussed in more detail in the next section. These expectations of lesser academic quality contributed to lower expectations of experience quality. Since expectations can affect actual experience, students who expect a sub-par experience may indeed mentally invest less in their own learning, leading to learning that actually is superficial and fleeting.

Finally, an understanding of time required to complete the coursework was also part of student expectations. As part of each module description, the run time, or the time required to play the narrated version from start to finish, was given. Since post-module practice tests were listed separately from the modules, the time estimates did not include time necessary to complete them. Overall, students were split, with many calling the time estimates “nonrealistic” (student 22) because they did not account for test time and did not account for study behaviors such as

stopping/starting and taking notes. In some of these cases, students required half again as much time to complete a module as predicted. While this is essentially an epistemological error, giving students the impression that they can complete a learning block in an impractical amount of time can lead to a variety of problems. Having inaccurate expectations of time required can promote rushing (i.e. if a student allots one-hour to complete a module and can't finish in that time), as discussed earlier related to procrastination and cramming. It can also alter self-efficacy, if students who take much longer to complete coursework begin to doubt their academic ability (i.e. I'm a slow learner). This was discussed in the previous section, which contained remarks from students who felt guilty for using too much time to learn, making expectations important determinants of what students consider adequate versus superfluous learning time.

Learning Style Preferences

Although the Wilderness Stewardship Planning Framework was a self-paced e-learning course, sixty percent of the sample preferred learning in a group setting versus learning alone. "...I just do better in a classroom environment. That's just it in a nutshell," as one student put it (student 31).

"I feel like I learn better in a group, because there's more interaction...I've never been one of those people who can just go off with a book and book learn and then be an expert at it. I tend to need more...educational ways to get me to learn."
(student 18)

Student 18 implies that learning alone, or in a self-paced fashion, requires more academic stamina, self-discipline and focus. Despite her suggestion that group learning is guided (i.e. hand-holding) and structured, she sees it as a more stimulating and enlightening way to learn, due to the presence of interaction with other students and/or an instructor. Other students cited various types of interactions, such as two-way conversations, understanding others' viewpoints,

asking questions, and receiving feedback, as being important elements of group learning and reasons for preferring group learning.

“I’m more of like a verbal processor, so I think talking through things and having dialog and conversations is definitely preferred.” (student 12)

“...I like to get other people’s thoughts on stuff, because you can learn a lot from just hearing other people’s viewpoints, because they might look at something and they have a different view than you.” (student 20)

“...people asking questions that I may not ask, things to stimulate thought.” (student 7)

“I think with a group certainly helps just because you kind of get that overall conversation and feedback...” (student 15)

Several students, like the following, also preferred group learning, but because they felt these types of interactions improved retention. “I like doing it with a group, because I feel discussions help me to retain things better,” said this student (student 19). This remark and those above imply that during interaction retention may improve because students compare their ideas to those of others (either aloud or internally). This requires evaluative thought, assessing the accuracy and value of information as compared to personal beliefs, which cements knowledge more firmly into memory.

Overall, all these remarks indicate a strong preference for face-to-face learning over self-paced learning, the type of learning students engaged in during this study. This is significant, in itself, because student preferences are in contrast to a significant amount of courses being offered by the federal government. While the students in this course were amenable to learning alone, despite disliking it, other students may disregard e-learning altogether because of a preference for learning in the classroom.

Also, as previously discussed, expectations influence experience, and preferences related to learning style also influenced student experiences, specifically their choice of course material

format. Sixty percent of the sample preferred the narrated PowerPoint presentation style format, while the remaining forty percent chose the PDF format. Several students who experienced technical difficulties related to the presentation style format and had to use the PDF format indicated that, had they had a choice of formats, they would have chosen the narrated presentation style format instead. Several students who chose the narrated presentation style format classified themselves as visual learners, like the following student:

“I’m kind of a visual learner, and so [the narrated presentation style format] really helped me. And so I realize it’s a little bit more difficult in some sense because there’s no other interaction. You know, it’s just a computer. You don’t get ideas from other people. So I really liked the PowerPoint, because that really helped clarify things better.” (student 20)

While this student emphasized the visual aspects of the narrated presentation style format, the synchronized appearance of text and pictures to form essentially moving pictures, other students indicated that visual learning supplemented with audio was most beneficial. “I learn best if I’ve got both the oral and the written document, so having the audio portion was useful for me,” this student said (student 14). Students who preferred the narrated presentation style format because it included audio cited a variety of benefits of stimulating learning through multiple senses.

“It was more understandable...the narrative had examples but the audio with their examples made things clearer, I guess, more easy to understand.” (student 24)

“It just made it a little bit more dynamic for me.” (student 29)

“I wanted the audio and visual at the same time so that I could better absorb the information by using two different medias.” (student 35)

“...Another thing about the audio that really helped for me was...it’s much easier to stay engaged when I’m not always looking at the screen, but hearing something that reinforces it.” (student 10)

Students felt that this format was more understandable, engaging, improved retention, and held student interest more effectively. Interestingly, these benefits are similar to the benefits of

learning in a group, and the following two students described how the narrated presentation style format made them feel as if they were not learning alone:

“...I liked the different speakers, different voices, different experiences...Maybe that’s why I liked the narration. It felt like somebody was right there.” (student 29)

“And I actually thought it was good that there were those two people in it who were...the land managers...so it wasn’t the same monotone voice going through the entire thing. That there were other voices in there too to...help make it seem like you’re more kind of a group setting, although you’re looking at your computer screen. That’s the way it sounds, like you’re more in a group setting because there were other people narrating it as well. And since you...had the picture to go along with the voice, it kind of made it seem more real.” (student 21)

For these students, the faux-interactive qualities of the narrated presentation style format simulated parts of a face-to-face learning experience. In fact, some students voiced concerns that e-learning might replace classroom learning altogether. “...Now that...you can go online and do something, it’s going to take me away from a setting that I normally prefer. So in a way I may have set myself up for having to do more online training as opposed to being sent to training,” said this student (student 31). Another student described it this way:

“I guess there’s a fear that if, due to shrinking budgets and if distance learning or online learning is the only way that we’re going to be able to get some of these educational opportunities, I think that we will definitely be missing something...If it would be a hindrance it would be just in the way that it would take away from actual person-to-person interaction in a real classroom setting across the board.” (student 29)

Unfortunately, for many students like the following, learning in the preferred setting of a classroom is already outside the realm of reality. “I think I decided to take this course online because it was online or not at all,” said this student (student 4).

Many students were unable to attend classroom training, either due to a lack of time or funding. Based on both student preferences for learning in a group and the desire to choose a format that imitates aspects of learning in the classroom, the federal government may face an

uphill battle to learn organizationally. Its desire to make e-learning more prevalent and accepted appears to be in direct opposition to the desires expressed by some of its employees, and the fact that most federal government training courses lack interaction may contribute to the prevalence of negative prior e-learning experiences in these courses and to the fear that e-learning will become the status quo.

Technical Aptitude

The degree to which students liked or disliked computer-related activities and the degree to which they felt they were competent, or skilled, using computers also affected student learning experiences. While 23 students, just over seventy-five percent, felt “proficient” (student 23) or at least comfortable using computers and the Internet—“I’m not a computer geek, and I’m not a total novice to it either” (student 5)—seven students, approximately twenty-five percent, indicated they felt uncomfortable using computers and the Internet. “...Computer technology is not exactly one of my strong points,” said one student (student 33). Other students described themselves as being “computer illiterate” (students 7, 28) or “technically challenged” (student 4). Several of the students also expressed dislike or disdain for computers.

“I don’t like computers at all... We use the computer at work, because our reservation system is on computer. So I use them...but I certainly don’t find myself kind of figuring out ways to really use them. I would say it’s a minimal thing for me. Like hooking up those speakers to take this class was like a pain in the ass for me, because it was like I had to plug them to that plate of spaghetti behind my desk. And that was a chore in itself...” (student 22)

“I’m okay with the computer to some degree... But I really don’t use it much either...it’s only for work....I’d rather not deal with [computers].” (student 26)

These remarks suggest inexperience. The degree to which these students used computers was limited to work-related activities. Their use, however limited, was forced or engaged in grudgingly, and these students’ remarks suggest psychological distancing from technology

altogether. Although personal (as opposed to work-related) computer use is not necessarily an indicator of proficiency or comfort, its lack does suggest both inexperience (which is often linked to proficiency) and a general reluctance to adopt technology under any circumstances. Student 22's remark also contains two interesting points: First, that this limited use of the computer is by choice, since she implies that, should she desire to "really use them," computers could be beneficial and efficient to her work; and second, that the slightest technical inconvenience or challenge, in her case, hooking up speakers, is remarkably distressing and frustrating. In fact, students felt that necessary technical skills included persistence and troubleshooting to deal with unplanned difficulties. Like student 22 above, student 28 acknowledges possessing minimal troubleshooting skills.

"I personally consider myself almost computer illiterate. It's not a true statement, because I do manage to do my job, but...if I have a problem with my computer, the first person I call is IT...I don't even attempt to figure out what [the problem is]." (student 28)

A lack of troubleshooting skills likely results from inexperience and discomfort using computers, and students who lack the ability to spontaneously find solutions or try different courses of action to solve technical problems likely experience the frustration expressed by student 22. In some senses, this is a vicious circle: being inexperienced, or using computers minimally, makes one uncomfortable and lacking in troubleshooting skills; being unskilled and uncomfortable leads one to be easily frustrated by small or simplistic problems; being frustrated makes one reluctant to gain experience that would minimize frustration and facilitate comfort.

Several students made reference to age as a factor contributing to their dislike of computers and discomfort using them.

"[I'm] very comfortable [using computers]...now. I wasn't several years ago. I'm kind of older. I'm an older person, so I call myself electronically challenged..." (student 17)

“I compare myself to my parents’ generation that would refer to the new math.”
(student 22)

“In my old job...when I started out...there were no computers...computers came on me in later life, and it’s been hard to adjust. So taking that course online was, you might say, a challenge.” (student 4)

Although this study did not ask for age or birth year, age is often associated with technical aptitude, with older people generally being characterized as computer illiterate. This illiteracy is generally thought to exist because older people did not grow up in the current technological era, and thus did not learn technical skills early in life, as have more recent generations. While the three remarks above generally support this generational notion, of worthy note is the effort some of these older students have made to adjust to a culture heavily dependent on technology.

Although none of the students quoted in this subsection directly articulated how their dislike of computers may have affected their learning experiences, it can be inferred that a general and underlying distaste for technology preceded, caused or compounded the other personal traits described. For example, a student who generally dislikes computers may experience some measure of task-aversion related procrastination, be more highly influenced by any previous negative e-learning experiences, and be more apt to prefer group learning and thus the more likely to choose learning format options that replicate aspects of learning in a classroom. Similarly, a student with negative prior experiences may develop a general and underlying distaste for technology. While this study does not intend to prove cause or effect, it does suggest that technical aptitude can share a complex relationship with other personality traits and preferences related to learning.

Summary

Personality trait and preference barriers identified in this study included procrastination and cramming, expectations, learning style preferences, and technical aptitude. As depicted earlier in Figure 4, the personality trait and preference barrier category contributed to all three systemic problems. The strongest contributions were to the absence of deeper learning and the illusion of convenience, with more minimal contributions to the lack of an organizational culture of learning.

A large percentage of students in this course (36%) procrastinated, and an even larger portion crammed (67%). A few students engaged in intentional cramming as a way to increase retention and minimize competing priorities and workplace distractions. For most students, however, cramming was unintentional, with some students expressing regret over engaging in crammed learning which resulted in feelings of being rushed or hurried. In some cases, due to lack of time, students chose to expend minimal energy and do only the minimum amount of work required, which partly explains why only one student out of 30 completed the recommended analysis exercises at the end of each module. Crammed learning is often hasty, careless, and incomplete, with students omitting important learning elements to save time. These types of hurried learning experiences lacked quality and substance, elements of deeper learning. Additionally, many students had inaccurate expectations of time required for study, due to misinterpretations about what the time estimates given indicated or included. These inaccurate expectations may have contributed to the hurried feelings associated with procrastination and cramming.

Students also believed that the online delivery medium fosters expectations of courses that are easy, impersonalized, brief, passing, shallow, and cursory in nature, potentially making

students less receptive to and less invested in a more rigorous e-learning experience.

Expectations of lesser academic quality contributed to negative perceptions of experience quality in general, and since perceptions, attitudes, and expectations can affect actual experience, students with low expectations may have been less likely to engage in deeper learning and more meaningful scholarship.

Learning style preferences also contributed to the degree to which students likely engaged in deeper learning. Students suggested that interaction, a key element of learning in a group, made learning more engaging and increased retention, both key elements that define deeper learning. The lack of interaction present in this course led many students to choose the self-study learning format that best replicated face-to-face learning—the PowerPoint presentation style format with audio. Despite the fact that this format included no true interactive components, students felt that stimulating both visual and auditory senses was the most effective and enjoyable option in the absence of interaction.

Personality traits and preferences contributed heavily to the degree to which students engaged in deeper learning, and also to the illusion of convenience. The contributions of workplace barriers to the illusion of convenience are significant, as described in the previous section. In this section, students described procrastination both simply and in more complex terms. They suggested a strong link between competing priorities and incidence of procrastination, yet since procrastination is a personal choice, students bear some responsibility for this outcome. Although not explicitly stated by students who disliked or felt uncomfortable using computers and the Internet, procrastination that was task-related—putting off an unpleasant task—may also have been present. Procrastination, regardless of its cause, may also have been a contributing factor to the forty-eight percent attrition rate for the course. Students

also suggested that the self-paced online medium, which lacks the structure many are accustomed to, facilitates procrastination. Inaccurate perceptions of time required for study can also promote procrastination and cramming, with some students requiring half again as much time to complete a module as predicted. Indeed, in many cases, procrastination was followed by cramming. Regardless of the causes of procrastination and cramming, students' choices to delay learning, then compress it into whatever time remained, affect the timing of learning and the amount of control students have in determining that time. As such, these two behaviors are contributory factors supporting the notion that convenient e-learning is illusory.

Although, as mentioned above, students acknowledged that the self-paced online learning medium facilitates procrastination, if procrastination is instead the result of, or heavily influenced by, workplace barriers, this may support perceptions of an organizational culture that devalues learning. Likewise, the prevalence of prior negative e-learning experiences supports this perception. Most students described their previous experiences in required agency e-learning training courses as distinctly negative. They also acknowledged that these negative experiences led to negative expectations and strong stigmas against e-learning in general. Although there is no explicit link in this study between technical aptitude and prior negative experience, it is feasible that disdain for technology may cause students to be more sensitive to negative experiences or that repeated negative experiences may result in disdain for technology. Regardless of how technical aptitude may compound negative experiences, the fact that negative experiences, which have institutional causes in this case, may be fostering a reluctance to engage in future e-learning is in direct opposition to the increasing trend in e-learning offerings supported and encouraged by the government. Additionally, most of the students interviewed in this study preferred learning in a group to learning alone. Whether this preference is a result of

prior negative experiences or technical aptitude is unclear, however, the preference for classroom learning, especially if coupled with prior negative e-learning experiences, may exacerbate reluctance to engage in future e-learning.

Course Design/Structure Barriers to E-Learning

Introduction

When examining barriers related to course design and structure, it's important to consider both content and delivery—the weaknesses associated with the *what* and the *how* of learning. Interaction and networking are important components affecting how learning occurs. Since these aspects are inherent in the classroom, they are often overlooked, but can be key to reinforcing formal learning and extending that learning beyond the individual into the community and beyond the present into the future. Affirmation is also an important element of how learning occurs, both in the form of interaction (feedback from asking questions) and performance (confirmation of completion and congratulations). Additionally, the reliability, or unreliability, of technology can influence when and how well students learn. Although technology underlies this entire thesis, its relationship to and role in learning is discussed generally in this section. The next section on technology barriers focuses heavily on technology and discusses it specifically in the context of technical problems. Reading on-screen can also influence learning, and difficulty can make printable options important for some students. Offering different format options to accommodate learning preferences can, however ironically, lead to beliefs that e-learning caters only to the visual learner and ignores other senses and ways of learning. Online delivery can also affect retention and, through lack of sequestration from competing priorities and increased ease of distraction, influence tendencies to multitask, procrastinate, or become distracted.

In addition to considering how learning is delivered, weaknesses in the learning materials themselves can also hamper learning. Choices in how content is presented—length, use of sight and sound, structure of testing, and prevalence of examples—can affect both impressions and quality of student learning experiences.

Although identifying weaknesses in both learning delivery and learning content are pivotal, relevance of learning to work can impact the learning experience. Lack of relevance can occur for various reasons including lack of overlap or a mismatch between course content and job responsibilities, and may influence student choices regarding completion of specific tasks within the course.

Overall, these barriers collectively make up the larger category of course design/structure barriers and will be discussed in more detail as follows. A concluding summary describes how these barriers contribute to two of the three systemic problems—the illusion of convenience, and absence of deeper learning.

Weaknesses of the E-Learning Format

Weaknesses in course design and structure generally fell into two categories: weaknesses associated with aspects of the e-learning format and weaknesses associated with the course or the course materials. Weaknesses associated with the e-learning format are significant because they encompass difficulties in how learning materials are delivered—delivery being the bridging component between epistemology and the actual act of learning. These weaknesses will be described subsequently and include: lack of interaction, networking, and affirmation; unreliable technology; difficulty reading on screen; ignoring multiple learning styles; lack of sequestration and ease of distraction; and retention issues.

Lack of interaction. In the previous section students described learning style preferences for group learning and highlighted interaction as being a key component related to this preference. One student described e-learning as “a nonhuman substitute” (student 22). Another student inferred that interaction is one of the “intangibles” (student 27) students enjoy in a classroom setting and is often difficult to replicate online. In fact, the most highly referenced intangible and the most common complaint related to the e-learning format was lack of interactivity, specifically interaction with an instructor and other students, like the following student described.

“I think interaction with fellow students and just bouncing ideas off of fellow students as well as faculty is problematic with an online course, at least a course that doesn’t have sort of that interaction...I think in an academic community, it’s that whole interaction, not only with your professors, but also with your fellow students...that’s extremely helpful. The internet has done an exceptional job of putting a lot of information out there...But I still think as far as a college campus, that provides an atmosphere that you’re not able to duplicate on the web or with distance learning.” (student 10)

In addition to quantifying the types of interactions that are important, this student also suggests that interaction is part of an overall atmosphere of learning. Student 10, here, echoes student 27 by also referring to interaction in an abstract way. It is not surprising in either of these students’ cases that a conceptual understanding of interaction leads to the belief that interaction is difficult, or impossible, to replicate outside the classroom.

Not all students described interaction so abstractly, however. Many students in one way or another described interaction as asking questions, getting feedback, exchanging ideas, or brainstorming. Students, like this one, identified creative thinking as a benefit of interaction: “...anytime there’s a group of people, you’re going to hear things that are kind of outside of your box of thought” (student 7). Other students suggested that interaction makes a course more

appealing. “I think probably if there’s in a group setting or a classroom setting is probably more interesting, just because of the social interaction. Even if you have interesting subject matter, staring at a book or a computer screen can be uninteresting, to say the least, at times,” this student said (student 28). This comment is very similar to several in the previous section. When talking about the benefits of group learning, students identified interest and engagement, and likewise mentioned these concepts here when talking about the importance of interaction. Students also identified learning through examples as an important component of interaction.

“Real life examples being voiced, specific issues that people have encountered where maybe the cookie-cutter format didn’t quite apply or the places where just those nuances and inconsistencies that pop up when you’re doing this type of work. I think those real life examples are helpful to learn.” (student 12)

Although this course did present a variety of authentic examples, student 12 is referring to ad hoc examples revealed through discussion. Her remark demonstrates an understanding of how examples presented through course materials often don't address problems or needs outside of the frameworks or processes being taught. As such, she expressed a need for interaction through unplanned and unscripted example sharing as a way of reconciling this conflict and thus learning how to apply frameworks or processes to different, or difficult, situations.

Instead of referring to interaction as a way to learn specific skills, a variety of students viewed interaction according to who they envisioned interacting with. The following students identified interaction with an instructor as being an essential element of learning.

“Just the experience of a teacher or professor that can bring those personal examples and real-life situations, something like that, that’s probably the biggest difference between the online and classroom setting for me.” (student 15)

“[In online learning] I think you lose some of the enthusiasm of a professor, that you lose that kind of, the personality and the enthusiasm and the passion of what’s being taught.” (student 9)

Again mentioned here are real-life examples, but in the context of instructor expertise. In addition to expertise, student 9 mentioned the enthusiasm of an instructor as being influential. Both of these quotes suggest that the scripted and impersonal delivery of information in self-paced e-learning courses leads students to minimize or fail to recognize instructor experience and miss the passion many instructors bring, making uninteresting subject matter enthralling. Students who are interested and stimulated are more engaged and thus likely to learn more deeply.

While the students above identified the importance of interaction with an instructor, a variety of students prioritized interaction with other students—“learning from your peers” as this student put it (student 21).

“[In e-learning] you just lose all of their experience that makes a class so good. I’m a defensive driver instructor in the class that we come together. And I teach, everybody is kind of required to help teach the class, because I figure a lot of the people that I’m teaching have probably driven for 40 years, they just need to have the defensive driving class. Well, they have a lot of experience, and they have a lot to bring to the table. So I’ve talked to people that have taken a defensive driver class online, and all they do is read it and answer the questions so they don’t get that interaction with the people that have done that specific task for many years.” (student 13)

Student 13 described the benefits of learning from peers well. She underscored the importance of what often happens in groups of experienced individuals. In such groups the role of instructor moves from person-to-person, resulting in a group-taught learning experience in which there is no single or dominant instructor.

Overall, 26 of 30 students mentioned lack of interaction as a weakness of e-learning courses. According to Bacon and Stewart (2006) students that learn more deeply attempt to understand course materials by engaging in active learning processes to find additional meaning in the materials. They suggest that interaction, including project work and discussions, is an active process that facilitates deeper learning. Conversely, they stress that “the most common

example of passive learning pedagogy is lecture” (pg. 184), and students in the Wilderness Stewardship Planning Framework either read the material on their own, using the PDF format, or watched and listened to what can be considered an online lecture. The fact that so many students mentioned lack of interaction, and that interaction facilitates deeper learning, suggests that the degree to which students engaged in deeper learning was negatively affected by the absence of interaction.

Lack of networking. Students also mentioned lack of networking as a weakness of the e-learning format. Networking is considered to be a type of incidental learning—learning that serendipitously occurs as a by-product of another activity (Bova & Kroth, 2001). Networking is typically understood as informal interactions that occur during breaks or at other off times during a course or conference. “...It’s sort of that casual interaction that reinforces some of the learning points that you miss [in e-learning],” said this student (student 10). Student 10 identifies some immediate benefits of networking, specifically that casual conversation strengthens or supports what has been learned formally. These informal interactions also often lead to later learning through future professional contact. This student described it this way:

“And then another aspect of classroom that is missed...is the camaraderie you build with the other fellow students, sharing notes and sitting around the drinking fountain at break, discussing in depth maybe a specific case that’s going on on your district and you’ve met, you’ve heard through somebody’s question that they’re dealing with a similar question on their district, so you guys can kind of put your heads together, that whole aspect of networking and then the follow-up networking later.

...you remember that person that had the glasses that asked that question about such and such. And then a year later you have that same question. You’re like, oh, that lady with the glasses had that question, and then you try to remember her name and you dig through for her name, and you’ve got the list and you can email her and ask her that question.” (student 7)

Student 7 describes how informal interactions can immediately result in problem solving as students discuss similarities and differences in the work they do. He also describes how these types of interactions can facilitate future contact and future problem-solving. The following student described this aspect further:

“I’ve met [one of the course instructors] several times, but I had met him outside of there. When I did attend that training, I felt comfortable enough to send him an email when we were starting this wilderness process and ask him some questions. So I think when you’re actually in a classroom setting and you meet other managers that do the same kind of things you do or experts in that field, you actually get the networking skills to be able to call them up when you have an issue and maybe find some answers.” (student 18)

This student's remark suggests that informal interactions with both students and instructors or other experts facilitate future contact by increasing familiarity and minimizing discomfort, barriers to future contact. In other words, when two people have met informally, not only do they have an understanding of the expertise they can offer one another, they feel more comfortable contacting each other at a later date.

Finally, students valued networking related to career advancement.

“I’d like to advance. I’d like to get in more of a management type setting someday. I can’t ground pound for the rest of my career. I mean, there’s going to come a time when, at times we’re doing arduous work, and so it would be nice to get to know folks, to get to meet folks from other districts, other regions, that kind of thing.” (student 31)

This student suggests that networking is important for career advancement, specifically advancement from lower field-going positions into management.

All of these students identified networking as an important component of training that was missing from their e-learning experience. Although networking has benefits in the short term, the informal interactions that result in an individual forming a professional network are most valuable in the long-term. The existence of professional networks or communities to strengthen and support workplace learning is indicative of workplace

cultures that support learning. Not only do these networks facilitate career advancement, having a safety net of shared experience better allows students to extend the learning that occurs during training into the future. Removing this component from the learning experience may leave students feeling isolated and alone and may promote management actions made in a vacuum.

Lack of affirmation. In addition to interaction and networking, students also mentioned the lack of affirmation, or feedback, as a weakness of the e-learning format. "...instant gratification as far as feedback, I guess that's the thing I kind of miss with e-learning," said one student (student 14). Students distinguished between different types of feedback. As mentioned previously in this section, students identified interaction as a key component of learning, with many describing interaction as getting feedback. When talking about lack of affirmation, students differentiated between getting feedback from discussion and getting feedback regarding performance. "...If you're looking at something and like me, I think I've interpreted this correctly, but you're not completely sure. You kind of have to work a little bit more, figure it out for yourself..." said one student (student 20). Another student said, "I think just that overall discussion...to kind of get that immediate feedback if there's something that you want clarified" (student 15). These students discussed affirmation or feedback in terms of clarification, with questions and subsequent discussion as the vehicle for feedback. This type of feedback is important because it allows students to flesh out concepts they may not understand initially, thereby helping to ensure accurate understanding and application of learning materials, both immediately and subsequently.

Students also desired feedback regarding their performance in the course. These students described two important aspects of feedback regarding performance:

“...When I finished the course and finished the exam, I went to the grade section, and I was kind of looking for that feedback and that affirmation there. And I saw the grades, but it wasn't the final grade. So I kind of had a question in the back of my head, not for long, but for a short time, did I really finish everything that I was supposed to?” (student 2)

“I think the one big thing was that when I took the final, and I knew what score I needed to get to pass, and so I took it. And then it tells you what you got. And there was nothing after that. There was just nothing...Nothing popped up and said you passed. Nothing popped up that said, ‘Good for you, go to this place for your diploma.’” (student 4)

Student 2 described lack of feedback as resulting in confusion over whether or not he had completed all of the required tasks necessary for course completion. As an extreme example of this type of confusion, another student described taking an exam in a different training course repeatedly because no feedback was given as to whether the grade had been recorded or whether the student had passed. Degree of confusion may be related to technical aptitude in that students who are more tech-savvy may be less confused by a lack of feedback regarding task completion.

The second student above, student 4, described a different aspect of performance-related feedback, positive affirmation (i.e. a pat on the back) and documentation of completion. Although students in this course received a hardcopy certificate, these certificates were sent out over e-mail once the student had completed the course. E-mails were sent out in batch fashion on the first of every month, so in some cases, students waited an entire month to receive their certificates. Although the certificate process was described in the course materials, remarks from both students above and similar confusion suggests that students do not view feedback in e-learning courses differently than they do in classroom courses. The expectation for both is that feedback regarding performance is immediate.

Unreliable technology. For e-learning courses to function, reliable technology is a prerequisite. As such, several students identified unreliable technology as a distinct weakness of the e-learning format, yet its discussion here is general and overarching in nature. "...If I have trouble getting onto the site or have any trouble with [it], if it's just not functioning, obviously, and there's nothing I can do about it, then I can't do the course," said this student (student 25). "...You're dependent upon everything working right on your computer," said another student (student 5). "I think first the basic technical aspects of delivery of such a course in an online setting have to be very smooth and functional. If you can't get past that, I don't care how high quality the material and the information is, you can't absorb it as quickly or as well," said yet another student (student 27). All of these students have a general understanding of the relationship between technology and learning—essentially that the existence of technical problems (i.e. unreliable technology) precludes or hinders learning. Difficulty accessing the course materials influences when students can learn and the presence of access issues may prevent students from learning during preferred or convenient times. Technical problems may also decrease retention by requiring that students focus on resolving, working around, or ignoring technical difficulties rather than focusing on the course content. Some students in this study did experience technical problems that affected either access to the course materials or the way they functioned. Since these problems are classified as technical barriers in this study, however, they are described in detail in the next section, but brief and more general mention here is warranted. For students, obviously, the unreliability of technology was a factor that negatively affected their learning experience, or, as the students above acknowledged, had the potential to.

Difficulty reading on screen. Only four students specifically admitted that they printed out a hardcopy of the course materials (the PDF format), indicating that most of the students viewed the course materials on their computer screens. Several students admitted this was trying, like this student, who read the PDF version on-screen. "...I guess it is a little difficult to read online or on a computer screen the whole time," she said (student 19). "...At home I have a large flat screen that's pretty comfortable for reading. But if you don't have a large screen or you have an older one, I think it's very tiring on the eyes," another student said (student 5). Student 5 echoes what is probably the most common complaint concerning extended computer use—that looking at a computer screen for long periods of time can result in eyestrain. The following student, one of the students that printed out the course materials, however, identified a different point.

"Well, I think having to be in a place where you read a screen makes it harder. You could make the case that there's screens every place now...and maybe people that are more used to...this technology, that's not a problem for them. I'm always amazed at the people that read books online. I don't see how they can sit in front of that computer like that...I would think having it on the screen only is a problem, it'd be for me." (student 4)

This sentiment is similar to those expressed in the previous section in which students alluded to relationships between technical aptitude and computer experience, comfort, partiality, and troubleshooting skills. Here, this student implies that a relationship exists between technical aptitude, specifically familiarity or habituation, and the desire and ability to read, or in this case, learn, on-screen for long periods. Student 4 also underscores an important epistemological point—that to accommodate students with an aversion to reading on-screen, course designers must provide course materials in multiple formats, with at least one that is conducive to printing in hardcopy.

Ignoring multiple learning styles. Although the Wilderness Stewardship Planning Framework was offered in two different formats, students felt that the e-learning format in general ignores the existence of multiple learning styles. While this sentiment may be more widespread, the students in this study who expressed it all chose the PDF format.

“Well, if you look at kind of the basics of educational methodology, people learn in a variety of different ways. And some people do better hearing, some seeing, some doing, some reading. Most a combination of all of the above... with online learning I just feel like it only in general and in its simplest form it's really only playing to one of our senses and one method of learning.” (student 33)

Another said, “I think there's a potential for [an e-learning] course to just be appealing to one style of learning...” (student 2). Students 2 and 33 read the PDF on-screen. Student 4, who printed the PDF, characterized his learning experience as follows: “...Doing [it on] the Internet is almost just like reading it out of the books...” (student 4). Student 26 also read the PDF on-screen, and he and student 2 described how ignoring multiple learning styles affects the quality of learning.

“I think when the course was designed, what they had in mind for it, I think I left the course with it. But, at the same time, a course that I was in, in person, maybe a two-day course sitting down, and there were assigned readings to take, and then you go over the materials during the day and study them again before an exam, it would be just a couple more, appealing to a couple more learning senses and a little more exposure. I think I would probably have a stronger base in the skills there.” (student 2)

“...There's plenty of people that learn different ways, so I can't say that everybody would be great learners if they just used a computer class. They would definitely be missing stuff and not learning as much as if in other ways.” (student 26)

Both of these students imply that the amount students learn and retain is maximized in an environment that caters to multiple learning styles. Providing course materials in a format that caters only to visual learners, for example, may affect the degree to which students engage in deeper learning, especially students who learn most effectively through hearing, doing, or

interacting with others. Student 2 also recognizes that accommodating multiple learning styles may require interaction, the most mentioned weakness of the e-learning format.

Interaction also allows for ad hoc changes to accommodate multiple learning styles. Student 33 described how this often results in highly personalized learning in the classroom, in contrast to learning online.

“Well, you know, specialized help if somebody has, is having trouble in a certain area. You know, when you’re in a classroom, a quality instructor is going to be able to recognize that. And whether they tailor their general delivery that they’re giving to the whole group, whether they tailor that to better meet the needs of that one student or they take a little bit of time off to the side to try and help them learn in a way that’s, present the material in a way that is more in line with that person’s learning style, you don’t have that opportunity online.” (student 33)

Interestingly, the students who felt like e-learning ignores multiple learning styles all chose the PDF format, one that caters to visual learners. Additionally, since none of these students completed the work product application exercises, reading was not supplemented by doing, another type of learning. When collectively viewing the remarks here and in the previous subsection in light of technical aptitude, an interesting dichotomy emerges. Providing a simpler print-friendly format accommodates both students who don't like to read on-screen for long periods and students with lesser technical aptitude who may be more inclined to choose the learning format that is most familiar or appears to be least technically complex. However, providing this simple option leads the students who chose it to view e-learning as ignoring the multiple ways in which they learn, ways that may have been satisfied had they chosen a different format. In essence, accommodating one learning preference or characteristic may hamstring another.

Lack of sequestration and ease of distraction. As in the section describing workplace barriers, students suggested that the lack of sequestration, or removal from the work

environment, inherent in e-learning influenced how students were affected by the existence of competing priorities and workplace distractions. Here, students express similar sentiments implying that a lack of sequestration is a weakness of the e-learning format.

“...I like the actual classroom experience [because] you go someplace, everybody’s committed to learning, and you don’t get those interruptions.”
(student 14)

“When you go to a class, you physically take yourself away from your phone, your computer, all your red files of things to do, you know, that stare at you at your desk.” (student 32)

“I think because you have, say, for example, you were at your desk, you can be interrupted, you can have other things that take precedence quickly. Where if you are away somewhere at a training, that is your priority. So it makes you really have to focus and make sure you’re ready to sit down and make that your priority.” (student 13)

These students imply that being physically removed from the distractions and responsibilities of the work environment facilitates learning by eliminating competing priorities and allowing students to focus strictly on learning. While a lack of sequestration doesn't preclude learning, it does, as these students suggest, make learning more difficult and more reliant on a student's internal ability to schedule learning appropriately, ignore interruptions and retain concentration.

Students also suggested that not being sequestered increased tendencies to multitask and procrastinate.

“...It doesn’t necessarily relate to specific technologies, but you’re more maybe prone to multitasking while doing an online training or anything like that.”
(student 15)

“...Being on a computer often times we’re just tempted to check our email compulsively, so and that would break the flow of learning.” (student 23)

“And then just the fact that sometimes they’re less structured so it’s easier to procrastinate and do things like that than it is if you’re in an actual classroom where things are more structured.” (student 20)

As noted in previous sections, distractions, such as phone calls and email, and procrastination were prevalent. The implication here is that a lack of sequestration is a weakness of the e-learning format that may exacerbate these tendencies.

In addition to exacerbating priority conflicts and tendencies to multitask and procrastinate, other students suggested that learning and working on the same computer is distracting. "...I'm using the same computer that I'd be learning on to do my day-to-day work, so that was a little distracting for me," one student said (student 19). "...Because you're on a computer all day it's hard to keep your attention. I think it drains you over time," said another student (student 9). Clearly, these students associate learning with a change in physical environment (i.e. work and learning occur at different places). Students are not differentiating here between classroom and e-learning suggesting that they may be unconsciously applying the same norms that exist for classroom learning to e-learning in inappropriate ways.

Students also suggested that, when learning on a computer, it's easier to get sidetracked than when learning in a classroom.

"...I think because it's not a human, it's easy to get distracted. You know, the computer's on, you're supposed to be reading it or you're supposed to be listening to it. But, at the same time, a hawk just landed on my telephone pole, then I'm looking out my window. And oh, hey, it's raining now. You know, I mean, your mind tends to wander more when you don't feel like somebody's looking at you speaking." (student 7)

While the students above suggested that working and learning on the same computer was distracting, this student asserts it is the inhuman aspect of e-learning that makes getting distracted easier. This student suggests the presence of others helps one retain attention through illusory or actual oversight.

Overall, the e-learning format can increase tendencies to multitask, procrastinate, and become distracted and can result in a disjointed learning experience, as several students

described. Although most of these tendencies can be considered personality traits that surfaced during times of lower self-control, exacerbation of these tendencies can affect when students feel like they can learn and the control they feel they have over the learning environment. Maintaining continuity during learning also helps maintain concentration, and students who fall prey to these tendencies may be less inclined to engage in deeper learning.

Retention issues. A variety of students mentioned lack of retention as a weakness of the e-learning format. Since retention of knowledge learned is an important element of deeper learning, problems related to retention are important issues in e-learning courses.

“[My employees] do so many other trainings on the computer that by the time they get through all the ones that are actually mandatory, you know, information security and privacy and ethics and equal employment and equal rights and all this stuff, I feel like people are just kind of marching through these [optional] courses without paying much attention to the content.” (student 33)

“I think a lot of times it’s easy to just kind of scan and scroll through. I know I do that on the AgLearn courses...So I think if you’re not really feeling very focused I think you can kind of skim through and feel like you’ve completed something when really you haven’t gone into too much depth and you probably didn’t retain too much.” (student 12)

Students 33 and 12 bring up several interesting points. Student 33, in talking about the number and type of agency e-learning trainings his employees engage in, suggests that retention may decrease over time as students complete more and more e-learning courses. In the previous section, students articulated how their negative experiences in required online agency training courses negatively influenced their expectations for Wilderness Stewardship Planning Framework. Here, student 33 echoes some of the same sentiments by implying that the sheer number of e-learning courses required by the agency exhausts students to a point in which they can no longer retain the more valuable knowledge learned in optional courses taken later. The assertion is that poor quality required courses both impede retention in those courses and other

courses, thereby decreasing students' ability to engage in deeper learning. Student 12, in fact, stated that she skims through the required agency courses. In doing so, she acknowledges that engaging in superficial learning is much easier when learning online. She also alludes to the importance of internal motivations (feeling focused) as decreasing the tendency to engage in superficial learning, underscored by another student who said, "I kind of knew, because it was an online class, that it's up to me to get out of it what I can" (student 13). These remarks underscore the importance of active student participation and responsibility in learning.

Several students chose to print the course materials in hardcopy, instead of actually completing the coursework online, as a way to increase retention. One student said, "I don't think I retain as much...it's a big reason I printed everything off, because I knew I wouldn't really retain it online" (student 31). The following student had a similar response.

"And for my own benefit, I've probably killed a couple trees, but I print out all these materials and I save them as a point of reference, because I know I'm not going to absorb everything that's on a computer screen and have 100% retention. So I use it as much as a tool, a reference tool that's something I can return to when the need arises." (student 16)

Not only did student 16 print off the course materials because she, like student 31, expressed difficulty retaining knowledge learned online, she also did so for future reference. While many students acknowledged that they either printed out the course materials or save them digitally for future use (and thought this ability was a distinct benefit of the course), student 16, unlike student 31, implies she printed the course materials for the same reason many people own encyclopedias—why learn it when it can be looked it up? This is an interesting detriment in e-learning that may not be present or prevalent in the classroom. Because students in courses like the Wilderness Stewardship Planning Framework know they have access to the full course materials indefinitely, this may, in fact, hamper retention and deeper learning if students are unable or do not try to distinguish between 1) simple concepts, or facts, that lend to

memorization and can be looked up later instead of being memorized now and 2) complex concepts that need to be understood now in order to be retained for use later.

In the previous subsection, students implied that a lack of sequestration promotes multitasking, procrastination and easy of distraction, and here they suggest that this aspect of e-learning negatively affects retention.

“It would have [been] nice to have been in a classroom setting where that’s all I had to concentrate on is the material that I was learning. And I think because of that I found myself having to kind of go back and kind of review just a little bit of where I left off, especially before the little time there at the end. And had to do a lot of that. And I just didn’t retain it. I don’t think I retained it as well as if I would have been somewhere in a classroom environment with other people, with other folks that are wilderness managers.” (student 31)

This student asserts that a relationship exists between lack of sequestration in a classroom, the need for repeated review, and the ability to retain knowledge. It's important to note that the above student’s remark may indeed be influenced by both competing priorities and learning style preferences. Essentially, it is possible that a student experiencing high levels of priority conflict who prefers learning in the classroom may find it difficult to retain knowledge in a self-paced e-learning course and thus attribute this lack of retention to a lack of sequestration.

Some students, however, instead linked retention to a lack of interaction with others. “...For me I feel like it’s difficult to really absorb as much through online learning as you would if you were actually in a classroom or in the field and dealing with live people and not a computer screen,” one student said (student 33). “I like doing it with a group, because I feel discussions help me to retain things better. Even if you’re reading things alone, having a discussion with a group always helps me retain things,” another student said (student 19). Similar to student 31 above, these students suggest that retention is maximized in the classroom, however they suggest that, instead of a lack of sequestration, this is specifically due to interactions with others. In fact, earlier in this section many students voiced complaints related

to the lack of interaction inherent in e-learning. They suggested that interactions with both instructors and other students made learning more interesting, engaging, tailored, and, as the students above state, increases retention.

Weaknesses of the Course/Course Materials

While the last subsections discussed weaknesses in e-learning delivery, this subsection looks at weaknesses in the course and the course materials. Although e-learning delivery is obviously a key element in online learning, epistemological issues also factor in to overall student evaluations of learning. Weaknesses of the course and course materials discussed here included: compressed format, focus on words not concepts, need for more examples and testing issues.

Compressed format. As described in the previous section, some students expected the Wilderness Stewardship Planning Framework to be cursory and general because it was offered online; others crammed learning into a shortened timeframe, either intentionally or, more often, unintentionally. This notion of compression and brevity is expressed here as well by students who felt that the course materials were pared or trimmed. “I’m guessing that to make the course less than six weeks of solid studying they had to truncate it somewhat,” this student said (student 7). Tenets of student expectations and prior experiences emerged also as students made comparisons to traditional training courses which typically sequester students for several days’ or a week’s worth of learning.

“... I don’t think I would get as much out of it, just because it’s so crammed, you know. Because usually they try to do it in a 40-hour week,..[or] if you take a college course, it’s over the semester. So I just think it’s really difficult to cram that much in even on an online course...” (student 35)

“...It’s a lot of information to ingest in say a five-hour timeframe...I’m used to having a course that’s going to last at least a week or something like that rather than something that I can conceivably finish in a day. I didn’t, but you could have finished it in a day. I don’t know if you would have been really prepared for it.” (student 30)

Although all three students quoted above believed that the course materials themselves were shortened or abbreviated, students 35 and 30 suggest two different interpretations of what this meant. Student 35’s comparison to typical agency training and University semester-length classes suggests that he believed a considerable amount of material was excised, so much so that this truncation equated with a lesser learning experience. Student 30’s remark implies that he believed truncation was more purposeful and less extreme, resulting in a course that, while shortened, was very dense and potentially overwhelming. The true epistemological issues with perceptions of course material truncation, however, are articulated by the following student:

“...It was clear that a lot of the recordings that were used were taken from some kind of training seminar or something that the Carhart Center put on at some point. And obviously they had to cut a lot of the conversation and dialog of the teachers out in order to make it fit. I really would like to have had like more access, at least, to some more full-length kind of discussions, talks, presentations on the subject material, if that is, in fact available.” (student 23)

Student 23, like the others above, acknowledged that the material was truncated and expressed a desire to have access to the full-length content from which it was created. In reality, his perception that the content for the Wilderness Stewardship Planning Framework came from elsewhere isn’t entirely inaccurate. To obtain much of the content, the Carhart Center recorded the two instructors featured in the course as they gave presentations on various topics covered in the course. Although their presentations were not given for any other reason than to be recorded for the course, they were informal, resulting in a recording that sounds as though it was recorded at a live event (as opposed to in a studio). The audio from the presentations was then edited substantially, with specific pieces of dialogue being cut and placed in different portions of the

overall course outline, interspersed with narration recorded to describe topics not covered by either instructor. While this resulted in a very dynamic audio track (i.e. three different voices alternating), it also gave the impression, as student 23 stated and the other student above implied, that the Wilderness Stewardship Planning Framework was originally taught in a classroom setting and that the e-learning version is a truncated afterthought (i.e. that the Carhart Center thought, “Hey we have this great classroom course, let’s make it into an online course.”). The epistemological choices giving rise to this perception may lead students to believe that they've missed out on a more robust version of the course by taking it online, when in reality no classroom course on the topic exists.

Focus on words not concepts. Not only did some students feel as though the course materials were truncated, or shortened, others also felt as though the focus of the course was narrow because it focused on words and not concepts. “A lot of it was really focused on terms and remembering what they mean and all that rather than more basic understanding of the whole process and what needed to be done,” said one student (student 25). Another student described this in more detail:

“I found it to be, I think because it’s trying to teach a course on something that’s based on a legislative act that every word is very precisely chosen. But I think when you put too many precisely chosen words in a row,...you get lost, because I don’t think it really...described why different words are used. And I think I found it that when you were listening you knew the precise words were very important...But I didn’t think it was in-depth enough to compare it to other words. And it almost felt like a crossword....you start to focus a little too much on the wording and a little too little on the meaning and the comprehension.”
(student 9)

Student 9’s use of the word “crossword” to describe her frustration is poignant. She, like student 25, implied that the focus of the course was basic, limited and restrictive by centering on specific words rather than the larger systemic problems and concepts implied by those words. Since

student perceptions of the most important learning elements are often influenced by evaluation (i.e. how to learn in preparation for an exam) (Marton & Saljo, 1976b; Scouller, 1998), students with the sentiments described by students 25 and 9 often mentioned testing. Students described the practice tests and final exams as “rigid” (student 23) and “nitpicking” (student 4) with one student saying, “The testing brought you back to really exact things rather than the general idea” (student 4).

“...I found that it was infuriating to put in something like the word ‘crucial’ when the word they were looking for was ‘critical.’ And then that was wrong because the online scoring system is so precise. I found that really geared to how I needed to learn the concepts, because that was really sort of keying in on words versus concepts.” (student 9)

“What I didn’t like was some of the test questions. I felt like afterwards, I said you really have to pay attention. The ones that were fill-in-the-blank, oh, God...a decision maker needs the information, and I had put ‘needed’ and the word was ‘crucial.’ So it’s semantics...those kind of things. So some of that stuff I learned really quickly I needed to be writing notes on what the pertinent words were in case there were any fill-in-the-blanks, even though I felt like I had gotten the overall concept of what they were saying. When I went to go take the practice test, I realized I needed to write down the exact words.” (student 18)

“I thought the questions were a little bit hard. It would have been hard if I didn’t have the material available to look at, because they were so exact.” (student 4)

Students 9, 18, and 4 explained how the focus on words influenced how they learned the course material and what steps they took to prepare for the testing. Prioritization plays an important role in how people cement knowledge into memory, with the most important pieces of information anchored most firmly and deeply. As mentioned at the end of the last section, deeper learning entails more than rote memorization, which is essentially what the students quoted here did. By devoting their energy to the memorization of specific terms that would be included in the tests, students may not have engaged in deeper learning by focusing on understanding and remember the broader concepts. For example, student 9 will likely remember the *word* “critical” but is less likely to remember *what* was critical. Since the Wilderness

Stewardship Planning Framework was aimed at preparing students to engage in an actual planning process and the important take-away was conceptual rather than concrete, the course may have inadequately prepared students for the later retrieval and application of knowledge in the real world.

Testing issues. In addition to the complaints expressed above concerning the exactness of test questions and the implications this had on how students learned the course materials, students also had other issues with the testing. One student said, “The scoring was a little hard, because some questions have four answers, and if you missed one of the four, you missed the whole question. Should have given you a little slack on there, you know, part credit” (student 4). The lack of partial credit was a repeated complaint, as was lack of clarity in the phrasing of questions. “Some of the questions on the exams weren’t straightforward,” said one student who expressed this succinctly (student 12). Another student described this problem in more detail:

“Some of the questions I thought were misleading, you know, or poorly worded to, you know, it steered you in the wrong direction. You know, so where I thought I’d researched, check the right answer and then you go back and look and go, ‘You got to be kidding me!’ So, you know, and you [had to] read this question real closely.” (student 5)

Another student described taking the practice exam, anticipating having done well, and being surprised by her resulting failure, later acknowledging, like student 5, the need to read questions very closely before answering them. Obviously, as mentioned in the last subsection, testing often influences how students learn the course materials, but testing problems are often easy to remedy. In fact, all of the complaints expressed above concerning testing were addressed by the Carhart Center before the course was reopened in the fall of 2008.

A more complex complaint that students expressed related to testing, however, was a lack of personalized, interactive, and subjective evaluation.

“... I’m not that big of a fan of tests or anything...I don’t even know if the test is the best way to make people learn either. Just, I don’t know, just make it more interactive basically, discussions, essays, stuff like that where you actually got to produce something. Or would be like coming up with your own kind of wilderness plan or something that were more production. I don’t think just taking a test, is testing your knowledge.” (student 35)

“...I would have preferred to have an open deadline and to have submitted my own product...Maybe if there was like an assignment that I could have picked from and submitted it for like peer review, that would have been much more challenging to me...But the fact that I had to get an 80% on a test really stressed me out.” (student 22)

“I think if the testing was more interactive, that that would make a big difference...I almost felt like if the course could have taken more of a scenario and worked through it and almost like the testing was, you know, here’s what you need to consider. Which way would you go? Why?...that that would be much more helpful.” (student 9)

Not only did several of these students express general aversion towards testing, they all suggested that the standard multiple-choice-question-type test did not sufficiently evaluate their understanding of the material. They expressed desires for evaluation in the form of application—essays, papers, scenarios, peer-reviewed assignments etc.—creative products that require students to demonstrate a deeper understanding of the course materials. Not only does this type of testing better assess student learning, the testing itself can serve as learning. Giving students an opportunity to apply what they've learned by doing further cements knowledge into memory and increases the degree to which students engage in deeper learning.

Need for more examples. Examples are an important form of teaching used to explain larger, more complex concepts. Some students expressed the need for additional examples to clarify information presented in the course.

“Looking back at it now I think it would be good if maybe more kind of examples, case studies incorporated would be a good thing to kind of help. Examples would help show, illustrate specific points and things like that.” (student 15)

“I guess the only thing I can think about is having people that are actually out managing maybe talking about a problem they had or issues that they had to get around or an actual example of what the Center was trying to get across to us.” (student 13)

While the students above articulated this need generally, some students mentioned the need for examples of specific concepts or topics.

“The one thing that I thought was kind of challenging was in the module 2, the questions and also trying to explain the wilderness character quality, that to me needs some more explanation and maybe some more examples of what they really are wanting to know about that kind of stuff.” (student 24)

Case studies, or real-life examples, are a common teaching method and are particularly relevant in job training. Through the use of case studies, a dispersed workforce, like wilderness management, can easily learn from the achievements and mistakes of its members. In essence, teaching through case studies is a way of strengthening the workforce overall through the sharing of information and storytelling. It's not surprising then that students expressed the need for more real-world examples. While the course did employ a number of examples, adding more would only strengthen the course epistemologically.

Lack of Relevance

While many students, especially those with wilderness as a primary job responsibility, found the course to be highly relevant, a variety of students felt that the course was either not applicable to their job, or that it was only relevant in the long-term. “It’s not super relevant to my specific job responsibilities right now,” one student said (student 2). Another student said, “I think in the long-term it’s definitely relevant. And so at this point in time, other than just gaining some general knowledge and not relevant to a specific project, but in the long-term I think it will be relevant” (student 15). Students for whom the coursework was minimally relevant or relevant long-term gave varying reasons:

“[The course was] not very relevant...I’m the wilderness ranger, so while I get to help make some decisions, I’m not the final decision maker.” (student 31)

“...Had I been in charge of a wilderness planning process, the tools that were presented would have, I think, adequately prepared me and helped me through the process.” (student 23)

“On the job now I’m not sure I will use it in my current position, because I’m obviously evaluating new potential wilderness areas, not existing ones.” (student 18)

Each of these students expressed different job-related reasons for why the course wasn’t immediately relevant including lack of authority over planning decisions, non-involvement in planning efforts or specific projects, or involvement in wilderness designation rather than management. It stands to reason that the course may have been less or not relevant to the 14 students, like student 2 above, for whom wilderness was a secondary- or non-portion of their job. In fact, as one student said, “...There’s nothing to really apply [the course] to here. There’s no wilderness here” (student 28). Interestingly, however, wilderness-related work was a primary job responsibility for students 15, 31, 23, and 18 quoted above. This suggests that the degree to which wilderness-related work constituted a student’s job did not equate with the degree to which the course was relevant. Comments like those expressed by student 15 may be due to the nature of the course since planning is often not considered a day-to-day activity, but is more project-based and is often confined in time within a formal planning process.

In the same way that students above suggested that the course was not relevant to their jobs, some students gave situational reasons, asserting that the concepts taught in the course were not relevant due to the specifics of the wilderness areas they managed.

“...I haven’t really got into the management issues because there aren’t very many in the wilderness here on the forest.” (student 34)

“It was relevant, and it wasn’t relevant. And the reason is, because our wilderness is...so remote and so tough and popular, and there’s some good entry points, but it’s hard, hard to get through, and hard to make your way through it, that we don’t

have a lot of the problems that were used as an example. But on other parts of our forest, other districts...For example, sites that are overused. We don't have any like that really, so we don't have those problems." (student 4)

Both of these students stated that their wilderness areas had few problems and expressed an inability to relate to the examples used in the course. A traditional way of teaching is to present conceptual information followed by specific examples aimed at helping students understand the larger, more complex, concepts and apply them under different circumstances. In fact, as articulated previously in this section, some students felt as though the course contained too few examples. It is possible that students 34 and 4 were unable to make the mental jump between conceptual and specific, thereby making it difficult or impossible to relate to the specific examples and understand how the concepts could be applied locally. Conversely, it may be that the examples presented in the course inadequately or poorly exemplified the concepts, leading to the inability to relate to them expressed here.

While some students gave job- or location-related reasons, similar to those expressed above about the course as a whole, for why the optional work product exercises at the end of each module lacked relevance, others described these exercises as impractical or lacking structure.

"...I saw the pragmatic value of doing that. But I didn't have anything that would be realistic for me." (student 2)

"I know that they wanted you to apply these concepts to your own park. But I think just to say at the end of each module, okay, now go look at your own park, and make these decisions. I don't think that's very likely...in my case, like I didn't have an issue I needed to work through." (student 9)

"So if there had been a setting, okay, and this is the wilderness area that you manage, these are the issues that you need to address, you know, and an interdisciplinary team to address some of these issues. Now how are you going to work through that process? I think that would have been helpful for me..." (student 10)

“And all the issues that were, that came out of each module, we really don’t have that problem. And so I couldn’t really, I couldn’t really do my own little exercise, because there was no, there was nothing to fix. So I thought about that, but I just, I couldn’t figure out how to do it unless I made up some problem. If I had been in class and had to do it, then I would have made up a problem...So that would be a real definite example of having a classroom situation with those.” (student 4)

These remarks are similar to those expressed above in that these students saw the applicative exercises as unrealistic and irrelevant and thus found it impossible to engage in the application of the course concepts locally. Student 10 adds to this by suggesting that the exercises lacked structure. Student 4’s remark here, however, is particularly significant because it also reveals a distinct difference between self-paced and structured learning. He acknowledged that, had he been in the classroom, he would have engaged in application-type learning, regardless of relevance. This implies that making these exercises an optional part of the course was a serious epistemological flaw, with one student, in fact, indicating that these exercised “have to be mandatory” (student 35) in order to be completed.

Lack of relevance of the course in general may have contributed to the lack of completion of the optional work product exercises. These exercises were the only opportunity in the course for students to employ application by requiring production of a creative, original, individual product (interestingly, one of the evaluative needs expressed previously in this section). Since application, or doing, results in deeper learning, the fact that only one student completed any of these exercises indicates that most students missed a tremendous opportunity to engage the course materials.

Overall, a lack of course relevance of both the course materials and the exercises to the workplace is significant because relevance is often a student measure of goal-oriented learning, which is typically indicative of both andragogy and job training. Adult learners in the workplace are individuals who engage in learning to obtain specific skills that allow them to achieve a

particular or specific job-related goal. In this case, students garnered skills necessary to complete a wilderness planning process. Although the course was designed and intended for those employees with higher levels of wilderness responsibility who would be, or could be, participants in or leaders of a wilderness planning process, actual enrollment was varied with almost half of the sample having secondary or no wilderness-related job responsibilities. Since part of course design, and job training more specifically, entails matching students to appropriate learning opportunities, the lack of relevance expressed here by a number of students may be due to poor marketing, rather than the quality of the course materials or to student expectations, other possible sources of irrelevance.

Summary

Course design/structure barriers identified in this study included weaknesses of both the e-learning format and the course/course materials and lack of relevance. As depicted earlier in Figure 4, this barrier category contributed to all three systemic problems. The strongest contribution was to the absence of deeper learning, with very minimal contributions to the illusion of convenience and the lack of an organizational culture of learning.

Most of the students in this study identified lack of interaction as a key weakness of the e-learning format. Although students characterized interaction differently—part of an overall learning atmosphere, asking questions, getting feedback, exchanging ideas, brainstorming, one of several learning styles, interacting with other students, interacting with an instructor—they suggested that interaction facilitates creativity and problem-solving, encourages critical thinking, makes learning more stimulating and interesting, increases retention, and provides opportunities for on-the-fly customization of learning to meet individual student needs or help troubled

students. A lack of interaction, however, may prompt some students to view e-learning as catering only or primarily to visual learners and can reduce the quality of learning for these students. Additionally, it can cause students to participate more frequently in passive learning processes, rather than active learning processes that help them find additional meaning in the course materials. Networking is a form of informal interaction and incidental learning that provides both short- and long-term learning benefits. In e-learning, an absence of networking can preclude reinforcement of learning immediately through casual discussion and later through future professional contacts. The absence of both formal and informal interactions in e-learning courses may represent yet another obstruction to deeper learning, both for the field of wilderness management as a whole and for individuals, especially for those who prefer learning with a group rather than learning alone.

Group learning away from the workplace makes students less likely to be influenced by competing priorities and workplace distractions, and can decrease tendencies to multitask and procrastinate. The lack of sequestration inherent in e-learning can increase the prevalence of these events or traits, often resulting in a learning experience that is choppy, irregular, disjointed, and discontinuous. Learning that occurs in fits-and-starts can be detrimental to maintaining concentration and focus, thereby making deeper learning difficult or impossible.

The ability to concentrate and focus is also important for retention, and retention is an important contributor to deeper learning. Students acknowledged that learning online increases tendencies to skim or learn superficially, thereby decreasing retention. Another interesting phenomenon is the use of the course materials for reference later in lieu of learning them immediately. Some students attributed retention issues to saturation with other online courses; others to a lack of sequestration; still others to a lack of interaction. Some students who were

concerned about retaining information online used hardcopy printouts as one coping strategy to increase retention.

In addition to delivery, retention and deeper learning are also impacted by the course materials themselves. A variety of students asserted that the focus of the course was too fine-scale, centering on specific words rather than overarching concepts. The structure of the evaluations influenced these views and often dictated what information students inferred to be most important and how they learned the information and prepared for the testing. Students memorized specific terms, rather than engaging in the deeper learning required to understand, remember, recall and apply more complex conceptual information. By implying that the materials were narrow in scope, students likely focused their learning on the wrong things and may have emerged from the course ill-prepared to undertake an actual wilderness planning process.

Students also viewed the testing as standard, impersonalized, and static and expressed desires for additional testing options that better evaluated their understanding of the information. They suggested evaluation in the form of application through the generation of creative products—essays, papers, scenarios, peer reviewed assignments etc. These types of tests are active learning processes that give students an opportunity to apply what they've learned by doing, and can thus improve retention and increase the degree to which students engage in deeper learning.

Although a significant contributor to the absence of deeper learning systemic problem, this barrier category contributed less significantly to the illusion of convenience. Students articulated a general and overarching understanding of the relationship between technology and learning—essentially that the presence of technical problems during e-learning courses precludes

or hinders one's ability to learn. Technical difficulties related to access, discussed specifically in the next section, particularly influence the timing of learning and may prevent students from learning during preferred or convenient times. As already mentioned, lack of sequestration from the work environment is associated with increased tendencies to multitask and procrastination, also behaviors that may affect the timing and duration of learning. Learning in the workplace, rather than somewhere else, also subjects students to workplace pressures, such as competing priorities, making it more difficult for students to schedule learning.

Likewise with the illusion of convenience, this barrier category also contributed less significantly to the lack of an organizational culture of learning. Students acknowledged that lack of networking was a weakness of the e-learning format. Networking allows students to form informal relationships that serve to facilitate future learning. Social integration through access to an extensive network of professional contacts and participation in communities of practice can be used by organizations to support learning. Since wilderness management is a relatively small field consisting of geographically-dispersed employees, these types of supportive learning structures would be highly appropriate. The lack of opportunities to form professional networks can further isolate employees, contribute to inconsistent management practices by encouraging management decisions made in a vacuum, and overall, suggests that a culture of learning is absent.

Technology Barriers to E-Learning

Introduction

Although the other barrier categories discussed so far apply to all facets of distance learning, technology barriers are specific to e-learning. In the previous section, students

expressed a general understanding of the relationship between technology and learning—that unreliable technology can hinder learning. In this section, specific technology problems are discussed that support the general understand students articulated previously. Technology barriers included connectivity, login, hardware/software, navigation and testing problems. Problems related to access are often most troublesome. These problems, typically associated with bandwidth, computer or network availability, registration and login, can prevent student use of course materials, thus precluding learning altogether. Problems related to functionality, such as poor quality speakers, outdated software, bad links, confusing navigation/organization, or lack of spellcheck, typically don't preclude learning, yet they make learning more difficult and time-consuming.

These types of problems collectively make up the larger category of technology barriers and will be discussed in more detail as follows. A concluding summary describes how these barriers contribute to two of the three systemic problems—the illusion of convenience, and lack of an organizational culture of learning.

Connectivity Problems

The most prevalent technical problem described by students was related to access. Among other commonalities in the remarks in this subsection, students expressed difficulty describing and understanding the source of access-related problems. This is often the case with connectivity issues because they are complex, usually the product of multiple factors, and rarely result in error messages. Often then, when troubleshooting particularly insidious technical problems like these it is advantageous to employ a technical expert. The author of this study is employed as a webmaster and therefore was able to offer additional insight into the connectivity

problems described by students, despite the fact that students rarely articulated the true cause of the problem. The students in this study described connectivity issues related to bandwidth and network compatibility as follows:

“So, I would go on to get onto the actual site, and it would be down or just wouldn’t come up a few times...It actually would bring up like the title, the Carhart IT check and then it would just not even, just, basically it seemed like it just wouldn’t refresh itself. So it would have the title and stuff up there but then everything else was white below it. And then that wasn’t showing... So I would go do a different task and then go back and try to get on later, and then I’d be able to get on later...So that was the biggest frustration...” (student 19)

“I know I was having some logon problems for a while, just that it didn’t want to load up and then I had to keep refreshing pages, and the page wouldn’t be displayed...But then like I’d be logged in, but nothing was showing up. So I had to keep refreshing the page or go back. And sometimes it actually just takes quite a while. You click on something and it took a while for it to kind of pop up with what it was supposed to be. And then it would kind of freeze up there, and then you would kind of hit back a couple times and it would essentially go back. It just seemed kind of sluggish...” (student 21)

“...Initially Adobe Presentation just comes up with a loading logo and it would just sort of cycle through that...” (student 9)

“...When I would go to pull up the website to get on the Virginia Tech blackboard which is the gateway to where the Wilderness Stewardship Planning class was found, I struggled to even pull up that website. And some parts of it would show up sometimes, parts of it wouldn’t show up sometimes...It was really kind of frustrating and not real conducive to a smooth learning experience...” (student 27)

“...There was one of the practice tests I was taking where in the middle of it, lost a connection and had to go back and re-log on and get back to that test. And it was one of the practice tests so it didn’t count for a grade, but that was a big concern when I was taking the final test, because the instruction said you only get to take it once. So...I took it when I think actually everyone was out of the building at one point...And then I saved early and saved often.” (student 14)

One factor giving rise to the connectivity problems these students experienced was related to the fact that Virginia Tech’s Blackboard site was a secure site. Although hosting content using a secure certificate provides additional privacy and security, it can sometimes result in page load issues, which is what these students described. What’s important to note is the frustration

expressed by students, since most students who experienced connectivity issues experienced them repeatedly. In fact, student 19 said she experienced connectivity problems that prevented her from logging in approximately thirty percent of the time. Likewise, students 21 and 27 described an inability to log in, but also suggested, along with students 9 and 14, that connectivity issues existed after login, preventing students from accessing HTML content, the presentation-style format, and completing tests. Connectivity problems specifically related to testing were mentioned here by student 14, but will also be discussed later in this section in the context of testing problems.

Access issues prevented students from using the course materials, either by stopping the learning experience before it could begin, or by preventing access to specific portions of the course materials. To deal with connectivity issues, as students 19 and 14 noted, they would engage in other work and try again later, or engage in learning when they thought connectivity problems would be minimized. Student 21 engaged in repeated refreshing and movement back and forth within the site until successful. Both postponing learning and perseverance were likely prevalent coping strategies for dealing with connectivity issues. Postponing learning obviously affects the timing of learning, whereas perseverance affects the duration. Both strategies minimize student control over the learning experience and, as student 27 noted, being prevented from engaging in learning at desired times resulted in a frustrating and disjointed learning experience.

Two factors compounding the secure site page load issues described above are variable or insufficient bandwidth or network performance. “Our typical problem here is not enough bandwidth and during certain times,” said one student (student 14). “I think our connection is a little bit slow,” said another student (student 25). “I actually think it was just the network on our

side was slow,” said still another student (student 9). “Just the Virginia Tech Blackboard framework did not seem to mesh well with the National Park Service’s computer system,” said yet another student (student 27). Since secure sites and incorporation of multimedia require more resources—more bandwidth and higher network performance—students who suggested that low bandwidth and slow network performance were factors in connectivity issues likely experienced them routinely in their work environment. Not only do bandwidth and network issues compound access issues, they also suggest that students perceive workplace technology to be inadequate to facilitate learning, especially learning that is resource intensive. In some cases, students had difficulty engaging in learning because they lacked access to a computer altogether or to a computer that could technically facilitate the type of learning experience they wanted.

“I think my biggest challenge was getting a computer for a length of time. That was my biggest challenge where I work... because I don’t have my own computer... So any time I had an hour or two I would disappear and find a computer...” (student 17)

“And I first tried logging in, I think, late April I think it was and then realized that the audio wasn’t going to work. And I tried to think of a couple other different options, to see if I could borrow somebody’s computer, whatever, and it just became way too cumbersome...” (student 16)

“...It was a challenge to be able to take the course [because] I needed to be at my office where I could hook up to high-speed Internet, where[as] the remote station that I work out of for the spring, we only had dial-up, and it’s just not really an option. And same thing at home.” (student 33)

Student 17 is likely typical of many employees who work in a shared office environment. In the section on workplace barriers students described how open, shared offices were incredibly distracting to learn in, and student 17’s remark highlights technical insufficiency as yet another challenge to working in this type of environment. Student 16 described struggling to find or use another computer in order to listen to the audio. Student 33 also described struggles with having to use a computer in a different location. He is likely typical of employees who work in very

remote field offices for certain months of the year. Since the Pew Internet and American Life Project reports that broadband availability continues to increase nationwide and government workers are among those who use the Internet for work the most (Horrigan, 2009; Madden & Jones, 2008), these remote low bandwidth offices fall well short of national technological norms. A lack of sufficient technology in remote offices may preclude learning in those places requiring students to schedule learning according to what office they work in.

An organizational culture of learning requires that employees be provided with the resources necessary to engage in learning. Employee perceptions of inadequate technology, either low bandwidth and network performance or lack of computer access, imply a lack of support for learning. The technical choices made by the Carhart Center and Virginia Tech to deliver this training—using Blackboard’s secure learning management site and incorporating movement and sound—require more bandwidth and higher network performance than many other work-related tasks. Since an organizational culture of learning requires that employees be provided with the resources necessary to engage in learning, technology that facilitates work-related activities, yet is insufficient to facilitate resource intensive learning, implies that learning is unimportant and that support for learning is lacking, likely on many levels.

Login Problems

As described in the methods chapter, students registered for the course by filling out a simple form. The form information was processed by Virginia Tech and students then received an e-mail containing their login information and the course URL. Despite the fact that this process proceeded flawlessly for most students, some experienced problems following registration. “The registration process was really easy, and then all of a sudden I tried to get on,

and it wouldn't let me get on. But I never received an email telling you that my name and my password and all that jazz," one student said (student 18). Student 18 is a special case since her registration information was lost altogether and Virginia Tech was unable to offer an explanation. Another student, student 13, described a more prevalent complaint related to receiving login information: "I got the wrong password originally to get in and so that took a long, not a while but I had to get that password changed so I could get into the program" (student 13). Student 13's complaint was echoed by several other students who were issued incorrect passwords. All of these students had to contact Virginia Tech technical support, but all reported that technical support staff was helpful and efficient in resetting their passwords. Other students, however, reported different issues related to logging in.

"Well, first I had the problems, because I have an underscore in my email address, and because your username was underlined, I didn't realize it had the underscore in it still, which is probably not paying attention on my part to realize that...it wasn't a space, it was actually an underscore." (student 21)

"Even the email you guys webbed me, and it was kind of highlighted, I'd click onto that, and it didn't open up...I would try to get the website up, and I would get a ton of different Googles for Virginia Tech, all these other links. But I couldn't get the right one. So I spent probably another 35 minutes trying to get to the right one so I could actually get to your program, the class." (student 26)

The problems described by students 21 and 26 are isolated incidents that may be associated with lower technical self-efficacy and comfort. Student 26, for example, was one of the students who was uncomfortable with technology, saying he'd "rather not deal with [computers]." Overall, login problems affected the convenience of learning by requiring that students spend time up front troubleshooting technical problems rather than learning.

Hardware/Software Audio Problems

Some students experienced either hardware or software audio problems that hindered learning. Hardware problems stem from the computer's user input or output devices themselves (ex. keyboard, mouse, speakers, hard-drive etc.). Student 16 was quoted earlier in this section as struggling with lack of access to a computer equipped with appropriate technology to facilitate learning. "...My work computer does not have an audio card. So I had to make arrangements to do this training from my home computer so that I could actually hear the dialog," she said (student 16). Other students also described various hardware problems associated with audio.

"I don't have any speakers on my computer. So it's just, it's not that it can't be hooked up, it's just, it's a government computer that for whatever reason they never hooked up the audio on. I've never seen it as a priority so it's just something that could be easily remedied, I'm sure. I just haven't gotten around to it." (student 10)

"I used rotten speakers. And that was actually difficult. I would say from the technological point of view, they were, I couldn't really control the volume, and it wasn't the program, it was actually the speakers. So, you know, how like when they get really old they crackle and stuff, I could get it to the point where I could set the volume where it would actually be clear enough for me to hear, but I couldn't make it go up or down." (student 22)

While the students above experienced hardware audio problems, one student instead experienced software problems—problems arising from within programs installed on the computer.

"I tried to get into the audio, and it said I didn't have the software or the access to...Adobe...I didn't have an update on it. And so I just went ahead and did [the PDF for] the first couple modules. And that was okay if that's all I could get. But I really did want the audio. So I did send them an email...and they sent me back some numbers and some names to call...When I told them what was happening, they said oh, you just need an update. So if you go in and do this, this, this, it'll update it for you. And, by golly, I went back after I did that and had the audio immediately." (student 24)

All of these students described hardware or software problems that either prevented or hindered access to or enjoyment of the PowerPoint-style presentation with audio. While most students admitted to reading through the study guide, which contained technical requirements, it's unclear

why students with inadequate computer configurations did not heed these requirements and take responsibility for securing them. Student 16, instead, completed the coursework from home as a coping strategy to ensure access to the audio, a strategy that has already been identified as one that affects the convenience of learning by altering the times when learning can occur. Likewise, student 10 also accessed the audio from home, but when in the office, completed portions of the coursework using the PDF format, revealing that lack of access to technology can affect student choices related to course format. Surprisingly, although students should bear some responsibility for ensuring they have the correct technical requirements, only student 24, who had the only software problem, took actions to fix the problem by contacting Forest Service technical support. As with login problems, the existence of software problems affected the convenience of learning by requiring that student 24 spend time up front troubleshooting this technical problem rather than learning. Conversely, none of the students with hardware problems contacted agency technical support or made any efforts themselves within the office setting to remedy their technical problems (ex. obtain an audio card, connect speakers or find better ones). Although hardware problems can often be more time-consuming to fix than software problems, this suggests that employees who do not have appropriate learning technologies available to them feel unable or are unwilling to secure them. These employees may not feel as though they possess the power to require their employer to fix problems with company-owned equipment or have the technical expertise to fix the problems themselves. This leads employees to adopt the passive coping strategies described above by students 10, 16 (working at home) and 22 (tolerating bad speakers). As with connectivity issues, employees in an institution that does not provide functioning computers may perceive that learning is unimportant and is unsupported and may feel powerless to pursue changes that would better facilitate learning.

Navigation Problems

Navigation is a key element of any website, and its purpose is to guide visitors by logically organizing content. Unfortunately, two students had difficulty navigating Virginia Tech's Blackboard website.

“There was a lot...of extraneous stuff. And you kind of had to figure out where you needed to go. It didn't really just lead you...it was pretty busy on the screen instead of being very straightforward...it just took a little more time to navigate it.” (student 25)

“I think I must have pushed a wrong button at one point and it popped me up with a page that I thought was the page to find the thing but it wasn't. And I did a little head scratching before I figured out the system...” (student 7)

Within the Blackboard website, visitors had to click on a link in the navigation bar titled "Module Materials," select a module, then select a viewing format (i.e. PDF, HTML or PowerPoint Presentation). There were also other main navigation bar items for announcements, study guide etc. Since Blackboard is a learning management system tailored specifically for use by universities and is therefore conducive to classes that have assigned readings, assignments, activities, discussion boards, exams and a variety of other components, it is likely that these two students found the navigation to be too layered relative to the extensiveness of the material. In this case, the material in this course was much less extensive, as compared to academic courses, and therefore students were expecting access to the module materials with fewer clicks.

Navigation can also be defined as a route or a series of steps or actions. The following two students describe problems navigating related to downloading the PowerPoint presentation-style format for viewing locally.

“...There were some times when I thought that I had extracted the zip files and then the screen wasn't coming up...I never really quite figured out what I was doing wrong. But that happened to me a couple times...Sometimes when I extracted it would start right away, and other times I had to go in and open a folder...” (student 29)

For this student, navigation problems occurred in the context of negotiating zip files. To download the PowerPoint presentation-style format, students had to download and extract a zip file, use the file explorer to find the location of extraction, then launch the index file. Due to this series of steps, zip files are a common source of confusion for many computer users, and the student above described instances in which she perceived that different zip files operated differently, likely because of mistakes made in the series of steps required. This perception resulted in uncertainty about how to navigate through the extraction/viewing process.

The following student successfully negotiated the zip files, however complained of a legitimate concern regarding linkages between the PowerPoint presentation-style format and external links within the content when viewed locally.

“...Sometimes when there was like an opportunity to open links I would go and click the Carhart symbol because I had downloaded all of the modules. There wasn’t a synchronicity, so I could just click it and find out more.” (student 23)

Each time an external link was presented within the PowerPoint presentation-style format, the Carhart Center logo, a wolf and moon symbol, appeared at the bottom right corner of the screen and the narrator instructed the student to click on the symbol to launch the external link in a new browser window. Unfortunately, for an unknown technical reason, the external links only worked when the presentation was streamed, not when it was launched and run locally. Thus, this student expressed frustration with the lack of access to this external content, despite the fact that it was extraneous or supplementary to the main course information.

Testing Problems

Issues or problems associated with testing were mentioned in the previous section. Students described the content of the testing as “rigid” (student 23), with focus on “exact things rather than the general idea” (student 4). The focus on words influenced how students learned

the course material in preparation for the exam. Other students complained about a lack of evaluation options besides the standard multiple-choice-question-type test. In this subsection, however, students described functional problems related to testing.

“The one thing that I guess annoyed me the most was taking the assessments. And in the assessments you had to fill in the blanks. And I can’t spell to save my life. And you had to spell them right to get them right. It didn’t allow for misspellings. So unless you took it with a dictionary in front of you, you more than likely would get those questions wrong. I mean, it knew fluctuations for capitalization, but that wasn’t my problem, it was actually spelling the word right.” (student 21)

While spellcheck is becoming a common feature on many websites requiring the input of information, the lack of a way to account for misspellings was the number one technical complaint students expressed about testing. As in Microsoft Word, for example, where common misspellings are corrected instantly and more complex mistakes are identified for manual correction, student 21 asserted that the test should automatically account for spelling mistakes and grade accordingly. This assertion suggests another way in which students in e-learning courses bring with them expectations of classroom norms. In this case, since students know that a misspelled word will be overlooked by the professor as long as the professor feels the student adequately understood the concept, they expect the same treatment from online grading systems, which are, at present, not intuitive enough to meet this expectation.

In addition to complaints about spelling, two students had connectivity problems specifically related to testing. Connectivity problems, in general, were discussed earlier in this section, with students describing various experiences in which pages did not load repeatedly or had to be refreshed or Internet connections were lost altogether. In the context of testing, connectivity problems in both of the following cases caused incomplete test scores to be recorded through premature ending of the final exam.

“When I went to take the test, there was one part on there, it didn’t have a diagram on one of the questions. And it just had A, B, C, D. It had the choices, but it had nothing to go with it. And so that’s where I had trouble. And when I went to try to find a diagram, then it kicked me off the test.” (student 20)

“...I confess that there were some technical glitches that precluded my full appreciation of the course material...namely I would fill out the quiz, and sometimes it would take, sometimes it wouldn’t. Fortunately, that wasn’t a big deal because you could take those quizzes over and over again...But what really kind of made me mad was at the end I was ready to take the final exam, and I had prepped for it and downloaded the study guide, reviewed that what I thought to be pretty thoroughly and worked through the final exam only to...click the submit button and it didn’t submit. It was lost. And so then I tried to go back and resurrect it, pull it back out. The Virginia Tech system showed that I had made one attempt and that was all you get. So I had to email the Virginia Tech help desk and say hey, listen, here’s what’s happened, can you help me and give me another try at this thing, because I don’t feel it was my fault that this thing locked me out. And so they did, they unlocked it for me so I could retake it. That time it worked fine...but I had to retake the test all the way over again...so I had to take the exam twice essentially. So that was a little frustrating.” (student 27)

In student 20’s case, the broadcast of information from the Blackboard server to the student was interrupted, resulting in a broken image where the image of a diagram should have been. As described earlier in this section, broadcast interruptions preclude access to important course content or prevent access altogether, making connectivity issues a serious and prevalent technical concern within this study. Since, as student 27 described, the Blackboard system allowed one attempt at the final exam, both students had to contact technical support and retake the exam as a result of connectivity issues that occurred during testing. For student 27, who also experienced repeated general connectivity issues, retaking the test was the source of significant frustration. In his case, however, testing information failed to transmit upon submission, revealing that connectivity issues not only interrupt broadcast but transmission as well. This is an important point because, in this course, the testing was the one element of the course that required student to interact with the website and the existence of test-related connectivity issues prevented this opportunity for two-way information exchange.

Summary

Technological barriers identified in this study included connectivity, login, hardware/software, navigation and testing problems. As depicted earlier in Figure 4, this barrier category contributed equally to two of the three systemic problems—the illusion of convenience and lack of an organizational culture of learning.

In the previous section, students articulated a general understanding of the relationship between technology and learning—essentially that the presence of technical problems during e-learning courses precludes or hinders one’s ability to learn. In this section, technical problems were explored in more detail and included hindering factors—a lack of spellcheck during testing, difficulty understanding the Blackboard website navigation scheme, and problems negotiating zip files—and precluding factors—connectivity and hardware/software issues. Precluding factors are of most concern and are those that contribute to the systemic problems.

The most frequently experienced technical problems described by students were connectivity issues, due to low or intermittent bandwidth, slow network performance, and incompatibility with agency networks. In some cases, this may have been caused, or compounded, by the use of the secure Blackboard website. Students described impediments to access in their accounts of pages not loading at all, both before and after login, portions of pages not loading, excessive page load times, screen freezes, Internet outages, and interrupted testing. Typically, students who experienced connectivity issues experienced them repeatedly, and this was a source of significant frustration for some students. The most common coping strategies included postponing learning—upon encountering connectivity problems, students would engage in other work and try to learn again at a later time—and perseverance—repeated refreshing or

movement back and forth within the site until a page loaded correctly. Some students also had difficulty finding an appropriate computer to facilitate learning, such as students who worked in shared offices and didn't have their own computers or students who worked in remote offices with very low bandwidth (i.e. dial-up) for portions of the year. Other students had problems logging in, most commonly because they were given an incorrect password. These students had to engage in troubleshooting prior to beginning the learning process by contacting technical support to have their passwords reset.

Collectively, connectivity, computer, and login problems preclude access. They prevented students from using the course materials, either by stopping the learning experience before it could begin, or by preventing access to specific portions of the course materials. Required troubleshooting or the use of the coping strategies described above, while successful in mediating login and connectivity issues, affected student control of the learning environment, specifically the timing, duration, and continuity of learning. As with other types of barriers that contribute to the illusion of convenience, a lack of student control over these elements of learning prevents students from engaging in learning during convenient times and at a convenient pace.

Although students rarely described technical problems in technical terms, descriptions of inadequate institutional technology were multifaceted. Some students, in fact, acknowledged working in offices with low bandwidth and inadequate network performance. In addition to the students described above who experienced problems finding an appropriate computer to facilitate learning, other students experienced computer problems that precluded learning. These hardware and software problems related to accessing the audio component of the PowerPoint style presentation. Some students did not have audio cards installed, others did not have access to

speakers or used inadequate speakers, and still others lacked the appropriate software to listen to the audio. Unwilling or powerless to require their employer to fix company-owned equipment problems and themselves lacking the technical expertise necessary, employees adopted passive coping strategies including learning elsewhere (at home or in another office) or tolerance of existing conditions.

All of these problems, whether access-related (inadequate bandwidth/network performance, finding a computer) or computer-related (not having appropriate hardware/software), may stem from institutional technology inadequacy, despite bandwidth increases nationally, even in rural areas, and agency-wide standards for computers. While the available technology may facilitate most work-related activities, student comments suggest that it is insufficient to facilitate resource intensive learning. Employees working in an institution that does not provide sufficient and functioning technology for learning may perceive that learning is unimportant, unsupported, and may feel powerless to pursue change, demonstrated by the passive coping strategies adopted by most students. The fact that these government workers wanting to learn endure, and in many cases simply accept, substandard technology may suggest the existence of an organizational culture that does not value learning.

Systemic Problems

As described in the introduction to this chapter, the final section is dedicated to the analysis of the systemic problems—the illusion of convenience, absence of deeper learning, and lack of an organizational culture of learning. This analysis aggregates barriers from the relevant categories that form these problems and analyze them in light of relevant literature. As depicted in Figure 4, all four barrier categories contributed to the illusion of convenience, with the

strongest contribution coming from workplace barriers. Two barrier categories, personality trait and preference barriers and course design/structure barriers, contributed to the absence of deeper learning, and all four barrier categories contributed to the lack of an organizational culture of learning.

Illusion of Convenience

Merriam-Webster's Online Dictionary (2009) generally defines convenience as "fitness or suitability for performing an action or meeting a requirement," in this case fitness or suitability for learning online. Convenience has been identified as one of the major benefits of e-learning, specifically that learners can effectively engage in "just-in-time" learning by scheduling and self-pacing learning according to their own schedules (Chu 2002; Rosenburg, 2000). In this context, fitness or suitability encompass elements of timing (when), pace (how fast or slow), duration (how long), and continuity (how smooth or disconnected). Also inherent to self-paced e-learning is student control, in which the Internet serves "to center learning around the student instead of the classroom" (Web-Based Education Commission. 2000, p. iii).

In this study, however, a variety of workplace (competing priorities, work environment distractions), personality trait and preference (procrastination and cramming), course design/structure (lack of sequestration, technical difficulties), and technology barriers (connectivity issues, hardware/software issues, login issues) hindered or precluded students' abilities to engage in convenient, student-controlled learning. The interaction of these different factors resulting in the illusion of convenience is illustrated below in Figure 5.

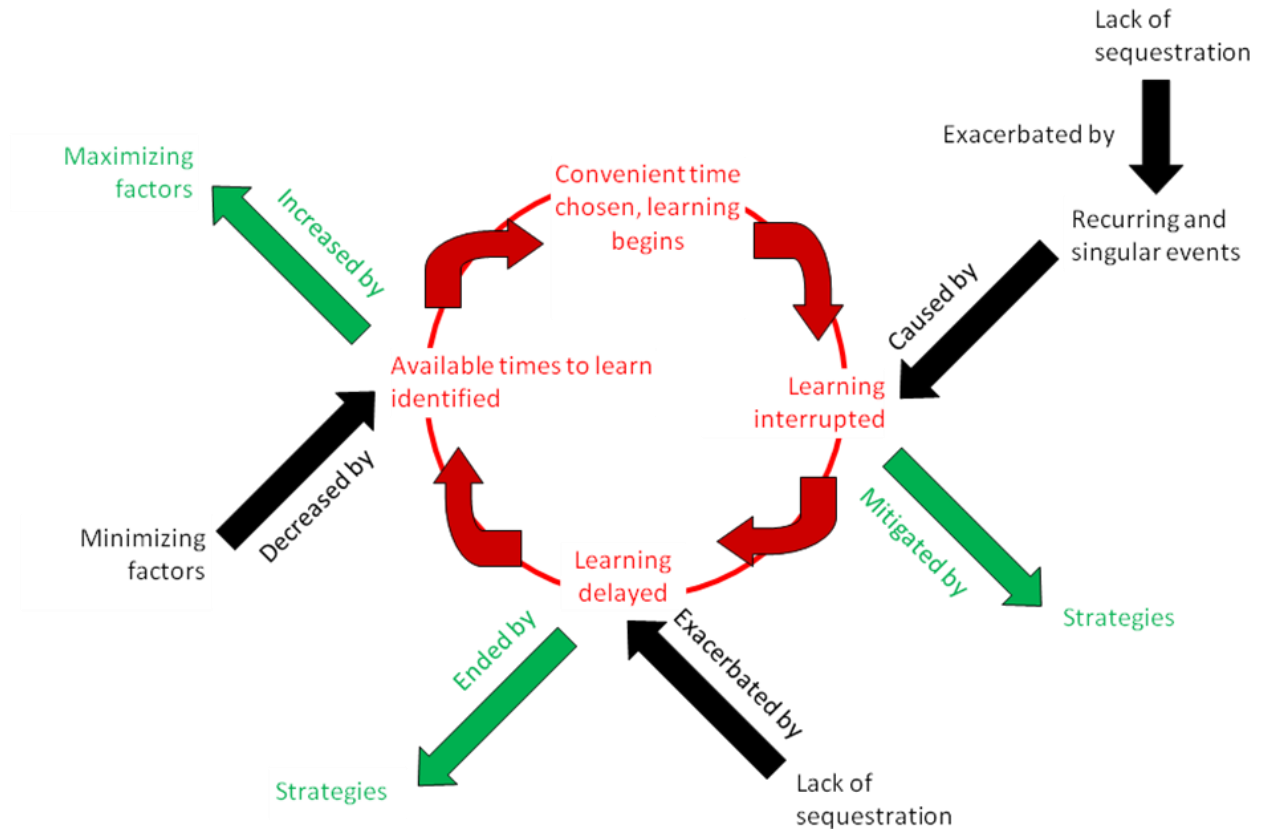


Figure 5. Interaction of barriers to produce the illusion of convenience.

In Figure 5, the red arrows depict a cyclic system; the black arrows depict determinants, causes, or exacerbating conditions feeding into the system, while green arrows depict conditions which allow exit from the system. Students begin the learning process by identifying available times to learn. In the workplace, a significant amount of time during the workday or work week is earmarked for other tasks, causing students to "fit [learning] in" (students 2, 5, 14, 21, 28, 32) or "work [learning] around...obligations" (student 4). The existence of competing priorities thus pares down, or minimizes, total time available for learning. Typically, competing priorities in this case are planned—"all the things you know you better be doing" (student 4), such as "law enforcement" (student 5), "mandates from the regional office" (student 5), preferred or field

season field work, or required learning—rather than spontaneous and are the most significant determinant of total time available. Three other factors can also minimize the total amount of time available for learning. If the student has been through the illusion of convenience cycle previously, either once or multiple times, procrastination, especially prolonged procrastination, reduces the amount of time available to learn in relation to the course deadline. Displacement in recreation literature is typically understood as spatial or temporal varying of an activity in response to adverse conditions (Hall & Cole, 2007; Miller & McCool, 2003). Likewise, if the student has chosen displacement as a strategy for reducing the influence of competing priorities or mitigating learning interruptions, variations in the timing (ex. learning during “off” office hours) and location (ex. learning at home) of learning determine time available for learning. Finally, for some students, the “biggest challenge was getting a computer for a length of time” (student 17) either because they worked in shared offices or part-time in remote field offices with poor Internet connectivity. These situational constraints affect total time available for learning similar to spatial displacement.

While competing priorities, procrastination, displacement, and computer availability minimize total time available for learning, two types of actions, prioritizing learning and displacement, can offset these determinants and increase total time available for learning. Although for most students, “learning in the workplace... isn’t the main priority” (student 9), some found compromises in which they could postpone, ignore, eliminate, or delegate other work in order to prioritize learning. In other cases, they engaged in displacement by working at home or on personal time (either at home or in the office). Interestingly, here, displacement, depending on the situation, can serve as both a minimizing and maximizing factor in determining the total time available for learning.

Once the total time available for learning has been identified (decreased by competing priorities, procrastination, displacement, or computer availability or increased by prioritizing learning or displacement), students choose the most convenient time to learn. In this context convenient time is a subset of total time. This initiates the actual act of learning.

Once learning has begun, however, interruptions can be caused by a variety of recurring and singular events. Again, here, interruptions can result from competing priorities, typically those that are unplanned or spontaneous—“pressures of the day,” “the latest emergency of the minute” (student 14)—and often result in priority shifts or fluidity. Students were also subject to work environment distractions such as “continuous interruptions” (student 16) including phone calls, e-mail, noise, and unannounced or unscheduled visits from coworkers. The lack of sequestration inherent in the e-learning environment exacerbates the effects of both priority conflicts and distractions by not allowing students to “physically take yourself away” (student 32) and be “free from...other [work-related] responsibilities” (student 34) or interruptions. Learning was also interrupted initially and singularly for some students who were issued incorrect passwords or had insufficient hardware or software, while others were plagued by repeated connectivity issues, most related to bandwidth and network performance when connecting to the course website’s secure server.

To mitigate, avoid, or minimize interruptions, a variety of strategies can be, and were, employed including prioritizing learning, displacement, and coping. Not surprisingly, several of the same strategies used to offset minimizing determinants of total time available for learning are also applicable here. Prioritizing learning through adjustments in the structure and organization of work can, as it did with planned priority conflicts, minimize some of the impacts of interruptions from spontaneous priority conflicts. Likewise here as well, students chose spatial

or temporal displacement by learning through a “work-at-home agreement” (student 12), “flex schedule” (student 14), or during “off hours for the office” (student 33), for example, to escape distractions at work. In some cases, students also employed displacement to mediate technical problems: “...My work computer does not have an audio card. So I had to make arrangements to do this training from my home computer so that I could actually hear the dialog” (student 16).

Students also employed both problem-focused and emotion-focused, cognitive, or passive, coping strategies. Schuster, Hammitt and Moore (2006) label confrontation as problem-focused coping, rather than other types of coping such as psychological distancing, avoidance, rationalization, or self-control. Only three students engaged in problem-focused coping by telling others to “be quiet” (student 17) and “not bother me” (student 15), while most instead employed more passive coping strategies such as closing their doors, using headphones, or relying on internal locus of control to maintain mental focus. Some students who engaged in either displacement or coping exhibited product shift, defined as “changing one’s notion of appropriate conditions to match current conditions” (Hall & Cole, 2007, p. 23). In other words, they took little responsibility in securing an adequate study environment and accepted learning interruptions as normal and mediation strategies as necessary.

For some students, learning interruptions were followed by procrastination—the personal choice to delay, or postponement, of a task one intends to perform within a desired or expected timeframe (Ackerman & Gross, 2005; Steel, 2007). While research on procrastination generally focuses on academic procrastination in students, Sommer (1990) suggests that the same adaptations (procrastination often followed by cramming) students use to surmount the demands and rhythms of school are so ingrained that they permeate an individuals' work life long after exodus from academia. In fact, thirty-six percent of the sample admitted to procrastinating, a

much higher percentage than the ten to twenty percent typically reported for adults (Block, 2003; Ferrari, O'Callaghan & Newbegin, 2005). Procrastination is generally considered to be a personality trait and has been linked to deficient self-regulation (Klassen, Krawchuk & Rajani, 2007; Tuckman, 1991; Wolters, 2003), distractibility (Steel, 2007), task aversion (Ackerman & Gross, 2005), and distorted perceptions of available and required time (Coote-Weymann, 1988; Vodanovich & Seib, 1997), among other things. Self-regulation is the exertion of influence over one's behavior in order to demonstrate autonomy, engage in mindful, planned, purposeful, organized learning, set goals, and manage time appropriately, especially during stressful situations of high cognitive load (Klassen, Krawchuk & Rajani, 2007; Tuckman, 1991). In this study, the self-regulatory failures students attributed mainly to competing priorities may be related to the ambiguous organizational direction many students perceived related to learning, reducing the amount of autonomy and control students felt they had when faced with competing priorities. Although Steel (p. 70) states that "management of distracting cues could facilitate the prevention of procrastination," workplace distractions were prevalently reported, by seventy percent of the sample, in fact. While most appeared highly motivated to learn despite these challenges, students who described learning as somewhat burdensome or, like one who said, "I'd rather be out in the field..." (student 35), may have exhibited task aversion-related procrastination, which involves the voluntary choice of one task over another. Finally, some students required half again as much time to complete a module as predicted. In these cases, inaccurate expectations or perceptions of time required for study may have exacerbated procrastination.

As depicted in the Figure 5, the lack of sequestration inherent in the e-learning environment exacerbates tendencies to procrastinate, since students asserted that "[e-learning

courses are] less structured so it's easier to procrastinate" (student 20). According to Tuckman (2007, p. 415), "many students treat the opportunity for self-pacing as an invitation to procrastinate," and his research suggests that providing structure in the form of motivational scaffolding decreases incidence of procrastination in e-learning courses.

Regardless of the causes or factors contributing to procrastination, procrastination can either restart the illusion of convenience cycle depicted in Figure 5 or students can exit the cycle through cramming, completion of the course in an extended timeframe, or attrition. Cramming was earlier defined as a period of neglect of study followed by a concentrated burst of studying immediately before an exam (Sommer, 1968). Two-thirds of the students in this study crammed, with many registering early yet completing the entire course in a single day directly before the course deadline. The remaining one-third of the students completed the course in an extended fashion over the course of several weeks or months. Students who were motivated to complete the course but were plagued by learning interruptions followed by procrastination often chose cramming, which can be characterized as an adaptive reaction to these circumstances (Sommer).

Other students, however, chose attrition, even though this study did not interview students who dropped out. Although this study's sample included 30 students, 83 total students registered, and 43 (52%) completed the course, yielding an attrition rate of forty-eight percent. High attrition rates, especially in e-learning courses, are not unusual. Attrition rates in e-learning courses can, in fact, be two to three times higher than those in traditional classroom courses (Valasek, 2001). Although reasons for e-learning job training course dropout including isolation from fellow learners and the instructor, preference for classroom-style learning, and lack of networking (Zelinski & Osberg, 2002) were barriers described by students in this study, it is reasonable to speculate that attrition was, instead, the only available outcome for students who

were trapped in the illusion of convenience cycle to the point in which completing any amount of coursework was no longer feasible. Although little research actually links procrastination directly to withdrawal, two early studies are of significance here. Semb, Glick, & Spencer (1979a, 1979b) found that students who withdrew from self-paced psychology courses progressed at a much slower rate than did course completers. Students who eventually withdrew were an average of 2-3 class periods or 1-1.5 weeks behind course completers. Born and Whelan (1973) found that students who withdrew often waited a long period of time before attempting their first unit quiz. The results of both of these studies—lags in commencement and pace of study by withdrawing students—suggest that procrastination may have played a significant role in explaining the attrition rate found in this study.

In summary, Figure 5 depicts the complex interactions between workplace, personality trait and preference, course design/structure, and technology barriers that produce the illusion of convenience for some students engaged in e-learning job training. The challenges these students face are numerous and neither perseverance through inconvenient uncontrolled learning nor attrition is preferable, making the alleviation of the aforementioned barriers, where possible, a key step in promoting e-learning in the workplace.

Absence of Deeper Learning

Deeper learning is often defined and understood in the context of its antithesis, surface-level learning, which Marton & Saljo (1976a) describe as a reproductive, rote-learning strategy. Ramsden (1992, p. 48) describes the differences between surface- and deep-level learning as follows: In surface-level learning “...the focus is on reproducing bits and pieces of memorized or textbook knowledge. The process of learning is external to the student: it is one in which alien

material is impressed on the memory or manipulated unthinkingly with the intention of satisfying assessment demands.” In contrast, during deeper learning “...students are focusing on the content of the task and how it relates to other parts of the course or previous knowledge; they are trying to understand the task and relate its component parts to the whole. The process is internal: the students are concerned with integrating the new material with their personal experiences, knowledge and interests.”

Research, then, has focused on the relationships between deeper learning, learning strategy usage, retention, academic performance, and attitudes, among other things. While some studies have correlated deeper learning directly to various phenomena, others provide indirect correlates. Overall, students in this study exhibited a variety of traits, preferences, and behaviors and identified flaws in the e-learning format and course design that research has shown do not promote or enable comprehension and deeper learning because they influence learning strategy use, reduce retention, often result in poor academic performance, and foster negative attitudes.

Self-paced learning is only one example of the many types of learning strategies. Marton & Saljo’s (1976a) seminal research on deeper learning linked learning process to learning outcome, finding that students who engaged in processes that facilitated deeper learning actually learned more deeply. Although the Wilderness Stewardship Planning Framework was a self-paced e-learning course, sixty percent of the sample preferred learning in a group setting versus learning alone and lack of interaction and networking, an informal type of interaction, were the most commonly mentioned weaknesses of the e-learning format. Students believed that group learning facilitates creativity and problem-solving, encourages critical thinking, makes learning more stimulating and interesting, increases retention, and allows for a more customized learning experience through interactions including asking questions, getting feedback, exchanging ideas,

brainstorming, and learning from peers and the instructor. In the context of Marton & Saljo's research, students identified interaction through group learning as a deeper learning process and the outcomes they identified are consistent with deeper learning outcomes. This is consistent with Du, Havard & Li (2005) whose research found that dynamic discussions foster deeper learning. Students also identified networking as improving retention and described it as "casual interaction that reinforces some of the learning points" (student 10). In their evaluation of two online communities of practice, which facilitate networking, Chapman, Ramondt & Smiley (2005) found that strong community leads to deeper learning because groups that exhibited agreement, discourse and ownership were more inclined to demonstrate reflection, exploration, insight and impact in their communication and learning experiences with others.

A complex complaint some students expressed related to testing as a learning strategy was a lack of personalized, interactive, and subjective evaluation. These students suggested that the standard multiple-choice-question-type test was "rigid" (student 23) and "nitpicking" (student 4), evaluated grammar rather than thematic understanding, and thus did not sufficiently evaluate knowledge of the material. In fact, "assessment has been found to shape how much, how (their approach), and what (the content) student learn" (Scouller, 1998, p. 454). Another study by Marton & Saljo (1976b) found that learners adapt their learning strategies to their conception of what is anticipated during evaluation. Their research revealed that students who anticipated being tested on facts focused on surface-level learning, while students who anticipated being required to recall conclusion-oriented concepts descriptively engaged in deeper learning. As such, some students in this study expressed desires for evaluation in the form of application—essays, papers, scenarios, or peer-reviewed assignments—creative products that require students to demonstrate a deeper understanding of the course materials. Research on the

differences between multiple-choice-question examination and essay examination, for example, revealed that students were more likely to employ deep learning approaches when preparing essays and were more likely to perceive this type of evaluation as assessing higher levels of cognitive processing (Scouller). Further, students who preferred this type of evaluation were significantly more likely to employ deep learning strategies and report deep motives, suggesting that the lack of an essay evaluation option in this study may have reduced the likelihood for some students to engage in deeper learning.

As discussed in the previous section, procrastination followed by cramming in this study was prevalent, and these behaviors impact learning strategy use, retention, academic performance, and ultimately deeper learning. Also mentioned previously was that inaccurate perceptions of time available or time required contribute to procrastination (Coote-Weymann, 1988; Vodanovich & Seib, 1997), with many students in this study indicating that the time estimates were underestimates and some students needing half again as much time to complete a single module than was recommended. In this study, thirty-six percent of the sample, or 11 students, admitted to procrastinating. Pychyl, Morin & Salmon's (2000) study reveals that procrastinators spending significantly less time studying overall. Howell & Watson (2007) found that procrastination is associated with greater disorganization and lower cognitive and meta-cognitive strategy usage, yet it is higher cognitive and meta-cognitive strategy usage that results in deeper learning (Marton & Saljo, 1976a). Other research has also shown that greater investment in cognitive and meta-cognitive strategies results in increased retention (Bacon & Stewart, 2006) and higher academic performance (Eley, 1992). Still other studies have related procrastination directly to poor academic performance (Klassen, Krawchuk, & Rajani, 2007; Rothblum, Solomon & Murakami, 1986; Tuckman, 2002). Collectively, research shows that

procrastination is a behavior that does not promote factors associated with deeper learning, and thus deeper learning itself.

Also of significance is the fact that only two of the students who admitted to procrastinating did not cram. Overall, two-thirds of the sample crammed. Procrastination followed by cramming is a common pairing that is exacerbated by the lack of supervision and reliance on student learning initiative necessary for e-learning (Tuckman, 2007). Sommer (1990, p. 6) describes cramming as an intricate ritual in which students “master a dizzying array of facts and concepts as close to the deadline as possible and... regurgitate them creatively to each professor's specifications.” Several students in this study purposely used cramming to “keep the concepts fresh” (student 9). Most crammed unintentionally, however, and felt “saturated” (student 30), “overdid” (student 29), “rushed” (student 22), and did the “bare minimum” (student 22), which excluded the work product exercises designed to increase retention through application. The most-cited reason for non-completion of these exercises was, in fact, lack of time.

Indeed, research related to cramming and deeper learning has focused on retention. Not surprisingly, knowledge learned at a deeper level is retained longer than that learned at a superficial level (Bacon & Stewart, 2006). Students in this study, however, suggested that in e-learning courses “it’s easy to just kind of scan and scroll...skim through and feel like you’ve completed something when...you probably didn’t retain too much” (student 12). Sommer’s use of the word “regurgitation” above equates cramming with Marton & Saljo’s (1976a) and Ramsden’s (1992) descriptions of surface-level learning. Further, Willingham (2002, p. 38) writes that “cramming might allow you to remember things for a test the next day, but not for the long haul.” This statement is supported by McIntyre & Munson (2008) whose research found no

significant difference in marketing course grade between crammers and non-crammers, but after 150 weeks, crammers retained only twenty-seven percent of what they had learned while non-crammers retained eighty-two percent. This suggests that while cramming does not affect short-term retention and short-term academic performance measures, such as exam scores, it may reduce long-term retention. Since the purpose of the Wilderness Stewardship Planning Framework was to impart long-term knowledge—the necessary skills to participate in a wilderness planning process, immediately or sometime in the future—possible reduction in long-term retention for the two-thirds of the sample who crammed is of concern.

Also of concern is how attitudes affect deeper learning. In this study because the course was online and negative prior experiences with e-learning training were prevalent, some students began the course believing that it would give a “sense of the concepts and not much more, not as deep an understanding” (student 9) and would be easy, broad, general, basic, and cursory in nature. Indeed, there is evidence to suggest that previous experiences, perceptions, and beliefs about learning are relevant to academic investment (Ames & Archer, 1988; Ramsden, 1992). Noe (1986, p. 745) states that if, “prior to participating in the training program, trainees may be cognizant of task constraints and/or a nonsupportive social network present in the work setting...motivation to learn is likely to be low, and learning, behavior change, and performance improvement are less likely to occur.” Trigwell & Prosser (1991) found that students who perceived that their learning environment and coursework encouraged deeper learning were more likely to have higher quality learning outcomes than in environments perceived to encourage surface-level learning. Smith & McNelis’ (1993) qualitative research study on graduate attitudes and academic performance in distance education suggests that negative attitudes toward technology may be responsible for lower academic performance and achievement. Similarly,

other research has found that students who view learning as having intrinsic value—meaning that they view learning as important, interesting, and useful—perceive deeper learning strategies to be more useful, are more likely to engage in deeper learning, and have higher levels of achievement (Nolen, 1998; Pintrich & De Groot, 1990). Not surprisingly, then, overall evaluations of the coursework in this study were consistent with expectations; students expected surface-level learning and reported that the course focused too narrowly on words rather than concepts—superficial- rather than deeper-level learning.

In summary, this section describes the absence of deeper learning found in this study in the context of research on the relationships between deeper learning, learning strategy usage, retention, academic performance, and attitudes. Traits, preferences, and behaviors and flaws in the e-learning format or course design that do not promote or enable comprehension and deeper learning are salient because job training teaches life learning skills intended for recall and use in varying situations, both present and future. The alleviation of barriers contributing to an absence of deeper learning, where possible, is a key step in ensuring that job training adequately educates employees to surmount workplace challenges.

Lack of an Organizational Culture of Learning

Senge coined and popularized the term “learning organization” in organizational learning literature and defined it as “an organization that is continually expanding its capacity to create its future” (1990, p. 14). He described a learning organization as one that engages not only in adaptive learning, or survival learning, but moves beyond to generative learning to enhance creative capacity through integrative and broad-scale understanding, what he termed “systems thinking.” Other authors, such as Choo, use different terms, such as “knowing organization,” to

identify these types of successful organizations that "effectively integrate sense making, knowledge creation, and decision making" (2006, p. 4). An adaptation of Argyris & Schon's (1978) model of single-loop and double-loop learning shown in Figure 6 below describes the relationships between Choo's three concepts and depicts the differences between Senge's adaptive and generative learning.

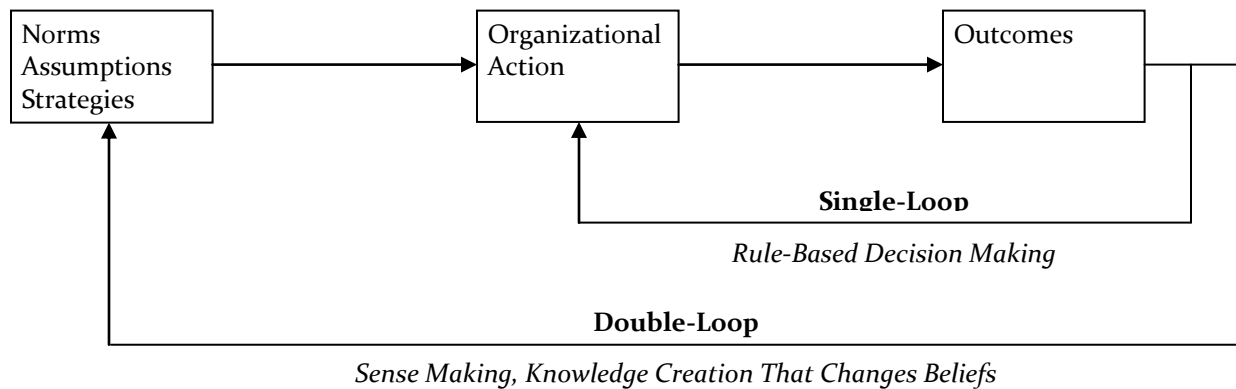


Figure 6. Single- and double-loop learning (Choo, 2006, p. 301).

According to Argyris & Schon:

“Organizational learning involves the detection and correction of error. When the error detected and corrected permits the organization to carry on its present policies or achieve its present objectives, then that error-detection-and-correction process is *single-loop* learning. . . *Double-loop* learning occurs when error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies and objectives.” (1978, p. 2-3)

Single-loop, or adaptive, learning is learning in which rules-based decision making changes organizational action and, ultimately, outcomes. Double-loop, or generative, learning is learning in which sense making and knowledge creation change norms, assumptions, and strategies, which in turn change organizational action and outcomes. It is the ability to not only engage in single-loop learning, but also the ability to engage in double-loop learning that characterizes a learning organization.

Intuitively, learning organizations are the products of learning individuals (Senge, 1990). How single-loop and double-loop learning are realized organizationally critically depends on how organizational culture—the physical, or environmental, and social attributes of a work setting—affects individuals (Dodgson, 1993).

In the context of the environmental aspects of organizational culture, “...learning is socially constructed inasmuch as what is learned is profoundly connected to the conditions in which it is learned” (Dodgson, p. 384). In this study, however, a variety of aspects of organizational culture hindered employees’ abilities to learn. Of profound concern was the impact of conflicting priorities, which caused learning to consistently fall behind most other work tasks, both emergencies and non-emergencies, and required trainings, regardless of relevance. Students perceived that “in the workplace...[learning] isn’t the main priority” (student 9), and this often meant that employees took a relatively passive role in facilitating learning and had difficulties or were unable to fit learning into the workday. In some cases, employees perceived receiving conflicting institutional messages about learning, that learning was sanctioned but not supported or encouraged. One student characterized the direction he received from his supervisor like this: “(supervisor speaking) ‘You can do this, you’re not gonna get criticized if you get caught doing this on the job. But all the things I have for you to do or all the things you know you better be doing have to come first’” (student 4).

Employees also endured distracting workplaces, with some working in shared offices, that provided inadequate physical space, privacy or quiet where learning was constantly invaded by “phone calls” (students 2, 4, 5, 16, 24, 26, 28, 31, 34), “peripheral noise” (student 7), “multiple conversations” (student 10), “people talking” (student 23), “visitor contact” (student 22), and “people coming and going” (student 10). The physical structure of the work

environment fostered a “right now” workplace mentality, in which unwanted, nonemergency, coworker interruptions, an expectation of multi-tasking, and a distinct lack of respect from coworkers when learning were prevalent. The conflicting institutional messages about learning described above and perpetuation of the “right now” workplace clearly prioritize the maintenance of status-quo skills through single-loop learning over transformations that might ensure better job performance through double-loop learning.

In this study, available technology was also part of the learning environment and an environmental aspect of organizational culture. Although the available technology facilitated most work-related activities, student comments suggested that it was insufficient to facilitate resource intensive learning. In several cases students had difficulty finding an appropriate computer to learn on—such as students who worked in shared offices and didn't have their own computers or students who worked in remote offices with very low bandwidth (i.e. dial-up) for portions of the year. However, by far the most frequently experienced technical problems were impediments to access in the form of connectivity issues, due to low or intermittent bandwidth, slow network performance, and incompatibility of the course technology with agency networks. Students described pages not loading, portions of pages not loading, excessive page load times, screen freezes, Internet outages, and interrupted testing, all of which were sources of significant and repeated frustration. Other students experienced hardware- and software-related computer problems, such as lacking an audio card, decent or available speakers, or the appropriate software to listen to the audio. All of these problems stem from institutional technology inadequacy, yet there is some student responsibility inherent in securing proper technical requirements. Since e-learning courses rely on sufficient technology as an underlying and prerequisite condition for learning, the absence of an appropriate technological foundation

suggests that norms and standards concerning technology are not supportive or conducive to this type of delivery.

In e-learning courses delivered in a self-paced fashion, students lack interaction, one of the most commonly mentioned weaknesses of the e-learning format chosen for the course in this study, and can experience isolation. Interaction can take many forms, but of particular interest related to institutional learning is networking. Although networking reinforces learning immediately through casual discussion, informal interactions that result in an individual forming a professional network or community are most valuable in the long-term since "...when...you meet other managers that do the same kind of things you do or experts in that field, you actually get the networking skills to be able to call them up when you have an issue..." (student 18). Professional networks better allow students to extend the learning that occurs during training into the future. Support for the formation of professional networks or communities to strengthen and extend workplace learning is indicative of general support for learning. The absence of this component from this course, however, left students feeling isolated from their peers. From an organizational perspective, employee isolation prevents important information from filtering throughout an organization, allowing for the changes in norms, beliefs, and procedures necessary for double-loop learning.

The ways in which environmental attributes of organizational culture—competing priorities, a distracting workplace, inadequate technology, and employee isolation—affect individuals are important. Equally as important, however, are the ways in which social attributes of organizational culture affect individuals. The social attributes of workplace culture "mold members' perceptions about the role and value of information...the types and structure of information required, and the flow and availability of information..." (Choo, 2006, p. 55). This

cultural foundation with respect to information and technology is reflected in norms, practices, and, ultimately, values. “At the deepest level, culture consists of values, which are deeply held, tacit preferences about the organization’s goals, identity, and modes of operation” (Choo, p. 177). These values are then observed in employee behaviors.

Agency employees in this study expressed values and exhibited behaviors suggesting that a variety of social factors within their organizational culture negatively affected learning.

Negative prior learning experiences were prevalent with almost half of the students characterizing their prior e-learning experiences as being generally negative, due heavily to the influence of required agency online training courses. Students described their prior negative experiences in these courses vividly: “Eew!” (student 29), “horrible” (student 18), “ineffectual” (student 30), “universally frustrating” (student 5), “redundant” (student 31), “Can the monkey jump through the hoop?” (student 16). Negative prior experiences and stigmas about e-learning course delivery, in general, fostered negative values, attitudes and expectations of rigor and quality for the e-learning course in this study. Students also reported outcomes that were consistent with expectations, with some believing the course had been “truncate[d]” (student 7) and prioritized surface-level learning by focusing “a little too much on the wording and a little too little on the meaning and the comprehension” (student 9).

Technical aptitude—defined in this study as the degree to which students liked or disliked computer-related activities and felt competent, or skilled, using computers and the Internet—is one reflection of a workplace’s cultural value of technology. As such, a general and underlying distaste for technology can influence values related to learning with technology. Approximately twenty-five percent of the students in this study characterized themselves as “computer illiterate” (students 7, 28) or “technically challenged” (student 4) and some exhibited

psychological distancing by confining their use of computers only to work tasks in which such use was mandatory or unavoidable. It is feasible that low technical aptitude caused some students to be more sensitive to negative prior e-learning experiences, easily frustrated by technology problems, susceptible to task-aversion related procrastination, apt to value group learning, or dismissive of self-paced e-learning opportunities.

To deal with many of the challenges of learning at work, students often chose passive coping strategies including spatial and/or temporal displacement and product shift. Some students learned at home on personal time; others engaged in learning in their offices early or late in the day, on days off or during planned or unexpected quiet periods. Overall, 10 students completed part or all of the coursework on personal time, and 12 students completed part or all of the coursework at home. Student who exhibited tolerance or acceptance of inappropriate existing conditions—the need to work at home or existence of continuous distractions, for example—demonstrated product shift because to achieve a mental state of tolerance they had to change their notions of appropriate or acceptable conditions to match the status quo. In general, students appeared to accept learning interruptions as normal and coping strategies as necessary.

Some students expressed feelings of guilt or reluctance to use work time for the purposes of learning, with one student saying, “I kind of felt guilty doing [e-learning] at work even though my boss said I could” (student 7). Other students were reluctant to learn on work time because completion of the coursework took longer than they felt it should. Still other students believed learning provided personal rather than professional gain, regardless of the actual relevance of learning to job responsibilities, and therefore felt reluctant or were unwilling to use any substantial amount of work time to learn.

Overall, all of these reactions—negative expectations stemming from negative prior e-learning experiences, low technical aptitude, prevalent use of passive coping strategies, and feelings of guilt for learning at work—imply that organizational culture conditioned students to believe that serious learning does not belong in the workplace. The negative behaviors exhibited by students suggest that the negative values, beliefs and norms behind them confine students to single-loop learning.

The information provided so far in this section describes how environmental and social aspects of organizational culture affected individuals in the study, preventing double-loop learning. What follows is a description from the literature of the aspects of an organizational culture that values and supports learning and provides a stark contrast with the above.

Choo (2006) suggests that a move is necessary from system-centered learning, typically found in most organizations, in which information is objective, resides in a static, tangible, physical form, and where learning equates with understanding how to get the information, to user-centered learning, in which information is objective, resides as tactic in the learner's mind, and is rendered useful when meaning has been created by the learner. It is this vision for workplace learning that allows organizations to move from single-loop to double-loop learning shown in Figure 6. Guglielmino & Guglielmino's (1988, p. 130) work aggregates a variety of industry case studies to suggest that organizational learning results from the "empowerment of champions" through "the provision of an environment and resources that releases creative self-directed learners to pursue their ideas and goals."

The key elements of such an environment include promoting autonomy, for example. According to Straka (1999), perceived autonomy is when employees have the impression that they are able to carry out work tasks, including learning, according to their own schedules.

Managerial responsibility, or the authority for decision-making (Skule, 2004), is an important element of autonomy to guarantee that employees can dictate when and how learning occurs, have the authority to set what priority learning holds in relation to other responsibilities, and ensure that the time for learning is available and can be dedicated to learning (Beckett, 1999). In his seven characteristics of learning intensive jobs, Skule also lists management support for and engagement in employee learning. He suggests that learning intensive jobs are characterized by unambiguous management support and reward for, encouragement of, and feedback regarding learning. Learning in this context, however, is not limited to learning that directly relates to an employee's job responsibilities. Senge (1990) characterizes learning organizations as those that embrace "personal mastery," what he defines as an ethic of continued life-long education or the discipline of personal growth and learning. He states that fostering personal mastery in employees entails providing a climate that allows individuals to create visions, challenge the status quo, continually expand their awareness of the interdependencies between apparent external forces and their own actions, and expand their understanding of the connections between themselves and others. "The sense of connectedness...characteristic of individuals with high levels of personal mastery naturally leads to a broader vision" (Senge, p. 171) and a more genuine commitment to the organization. In fact, several authors highlight connectedness as a key attribute of learning at work. Effective workplace learning is socially integrated (Straka) and collaborative (Beckett; Mott, 2000), with focus on and opportunities provided for participating in professional or occupational networks and communities of practice (Mott, Skule). Finally, Beckett and Guglielmino & Guglielmino (1988) suggest that successful training and development programs must include facilities conducive to learn. Such facilities include appropriate physical space for individual and group study, contain proper lighting and other

furnishings, and provide computer access and specialized software needed for technology-based learning.

Clearly, the model for workplace learning provided by the literature is different from the physical and social environment experienced by students in the study. The existence of competing priorities, distractions, inadequate technology, employee isolation, negative expectations, low technical aptitude, passive coping strategies, and feelings of guilt for learning at work are in stark contrast to user-centered and self-directed studies, autonomy, decision-making authority, management support and feedback, a climate fostering personal mastery, social integration and collaboration, and facilities conducive to learning—characteristics of learning organizations that foster an organizational culture of learning within their employees and, as such, reap the benefits of double-loop learning.

Conclusions and Recommendations

Overall, this research focused narrowly on the negative aspects of e-learning wilderness planning training within the federal wilderness management agencies. The goals of this study were, first, to describe the full range of barriers to successful e-learning experiences in a wilderness management job training course, and second, to assess applicability of the five-pronged attrition framework—a model developed to describe barriers relevant to academia—in describing these barriers. This study categorized barriers employees enrolled in an online job training course experienced as workplace barriers, personality trait and preference barriers, course structure/design barriers, or technology barriers. These four categories were in close alignment with four of the five categories identified by the five-pronged attrition framework, however, categorization alone oversimplified the challenges students faced when learning in the

workplace. Examining the relationships between barriers revealed three larger systemic problems: the illusion of convenience, absence of deeper learning, and lack of an organizational culture of learning. Existence of these systemic problems suggests that the influence of barriers on workplace learning is both additive and synergistic. By stopping with simple categorization, previous research on barriers to e-learning has fallen short, and it is through the description of these systemic problems that this study distinguishes itself in its contributions to the academic literature.

The job of educators and trainers is to remove problems to learning digitally, and this study suggests that there are opposing forces impeding e-learning job training. Many of the students in this study perceived that e-learning in the wilderness management workplace was challenging: Learning was often inconvenient; Learner personality traits, the course structure, and its delivery format fostered superficial learning, potentially leaving learners minimally prepared for the future applications of training; The existing organizational culture generally devalued and minimized the importance of learning as part of work. While each of these alone is problematic, in conjunction, they further reduced the quality of learning for many students at a time when the government is embracing e-learning as a way to continue training employees despite increasingly restricted travel and shrinking natural resource budgets.

These conclusions and the forthcoming recommendations, however, are of somewhat limited generalizability. Of particularly limited application are the epistemological conclusions. Since a synchronous course, for example, may elicit distinctly different responses regarding delivery format, interaction, and technical problems, the reader should be extremely cautious when applying the epistemological conclusions to other situations. This study's conclusions related to workplace and personality barriers and organizational culture are somewhat more

applicable. The 30-student sample provided a nationwide cross-section of the wilderness management workforce that represented different wilderness management agencies; a broad range of geographic regions; and employees with varying levels of seniority, longevity, and wilderness management responsibility and involvement. The conclusions are therefore relevant to the current and future wilderness workforce, and possibly to other government workers who may share a similar organizational culture. That said, it is uncertain how widespread the barriers or systemic problems are, both within the units studied or within other units or agencies. The reader should also be cautious when applying the conclusions to other work environments, such as non-government workers, or to other disciplines, such as informal learning.

It is also important to put the negative nature of this study into context. The Wilderness Stewardship Planning Framework was one e-learning course (of which the government offers many) delivered in a particular epistemological way (there are many ways e-learning courses can be structured and delivered). Students were asked specifically to focus on the negative parts of their experiences, and as such, positive comments were purposefully omitted. In fact, however, students did highlight some key benefits of their e-learning experiences. This course made training accessible to many who wouldn't have been able to be trained otherwise, due to time, money, or travel restrictions. It also made training available to many who may not have been able to justify training due to relevance, including employees who didn't currently work in wilderness but had career aspirations to do so in the future. The course was free and was thus an extremely efficient way for employees to take training. And finally, despite some negative expectations, many students were pleasantly surprised that the course was better than the required agency online training courses they were accustomed to.

Rather than focus on the positive, however, this study highlighted the negative factors influencing student experiences, because by exposing the barriers to e-learning, focus can be placed on mitigating those barriers. Since employees, e-learning providers, and employers all share responsibility in learning, this study offers the following recommendations for each group, specific to wilderness management. The first two lists recommend changes that work within the current organizational culture, while the last list offers more sweeping recommendations intended to promote changes in organizational culture. It is the aim of this last list to suggest environmental and social changes that may help transform the existing organizational culture into one that values learning and envisions learning as an essential, rather than tangential, component of an employee's job.

To improve the quality of wilderness management job training:

Learners should:

- Take a more active role in their own learning. While training providers and employers bear much of the responsibility for workplace training, learners should not be passive, dependent consumers of learning. Learners should continually pursue training opportunities to improve themselves personally and professionally and participate in these opportunities with full enthusiasm and effort.
- Set appropriate expectations of learning. Although andragogy suggests that prior experiences provide a rich resource for learning, learners should be cognizant of how negative experiences may negatively influence their present and future learning.
- Read, understand, and meet necessary course requirements. These may include technical (ex. garnering any missing/inadequate hardware/software, troubleshooting technical problems), environmental (ex. planning and accommodating learning amid other responsibilities, taking steps to secure a quiet study environment), and personal (ex. exerting good time management skills and motivation, taking risks with new or uncomfortable technologies) learning requirements, in addition to the typical course completion requirements.
- Enlist support for learning. Supervisors and coworkers can have important influences on employee learning. By asking for supervisor encouragement and acknowledgment and coworker consideration, learners may be better equipped to weigh conflicting priorities and mitigate workplace distractions.

E-learning providers, including the Carhart Center, should:

- Offer a broad range of training opportunities—asynchronous, synchronous, and group versions—that include interaction and networking. The current course was

- asynchronous in nature. In contrast, a synchronous version might, for example, use real-time application sharing software to deliver a scheduled series of PowerPoint presentations to groups of eight to ten employees who converse together about the topic while on a conference call. A group version of the course could capitalize on the strengths of both delivery options by requiring that employees complete some asynchronous components while capitalizing on local leadership to deliver others synchronously in the classroom.
- Better match employees to relevant trainings by exploring targeted marketing strategies, helping set appropriate expectations for learning, and designing tools to help learners choose the type of learning that's best for them based on their preferences, attitudes, and abilities. Most training providers, including the Carhart Center, offer a range of courses including introductory courses and advanced courses. Overall, employees with fewer wilderness responsibilities are better candidates for introductory courses, rather than advanced courses, while employees with high levels of wilderness responsibility are good candidates for both. Targeting the different types of training to these different types of employees may increase relevance for all trained. Once learners have been matched with (or match themselves to) appropriate learning opportunities, they should be enlisted to select the appropriate format for that learning. Providers could, for example, design simple pre-enrollment questionnaires that assess a learner's propensity for: group learning versus learning alone, procrastination versus good time management, and minimal versus maximal autonomy and authority (likelihood of priority conflicts with learning). Explanation of the questions could help better educate potential learners and their supervisors about the demands of e-learning, such as the need for adequate time for both coursework and studying, a quiet study environment, and good time management skills. The answers to the questions could be correlated to different delivery options (ex. propensity for group learning and procrastination suggests synchronous option; learning alone and good time management suggests asynchronous option), giving a learner insight into the learning format(s) that might best match his/her personality.
 - Rethink course content by making all learning elements mandatory, including elements that stimulate active learning processes and focus on conceptual understanding, and choosing testing methods that evoke deeper learning. Providers could include more diverse examples and case studies as learning tools, and offer essays, peer-reviewed assignments, or scenarios, rather than multiple-choice-questions, as testing options.

Employers, including wilderness management agencies, should:

- Institutionalize and legitimize learning and training by recognizing the space and time necessary for learning to occur within the workday. The agencies could help managers and employees rank learning as equivalent to other work by requiring assistance, supervision, and support from supervisors in their subordinate's learning. The agencies should also match training opportunities to required competencies and, ultimately, to employee performance evaluations.
- Provide better physical learning environments that offer adequate quiet, privacy, and access to learning materials and technologies. Agencies might provide new space or allocate existing space specifically for learning (ex. a learning room). A key part of

creating a satisfactory e-learning environment should also include upgrading and standardizing overall technology infrastructure to accommodate intensive, interactive online learning through reliable, broadband Internet and properly equipped computers.

- Supplement the work of formal training institutions by providing opportunities and resources to connect learners after training and further facilitate future learning for employees. Agencies could, for example, sponsor an online social network to connect trainees with each other and also facilitate broader, ongoing connections within the wilderness workforce.

Despite the aforementioned cautions, this study's findings and these recommendations may be of interest to organizations that provide informal learning opportunities including: semi-structured learning groups, such as social networks, communities of practice, or lessons learned centers; online search resources, such as publications, syntheses, databases, or data centers; or research designed for consumption by employees at work. Given the increasing focus on informal and incidental learning in the literature, future research into the challenges associated with conducting these types of learning in the workplace for the purposes of job-related education would provide a valuable context for this study. Research into informal and incidental workplace learning could explore questions like: What types of informal or incidental learning occur in the workplace? What types of digital resource or products facilitate these types of learning? How do these types of learning differ by profession, employer, or work culture? What types of barriers hinder or prevent these types of learning? How similar are these barriers to those that affect formal job training?

Quantitative research to determine how widespread the problems identified in this study are would also supply valuable information related to the generalizability of this study's findings. Quantitative research could serve as a qualitative research companion by exploring questions like: How prevalent are the barriers described in this study within the larger wilderness management workforce? Within the government, more broadly? Within non-government sectors

of the larger wilderness community? In summary, future qualitative and quantitative research on formal job training, informal learning, and incidental learning within and outside of wilderness management will improve and expand our knowledge of the intersections between learning and work.

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Appendix A: Definition of Terms

Andragogy

Assumptions about and methods or techniques used to teach adults.

Asynchronous

The occurrence of two or more processes at different times. Asynchronous is used as an adjective in this study to describe both e-learning courses and communication methods that may be used to facilitate learner-learner and learner-instructor interactions. When describing courses, asynchronous refers to courses, or components of a course, that are completely self-paced, meaning that the pace and timing of learning are controlled by the learner. Asynchronous interactions are those that do not occur in real time and typically use technologies such as e-mail or threaded discussion forums.

Attrition

The gradual loss in numbers of students during a course. Attrition is often termed dropout or withdrawal.

Barrier

An obstacle that negatively affects a learner's ability to start, continue, or finish a course.

E-learning

The definition of e-learning has three components: E-learning is networked, capable of instantaneous updates, storage and retrieval, distribution and sharing of information; E-learning is delivered to the learner via a computer using standard Internet technology; E-learning goes beyond the traditional paradigms of education and training to include formal instruction and informal learning.

Learning Management System

Webserver software, sometimes referred to as a course management system or virtual learning environment, that manages course materials, class scheduling, registration and access, digital communication, grading, and reporting. BlackBoard and WebCT are the most widely-used learning management systems in academia. The Departments of Agriculture and Interior have developed their own customized learning management systems, AgLearn and DOI Learn, respectively.

Persistence

Remaining or continuing in a course despite opposition. Persisting students are those that finish or complete a course, typically determined by completion of required assignments and a final exam.

Synchronous

The occurrence of two or more processes at the same time. Synchronous is used as an adjective in this study to describe both e-learning courses and communication methods that may be used to facilitate learner-learner and learner-instructor interactions. When describing courses,

synchronous referrers to courses, or components of a course, in which pace and timing are controlled by an instructor. Learners can be aggregated together in a single location, separate from the instructor, or learners can be distributed in many locations. Synchronous courses can employ a variety of technologies including one- and two-way video feeds, chat software or instant messaging, telephone audio coupled with conferencing software, and conferencing software that facilitates voice-over IP. Use of conferencing software is sometimes referred to as using a virtual classroom. Examples include WebEx, Centra, IBM Lotus Sametime, and Microsoft NetMeeting.

Appendix B: Project Timeline

Timeframe	Task
May 2007 – August 2007	Proposal available for review by graduate committee
September 2007	Proposal submitted for IRB review and approval
October 2007 – November 2007	Pre-testing of interview process and refinement of interview guide
January 21, 2008	Wilderness Stewardship Planning Framework course opens for registration
January 2008 – June 2008	Interviews conducted

Appendix C: Interview Guide

How long have you worked for the (BLM/FWS/FS/NPS)?

Can you tell me a little about your current position?

How is wilderness a part of your job?

Can you tell me more about your day-to-day responsibilities related to wilderness?

Have you ever taken any of the Carhart Center's classroom courses?

Had you taken any courses on the Internet before this one?

How many online courses have you taken? What were the courses about? Who taught the courses? What did you think of them?

In general, what do you think characterizes an effective online learning experience?

What makes a good online course?

Now, let's talk specifically about the Wilderness Stewardship Planning Framework course.

What motivated you to take this course?

Can you tell me about your experience in this course?

Can you tell me more about what worked well?

What was challenging or difficult about the course?

What changes would you recommend to the Carhart Center?

What were your expectations prior to taking the course?

How well did the course meet your expectations?

How did previous online trainings you've taken influence your expectations?

What other things do you think influenced your expectations?

How well-prepared were you for the academic demands of the course?

What kind of background knowledge did you feel you needed to understand the course material?

Did you feel that you had that knowledge?

Do you prefer learning alone or with a group?

How is this similar or different from your work environment?

What benefits (ex. travelling to a new city, networking or other incentives) typically associated with attending classroom trainings do you think are missing from online courses?

How significantly did the lack of these benefits influence your expectations of the course?
In what ways did you interact with your supervisor, co-workers or others regarding what you learned (either during or after the course)?

How did you pace your work for the course?
How does this compare to how you usually pace your work?

Did you work through the course materials before taking the practice tests?

Did you proceed through the course modules sequentially or skip around?

Did you prefer viewing the presentation-style format with audio or the printable PDF?
Why?

Did you complete the work products?
Why?

How accurate were the time estimates of how long each module would take to complete?

How relevant was what you learned to your job?
What specific aspects of what you learned were most relevant?

How do anticipate using what you learned on the job?
In what specific ways will you use what you learned?

Now I'd like to ask you some questions about the place where you did the course.

Did you take the course at work or at home?

Did you complete the course materials on company time?

How did you orchestrate this arrangement with your supervisor?
How supportive is your supervisor of job training?

How easy was it to learn at work/home?
What aspects of your work/home environment made learning easy?
What aspects of your work/home environment hindered your learning?

What types of distractions or interruptions that made it difficult to learn?

What did you do to minimize or alleviate these distractions?

How did you prioritize the online course relative to your regular job duties/responsibilities at home?

How does learning rank compared to your other job duties/responsibilities at home?

Did you try to do other tasks, such as e-mail, at the same time?

Now I have a few questions about the technology.

How comfortable are you, in general, using computers and Internet?

What kinds of computer skills do you feel are necessary to be a successful online learner?

How much attention did you give to the study guide?

What types of computer or Internet problems did you experience?

Can you describe these experiences in detail?

How easy was the registration process?

What problems did you experience related to registration?

In general, how do you think technology enhances learning?

Were there aspects of the course that were easier or harder because it was conducted using a computer and the Internet?

In what ways does technology hinder the learning process?

What was problematic about using a computer or the Internet to learn?

Appendix D: Verbal Consent (spoken to interviewee by interviewer)

Thank you for agreeing to participate in this interview. Before we start, I need to ask for your verbal consent. I will now read you a series of seven points and I will ask you at the end to give your verbal consent in the form of a yes or no answer.

1. I, (insert name) , agree to participate in this research project being conducted by Lisa Eidson, a graduate student at the University of Montana and e-learning specialist with the Arthur Carhart National Wilderness Training Center.
2. I understand that if I agree to participate in the study, I will be asked to describe my online educational experiences related to my enrollment in the Wilderness Stewardship Planning Framework course.
3. I am aware that my participation is voluntary and may be withdrawn at any time without penalty or prejudice.
4. I understand that the intended benefits of this study include a better understanding of online educational experiences. This research should provide the Carhart Center with information on how to improve online educational experiences for future students.
5. I understand that this interview will be recorded, but that all the information garnered during the study will be kept confidential. Although I may be quoted in subsequent reports, at no time will my name be used. Names and transcripts will only be made available, if requested, to the University of Montana research oversight body to ensure compliance with university research ethics.
6. I understand that anything I say during this interview will not influence my grade in the Wilderness Stewardship Planning Framework course.
7. I understand that my consent to participate in this project does not constitute a waiver of any legal rights.

Do you understand and agree to the items I just read? If so please give your consent as a yes or no answer.

Appendix E: Quantitative Data Extracted From Sample

The following information is a combination of that collected during online registration and that extracted from the qualitative interviews. Typically, the data extracted here from the qualitative interviews reflects the answers to short and specific questions (ex. How long have you worked for the agency?).

Sex

Male (18)
Female (12)

Title	Position
Backcountry Office	Division Chief
Backcountry Program Manager	Forest/District Wilderness
Backcountry/Wilderness supervisor	Forest/District Wilderness, Manager/Specialist (2)
Biologist - GIS Specialist	Natural/Cultural Resources Staff
Chief Park Ranger	Other (8)
Cultural Resource Specialist	Park Ranger (3)
Dispersed Recreation manager	Park Superintendent/Deputy
Environmental Protection Assistant	Recreation/Public Services Staff (5)
Forest Biologist	Resource Specialist (2)
Natural Resource Specialist	Timber/silviculture/reforestation Staff
Park Ranger	Trail Supervisor/Leader (2)
Park Superintendent	Wilderness Specialist (2)
Physical Science Technician	Unknown (1) – registration information was lost for 1 student
Range Technician	
Recreation Planner	
Recreation Program Manager	Appointment Type
Recreation Technician (2)	Permanent (21)
Recreation Trainee	Temporary/Seasonal (4)
Recreation Wilderness Specialist	Term (3)
Timber Marking Foreman	Unknown (3) – registration information was lost for 1 student
Visitor Information Services Supervisor	
Visitor Use Assistant	
Wilderness Manager	
Wilderness Patrol Supervisor	
Wilderness Ranger (2)	
Wilderness Visitor Use Assistant	
Wilderness/backcountry Ranger	
Wildlife Biologist	

Agency

FS (17)
NPS (13)

State

AK
AZ (6)
CA (2)
CO
FL
KY
MI
MO
MT (2)
NC
NH (5)
OR
OR
TX
VA
VT
WA
WV
WY

Years working for the agency

0-5 (8)
6-10 (13)
11-20 (3)
>20 (5)
Unknown (1)

Portion of job related to wilderness

Primary responsibility (16)
Secondary responsibility (11)
Not related to job (3)

Prior attendance at Carhart Center classroom courses

Yes (12)
No (17)
Unknown (1)

Prior experience with online courses

Required agency training (AgLearn or DOILearn) (30)
Agency professional development courses (2)
Technical training (1)
University (10)

Characterization of prior online course experience

Generally positive (2)
Generally negative (14)
Negative (agency), positive (university) (2)
Negative (agency)/positive (agency, university) (1)
Positive (university) (1)
Indifferent (4)
Unknown (6)

Motivation for taking the course

Job (18)
Career advancement (9)
Personal growth (6)
Unknown (3)

Type of timeframe during which student complete most of the coursework

Crammed (20)
Extended (10)

When coursework was started, in relation to registration date

Within several days (2)
Several weeks later (14)
Several months later (13)
Unknown (1) – registration information was lost

Completed recommended work products

Yes (1)
No (26)
No, but will in the future (1)
Unknown (2)

Location where coursework was completed

Home (7)
Work (18)
Part work/part home (5)

On whose time coursework was completed

Company (19)
Company (comp time) (1)
Personal (4)
Part company/part personal (6)

Was work environment distracting to study in?

Yes (21)

No (6)

Somewhat (3)

Preferred viewing format

Narrated (18) - streaming (16), downloaded (2)

PDF (12) – digital (7), hardcopy (4), unspecified (1)

Preferred learning style

Alone (8)

Group (18)

Both; depends on type of learning (4)

Characterization of computer skills

Comfortable with computers and the Internet (23)

Uncomfortable with computers and the Internet (7)

Appendix F: Detailed Comparison of This Study to the Five-Pronged Attrition Framework

This study's second research question looked at how applicable the five-pronged attrition framework was in describing barriers to effective e-learning job training. As described in the literature review, the framework used is the result of contributions by three authors, Rubenson, Garland and Schilke. To compare this study to these previous works, which collectively make up the five-pronged attrition framework, a breakdown of barriers taken from Schilke (2001, p. 52) was used. This study's barriers compared with those in this framework as follows in Table 2.

Table 2

Barriers and categories from the five-pronged attrition framework and this study

Barriers (five-pronged attrition framework)	Barrier (this study)
Situational	Work Environment
Poor learning environment	Competing priorities
Lack of support from family and peers	Competition between field work and office work
Poor study environment	Study environment distractions
Lack of time	Feelings of guilt for using work time to learn
Change in circumstance	Hindsight desire for coordinated learning with other staff
Took more time than expected	
Overcommitted, with multiple roles	
Dispositional	Personality Trait and Preference
Stress of multiple roles	Procrastination and cramming
Time management/procrastination	Expectations
Learning style problems	Learning style preferences
Need for face-to-face interaction	Technical aptitude
Adult pride	Course Design/Structure
Epistemological	Weaknesses of the online format
Epistemology of course differed from student's stance	Lack of interaction
Content lacked personal relevance, interest	Lack of networking
Lack of prerequisite knowledge	Lack of affirmation
Institutional	Unreliable technology
Problems concerning instructor	Difficulty reading on screen
Instructor was unavailable	Ignoring multiple learning styles
Contacting instructor was intimidating	Lack of sequestration and ease of distraction
Poor communication with instructor	Retention issues
Poor feedback	Weaknesses of the course/course materials
Instructional design problems	Compressed format
Problem with online instructional design	Focus on words not concepts
Need for other media/learning resources	Testing issues
Problem with quality of course material	Need for more examples
	Lack of relevance

Technological

Internet

Lack of computer access

Difficulty getting online

Resources availability (missing links)

Excessive download times

Technology

Connectivity problems

Login problems

Hardware/software problems

Navigation problems

Testing problems

In Table 2, barriers within the categories identified by each study are listed below the category, which is shown in bold. When examining Table 2, it is obvious that both inconsistencies and commonalities exist between this study (barriers shown in the right-hand column in Table 2) and the five-pronged attrition framework findings, taken from Schilke (barriers show in the left-hand column in Table 2), relevant in academia. Generally, the main barrier categories identified by Schilke were consistent with those found in this study; situational barriers equated to workplace barriers; dispositional barriers equated to personality trait and preference barriers; epistemological barriers equated to course design/structure barriers; and technological barriers equated to technology barriers. Absent in this study, however, was the existence of an overall category of institutional barriers, including problems related to enrollment and registration procedures, cost, availability and quality of technical support and other study resources or reference materials, and availability and quality of an instructor or tutor. Despite this discrepancy, it is important to note two things. First, institutional influences in this study appeared instead when barriers were analyzed in light of the systemic problems, as described in the last section in discussion and analysis chapter on the absence of an organizational culture of learning. Second, some barriers Schilke identified in the institutional category were classified under course design/structure barriers in this study. Not only are barriers within categories inconsistently matched in some cases, but there are notable absences of matches for a number of barriers relevant to e-learning job training. What follows is meant to briefly explain these

discrepancies, however it does not describe individual barriers in detail. These detailed descriptions can be found in the discussion and analysis chapter.

In this study, the most prevalently experienced barriers were those related to the workplace and included competing priorities and study environment distractions. These barriers are consistent with overcommitted, with multiple roles, and poor study environment listed by Schilke, however their influence was not as significant in his study. Additionally, students in this study indicated that lack of sequestration and ease of distraction was a weakness of the e-learning format, somewhat related to the study environment, yet these sentiments were classified instead under course design/structure barriers. Elements of Schilke's lack of support from family and peers is found in several places in this study: completing priorities, workplace distractions, feelings of guilt for using work time to learn, and within the systemic problem lack of an organizational culture or learning. While this study listed hindsight desire for coordination with other staff, this barrier was not documented by Schilke because, unlike this study, in which several groups of students worked in the same office, participants in his study were community college students and lacked any associations or linkages with each other. Conversely, he lists change in circumstance, in which students changed jobs, moved, or had another type of life changing event that prevented completion of the coursework. This barrier was not documented in this study. Although Schilke classifies taking more time than expected as a situational barrier, this study mainly classified it as a personality trait or preference, specifically an inconsistency between expectations and reality.

Under dispositional barriers, commonalities were found between procrastination and cramming and time management/procrastination, although Schilke's study does not mention cramming, and learning style preferences and a need for face-to-face interaction. Although

students in this study articulated a preference for group learning as a preferred learning style, criticisms related to weaknesses of the online format included a lack of interaction, a course design/structure barrier. Since the online course in this study was self-paced and no opportunities were provided to interact with instructors or other students (online or otherwise), it should be noted that student comments were somewhat different than those expressed by students in Schilke's study. His study's participants, who participated in synchronous chats with the instructor and other students in addition to completing group projects, expressed a need for face-to-face interaction, not just interaction in general. Schilke's study lists the stress of multiple roles as a dispositional barrier, however the concept of multiple roles was captured in this study related to competing priorities. Many of the participants in Schilke's study were adult students with families, full- or part-time jobs, and other non-academic responsibilities or roles, who experienced stress reconciling these commitments. Students in this study had similar difficulties, though instead of reconciling different life roles, they struggled with the stress of competing work-related priorities and responsibilities. Schilke's study lists adult pride—unwillingness or reluctance to ask for help when needed due to fear of being perceived as dumb or inept—as a dispositional barrier not encountered in this study. Conversely, this study found technical aptitude and negative prior experiences and subsequent expectations to be relevant personality traits or preferences related to e-learning, neither of which was not mentioned in Schilke's study.

Under epistemological barriers, Schilke terms participant expectations that the course would be easier than a traditional classroom course as epistemology of course differed from student's stance, sentiments also expressed by students in this study. This study, however, classified this phenomenon as a personality trait or preference barrier related to expectations. As another match, students in both studies identified lack of relevance (content lacked personal

relevance, interest in Schilke's study) as an epistemological or course design/structure barrier. Schilke's study, however, lists lack of prerequisite knowledge, a barrier not present in this study. Students in this study, in fact, were asked questions related to how well prepared they felt they were for the academic demands of the course, about their prerequisite knowledge, and, if they had completed either of two more basic online courses offered by the Carhart Center, how they felt completion of these courses prepared them for the one in this study. Overall, students felt prepared, felt that completion of prior coursework helped, but was not required, and felt that the course in this study provided sufficient background information for completion by students with relatively little prerequisite knowledge. In comparing Schilke's study to this one, of most significance is the absence in Schilke's study of many course design/structure barriers, however, he addresses some of them instead under his category of institutional barriers. In his section on institutional design problems, for example, matches are found between his: need for other media/learning resources and difficulty reading on screen and ignoring multiple learning styles; problems with quality of course and compressed format and focus on words not concepts. Absent in Schilke's study, however, are barriers this study's students identified related to lack of networking, lack of affirmation, retention issues, testing issues, and need for more examples. Understandably, networking is of greater importance in the workplace than for students in academia. It may also be that lack of networking and affirmation were not present in Schilke's study because students were provided with opportunities for synchronous interactions online. Possible explanations why retention issues were not mentioned by students in Schilke's study include the prevalence of procrastination and cramming in this study. It is possible that, since Schilke's study encompassed a traditional academic course spanning an entire semester, these behaviors were not as prevalent and therefore their impacts on retention were less significant.

The presence of barriers related to testing, types of testing options available specifically, and examples in this study are likely specific to the way this study's course materials were designed, and therefore may not be relevant to other studies.

Under institutional barriers, Schilke devotes a section to problems concerning the instructor in which students had various communication problems. This disparity, as previously mentioned, is caused by differences in the structure of the online courses evaluated in both studies. This study evaluated a shorter self-paced course in which students worked at their own pace and had no interaction with instructors or other students. In contrast, Schilke's study evaluated an online course spanning an academic semester in which students participated in synchronous chat sessions with the instructor and completed group work. Therefore, it should be noted that the type of online course and the presence or absence of online interactions can greatly influence the barriers students experience.

Finally, under technological barriers, students in both studies experienced access problems related to finding an appropriate computer and Internet connectivity issues, which Schilke terms lack of computer access and difficulty getting online. Students in this study also acknowledged the problem of unreliable technology more generally as a weakness of the online format under course design/structure barriers. Students in Schilke's study complained about resources availability (missing links), specifically dead links on the course website, a problem not experienced by students in this study. His study's students also experienced excessive download times. Students in this study did not complain directly of excessive download times; their problems related to excessively long page load times were instead expressed related to connectivity issues due in part to incompatibilities between the learning management system's secure website and agency networks. Students in this study also experienced a variety of other

technical problems not found in Schilke's study including login problems, hardware/software problems, navigation problems, and testing problems.