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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

PEDAGOGIES, PERSPECTIVES, AND PRACTICES: MOBILE
LEARNING THROUGH THE EXPERIENCES OF FACULTY
DEVELOPERS AND INSTRUCTIONAL DESIGNERS IN
CENTERS FOR TEACHING AND LEARNING

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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College of Education and Behavioral Sciences
Department of Educational Technology

May, 2013

This Dissertation by: Kim A. Hosler

Entitled: *Pedagogies, Perspectives, and Practices: Mobile Learning Through the Experiences of Faculty Developers and Instructional Designers in Centers for Teaching and Learning*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy
in College of Education and Behavioral Sciences in Department of Educational
Technology

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ABSTRACT

Hosler, Kim A. *Pedagogies, Perspectives, and Practices: Mobile Learning Through the Experiences of Faculty Developers and Instructional Designers in Centers for Teaching and Learning*. Published Doctor of Philosophy dissertation, University of Northern Colorado, 2013.

The purpose of this qualitative case study was to explore the experiences, perceptions, and pedagogy of nine self-identified faculty developers and instructional designers who work in centers for teaching and learning supporting faculty members requesting assistance with mobile learning. With the ever-increasing use of mobile devices across universities, exploring how these individuals were preparing for and addressing faculty inquiries about mobile learning may offer guidance and insight to others looking to plan for and support mobile learning endeavors at their universities. Data were collected through two semi-structured interviews and participant drawn models that yielded descriptions, perceptions, and experiences about mobile learning. Themes emerging from the participants included no requests from faculty for mobile learning support, a variety of frameworks to inform technology integration efforts, a faculty-first focus, an absence of pedagogical and theory based considerations, and migration to mobile learning through the learning management system. Time, lack of knowledge, and accessibility were seen as challenges to mobile learning implementation. Implications from the study included the need for faculty developers in Centers for Teaching and Learning to engage their universities in pedagogically sound discussions

and research-based implementations of mobile learning. Faculty developers need to proactively leverage students and instructors' personal use of mobile devices, as well as the learning management system, to move the boundaries of learning into contextually rich and vibrant learning environments.

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TABLE OF CONTENTS

CHAPTER I. INTRODUCTION.....	1
Mobile Learning: Beyond the Device.....	6
Pedagogies for m-Learning Informed by Theory	8
Definition of Terms.....	11
Summary	13
CHAPTER II. REVIEW OF THE LITERATURE.....	15
Introduction.....	15
Emerging Technologies	24
Ubiquity of Mobile Technologies	28
Mobile Learning Explicated	29
Mobile Learning in Higher Education	32
Frameworks and Models for Mobile Learning	34
Pedagogies for M-Learning	42
Challenges Implementing Mobile Learning in Higher Education.....	53
Summary	58
CHAPTER III. METHODOLOGY	64
Purpose of the Study	64
Researcher Stance and Research Design	66
Case Study as a Qualitative Methodology	72
Case Study Setting	76
Participants.....	76
Data Gathering to Address Research Questions	78
Securing Participants	80
Participant Overview	80
Data Collection Methods	81
Data Analysis	87
Data Interpretation	90
Study Limitations.....	94
CHAPTER IV. INTRODUCTION TO PARTICIPANTS	96
Alaina.....	99
Anna.....	103

Brent.....	112
Hannah	120
Dominic.....	127
Steve.....	135
Emily.....	143
Mike	150
Sam	157
Summary	168
CHAPTER V. THEMES AND FINDINGS	169
Participant Definitions of Mobile Learning.....	170
Antecedent Question: What Is Happening on Campus?.....	174
The Divergent Case.....	175
Faculty Not Requesting Mobile Learning Support.....	177
Pedagogical Approaches and Models--Interview Data.....	179
Pedagogical Approaches and Models--Visual Representations	184
Potential Challenges to Mobile Learning	187
Unanticipated Findings	192
Summary	195
CHAPTER VI. INTERPRETATION AND DISCUSSION.....	198
Mobile Learning, the Learning Management System, Pedagogy, and Models.....	200
Role of the Learner	212
Barriers and Challenges	214
Recommendations for Practice	217
Implications for Future Research.....	223
Conclusion	226
REFERENCES	231
APPENDIX A. INSTITUTIONAL REVIEW BOARD APPROVAL	252
APPENDIX B. PARTICIPANT SOLICITATION EMAIL.....	254
APPENDIX C. CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH	256
APPENDIX D. FIRST SESSION INTERVIEW QUESTIONS	259
APPENDIX E. SECOND ROUND OF SEMI-STRUCTURED INTERVIEW QUESTIONS	262
APPENDIX F. JOURNAL AND VISUAL MODEL CREATION INSTRUCTIONS.....	264

LIST OF TABLES

1.	Summary of the Three Models	60
2.	Personal Stances and Research Design.....	68
3.	Participant Descriptive Data	81
4.	Data Sources for Research Questions	84
5.	Interview Questions Aligned to Research Questions.....	85
6.	Participant Data.....	98

LIST OF FIGURES

1.	Four types of mobile learning: A pedagogical framework	37
2.	M-learning framework	39
3.	Framework for the Rational Analysis of Mobile Education model	41
4.	Mobile learning visual representation as perceived by Alaina	105
5.	Anna's view of the necessary elements for a mobile learning initiative	111
6.	Brent's model of mobile learning for his campus	119
7.	Hannah's concept map of mobile learning	127
8.	Dominic's expansive view of mobile learning	135
9.	Steve's vision of mobile learning on his community college campus	143
10.	Emily's model representing the attitudes of faculty members and students toward technology	149
11.	Mike's model of mobile learning	156
12.	Sam's visual interpretation of mobile learning	165

CHAPTER I

INTRODUCTION

As we enter the second decade of the 21st century, technology tools supporting increased virtual social interactions and augmenting educational practices abound (El-Hussein & Cronje, 2010; Traxler, 2007; Wagner, 2005). Today's undergraduate and graduate college students are more connected to each other and the World Wide Web than ever before. Smartphones, netbooks, and tablet computing offer broadband and wireless (WiFi) "instant on" connections to the Internet and the expansive amount of resources it offers. According to the 2010 Horizon Report (Johnson, Levine, Smith, & Stone, 2010), mobile devices have become an accepted, integrated, and ubiquitous part of our daily lives, allowing access to video and audio files, geo-locating, social networking, personal productivity, informational and academic resources, and just-in-time learning. Mobile devices are continuing to evolve and are becoming increasingly more popular as a principal means for accessing Internet resources, acting as "doorways to the content and social tapestries of the network" (Johnson, Smith, Willis, Levine, & Haywood, 2011, p. 12). According to Johnson, Adams, and Cummins (2012), universities are building and designing mobile applications that are specific to educational and research needs across the curriculum. Compact, mobile, handheld devices with their simple connectivity and portability allow students and instructors alike to create and consume information efficiently with relative ease whenever they desire. According to the 2011 Horizon

Report (Johnson et al., 2011), mobile devices incorporate the convergence of electronic book readers, annotation tools, applications for creation and composition, social networking tools, digital capturing tools (audio, video, photos), all of which lend themselves to educational use. As ownership and use of mobile devices increase, so do the expectations that these devices will be accepted and effectively used in educational settings.

Schools and universities are facing the fact that ubiquitous mobile devices are fast becoming an integral part of student life today, which means they need to begin examining how well prepared they are to embrace mobile learning, the design and development of mobile content, and the implementation of mobile learning (Pachler, Bachmair, & Cook, 2010). As Traxler (2007) confirmed, the role of education is challenged; the relationships among education, technology, and society are more fluid and dynamic with the advent of just-in-time, anywhere access to content and information that mobile devices offer. Are university instructional designers and those who support instructor and faculty development efforts finding themselves at a place where technology and learning theories are likely to connect? Are designers and faculty developers stepping back and examining the more learner-centered and constructivist environments that mobile learning engenders?

The purpose of this research was to investigate the activities, work, challenges, and perspectives of faculty developers and instructional designers as they strive to address requests for mobile learning implementation and support from university faculty and instructors. This research sought to discover the challenges and experiences encountered by faculty developers and instructional designers in university centers for

teaching and learning and the solutions they offered faculty members regarding their mobile learning inquiries.

Faculty development centers house a variety of talented and skilled professionals who provide a spectrum of skills in support of faculty professional development and excellence in teaching and learning. Once called an instructional specialist or instructional developer who assisted faculty in instructional or course development and in improving teaching skills (Centra, 1976), a more common title found within university centers for teaching and learning today is that of the instructional designer. Lohr (2008) describes an instructional designer as “a professional who analyzes instructional problems and their solutions and creates, implements, and tests appropriate interventions” (p. 4). In addition, the role of instructional designer is one of several roles found in the field of educational technology. Januszewski and Molenda (2008) defined educational technology, a broader concept than instructional technology, as the “study of and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources” (p. 1). As such, it is instructional designers who develop instructional materials in a variety of forms, delivered through a variety of means, to support student learning and improve performance. In university centers for teaching and learning, instructional designers often guide and support faculty desiring to build or enhance their courses, transition courses to an online venue, and effectively integrate technology into their teaching practice.

Today’s instructional designer does more than teach instructors and faculty how to use a learning management system, create assessments, or ensure the alignment of

course objectives with course content. He or she needs to be prepared to discuss and implement best practices for integrating technology with course content (including sensitivity to context), provide engaging instructional strategies, work in collaboration with subject matter experts, and manage all stages of the instructional design process. Other responsibilities include assisting with production of interactive elements and other media elements to be used in online courses, serving as a local expert user of content creation tools, and participating in evaluating and assessing instructional effectiveness and continuous improvement of course materials in collaboration with university faculty and staff.

Instructional designers are playing an increased role within university settings as “learning environments are more complex and more demanding of skilled individuals than ever before” (Dempsey & Van Eck, 2007, p. 298). Dempsey and Van Eck explained universities are finding themselves exposed to direct competition from private industry, while concurrently the demand and reward structures for instructional designers are increasing as more and more they are seen as highly skilled and useful partners in business and academia.

Many universities employ instructional designers in their support centers for teaching and learning. These support centers go by a variety of names such as Center for Teaching and Learning, Faculty Development Center, Center for Teaching Excellence, Office of Teaching and Learning, or Educational Technology Center. These centers, along with the work of instructional designers, support faculty and instructor development at various levels in an effort to promote student learning and performance.

In addition, these centers provide direct training of faculty while also serving as a clearinghouse for available resources.

Although similar in many ways, faculty training and instructional design are not the same thing. Training professionals tend to cover a broad spectrum of topics, usually delivered in a workshop format, i.e., sessions on university procedures, how to use the university's learning management system, best practices regarding syllabi construction, and the use of interactive white boards, to name a few recent topics. While instructional designers may likewise provide training, their work also focuses on the intersection of learners, desired learning outcomes, strategies for reaching those outcomes, and a process of formative and summative evaluation. Instructional design necessitates analyzing learners, learning theory, and learning and performance contexts. Instructional designers create and test a variety of interventions. In sum, the instructional design process is complex, broader, and generally spans a longer development period than the timeframe necessary to create content-focused faculty development workshops.

Because technology is transforming the face of higher education at an ever increasing pace, universities need to manage this transformation and, as a result, have begun to hire more technology professionals (Surry & Robinson, 2001). These technology professionals range from information technology specialists, information security experts and network experts, to instructional designers and instructional technologists who collectively support a university's efforts to implement and sustain distance and mobile learning initiatives and best practices. While collectively this team of people and their respective centers are responsible for ensuring the highest quality of distance learning experiences for students, the focus of this study was on the activities,

experiences, and perspectives of instructional designers and faculty developers as they face the pervasiveness of mobile devices and ensuing faculty requests for assistance implementing mobile learning in their courses.

Mobile Learning: Beyond the Device

Mobile learning (or m-learning) by its very name invokes the mobility of the learner with a portable handheld device, resulting in a corresponding mobility of learning (El-Hussein & Cronje, 2010). According to El-Hussein and Cronje (2010), “These observations emphasize the *mobility* of learning and the significance of the term ‘mobile learning’” (p. 14). Because many definitions of mobile learning exist, El-Hussein and Cronje urged the consideration of the relationship of the words mobile *and* learning in any definition of mobile learning but acknowledged the difficulty of ascribing one fixed definition to the term. They advocated for the concept of mobility to be an interdependent tripartite classification--the mobility of the technology, the mobility of the learner, and the mobility of learning “that augments the higher education landscape” (p. 17). Traxler (2007) discussed how m-learning definitions can have a technical focus, describing the technologies involved in m-learning as opposed to definitions of mobile learning that offer a conceptualization of the terms ‘mobility of learning’ from the “learner’s experience of learning with mobile devices” (p. 1).

Mobile learning can also be described as essentially contextual; learning takes place across locations, times, topics, and technologies as people interact with others and their surroundings using everyday digital tools (Sharples, Milrad, Arnedillo Sánchez, & Vavoula, 2009). According to Laouris and Eteokleous (2005), m-learning is not only defined as ever-changing mobile technology (i.e., faster processors, smaller devices,

varying output characteristics) but should also be explained with “... a socially and educationally responsible definition [that views] the learner as the one being mobile and not his/her devices! What needs to move with the learner is not the device, but his/her whole learning environment” (p. 6). Laouris and Eteokleous’ definition offers a more learner-centered focus when describing mobile learning, which underpins Traxler’s (2007) explanation that mobile learning is personal, contextual, and situated, making it ‘noisy’ and difficult to define. He delimited the term mobile learning by not including laptops or tablet computers because they are not carried or used in a habitual manner. He believed “learners, and indeed people in general, will carry and use their phones, their *iPods*, or their PDAs habitually and unthinkingly; however, they will seldom carry a laptop or *Tablet* computer without a premeditated purpose and a minimum timeframe” (pp. 5-6). Although individuals may carry Smartphones, PDAs, and tablet computers much like they carry a small, spiral-bound pad of paper tucked under their arm or in a handbag, one may argue whether any handheld device is ever used in an unthinking, mechanical, or unintentional manner.

Pachler et al. (2010) delimited mobile devices much like Traxler (2007) when they wrote, “We consider laptops to lie outside the range of devices we focus on in the context of mobile learning as they mostly still lack true portability and ubiquity as well as penetration of a wide range of social contexts” (p. 7). Beddall-Hill, Jabbar, and Al Shehri (2011) did not include laptops in their definition of mobile devices because cameras are not consistently found built into laptops and they are not small enough or light enough to capture data or observations while the learner is on the move.

For the purposes of this research, mobile learning was broadly defined as the mobility of the learner in tandem with the handheld mobile device (Smartphones, iPhones, iPad, Personal Digital Assistants, MP3 players/iPod, tablet computers), a wireless Internet connection, and the learner's ability to move fluidly across time and place with access to content, information, and discourse anytime and anywhere. In this definition, the exploratory, situated, and constructivist nature of mobile learning was implied while maintaining a learner-centered (end user) focus. Furthermore, no one specific mobile application was examined; rather, all potential uses of handheld mobile devices with wireless Internet connectivity in support of learning were considered.

Pedagogies for m-Learning Informed by Theory

Because of the personally managed, highly contextual, and networked nature of m-learning, it readily lends itself to a learner-centered, constructivist pedagogy underpinned by learner-centered theories and constructivist philosophy. Instructors and faculty members seeking to capitalize on the affordances of mobile learning are hard pressed to be the “sage on the stage” but instead function as the “guide on the side” (King, 1993), orchestrating content chunks, access to information (videos, Internet links, images, and audio), and activities. Mobile learners are not constrained by time and place; they have the ability to access content and generate content in a just-in-time, “just for me,” and “just enough” manner (Traxler, 2007, p. 5). This immediate and voluntary access to information, course content, and communication underscores a learner-centeredness to students' educational transactions.

Learner-centered pedagogy is a close sibling of a constructivist teaching philosophy, both lending themselves well to mobile learning environments.

Constructivism entails humans making meaning and constructing knowledge from active participation and inquiry that is social in nature. Constructivism as a theory embodies knowledge as “ emergent, developmental, nonobjective, viable, constructed explanations by humans engaged in meaning making in cultural and social communities of discourse” (Fosnot, 2005, p. ix). From a constructivist perspective, the instructional designer and course instructor provision students through the creation of authentic tasks that help students integrate their understanding from multiple perspectives through reflection and interaction. A constructivist teaching philosophy is less content oriented and more learner-centered by its very nature. Mobile learning complements a constructivist, learner-centered approach because it is personal, socially networked, and contextual with the locus of control residing with the learner. It falls to instructional designers and others who support faculty teaching efforts to create an information-rich, socially meaningful collaborative learning environment--one that exploits the anytime, anywhere, in-my-pocket availability mobile learning affords.

A general mandate for most higher education institutions is to be relevant and to support student and faculty performance. As the specific role of instructional designer finds a new niche within university centers for teaching and learning, it is important to examine the designer’s readiness to embrace new technologies touted to support student learning and performance. One such emerging technology is mobile learning. As several researchers are quick to point out, much has been written and studied regarding the technical aspects of mobile learning (Traxler, 2007; Traxler & Kukulska-Hulme, 2005) as well as ways in which mobile learning has been implemented in a variety of fields and disciplines (Gupta & Koo, 2010; Johnson et al., 2011). However, no research specifically

examines how instructional designers and faculty development professionals within universities are planning for, addressing, and supporting instructor requests for mobile learning, a technology that is not only ubiquitous but whose use is growing exponentially.

More specifically, this study sought to understand how instructional designers and faculty development personnel perceived and approached mobile learning and how they anticipated or supported faculty requests for implementation of mobile learning in their courses. It was important to learn what faculty developers and instructional designers were doing, and how they were doing it, to better understand the challenges faced by faculty development centers trying to stay abreast of pervasive, emerging technologies such as mobile learning. In addition, this study provided insight into pedagogical models, strategies, challenges, and lessons learned as the planning, guidance, and support of mobile learning endeavors were explored from instructional designer and faculty developer perspectives and experiences. This study investigated the following research questions:

- Q1 How are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?
 - Q1a What, if any, pedagogical approaches, conceptual frameworks, or models are they using when guiding faculty and addressing requests for mobile learning implementation and pedagogical support?
 - Q1b What are the barriers and challenges instructional designers and faculty developers face when supporting and guiding faculty in their mobile learning endeavors?

Definition of Terms

Critical to any study is a clear understanding of key terms and constructs the researcher uses in a study. For the purposes of this research, the following definitions provide clarity as to how the terms were used in this study.

Constructionism. Derived from Seymour Papert’s work (1980), constructionism offers a theory of learning as well as an educational strategy. It means the learner “is an active builder of knowledge” while emphasizing the creation of external artifacts shared by learners (Han & Bhattacharya, 2001, para. Constructionism: What is it?). Constructionism is meaning constructed by individuals as they interact and engage with people and the world in an interpretive manner.

Constructivism. A philosophy about knowledge and learning, which posits that knowledge is not independent of the meaning a learner ascribes to an experience. Constructivism assumes “knowledge is constructed by learners as they attempt to make sense of their experiences” (Driscoll, 2005, p. 387) mediated by their prior knowledge. A constructivist pedagogy, therefore, instantiates an active, collaborative, exploratory nature into the instructional design and instructional strategies of a course. The objective is to allow students to problem solve and make meaning while engaged in authentic and meaningful tasks where the instructor acts as guide and facilitator.

Faculty-developer. According to the Professional and Organizational Development Network in Higher Education (POD; 2007), “Faculty development specialists provide consultation on teaching, including class organization, evaluation of students, in-class presentation skills, questioning and all aspects of design and presentation” (para. faculty development definitions). In addition, POD noted that

faculty developers advise faculty and instructors on aspects of teacher/student interaction that include advising, tutoring, discipline policies, and general administration.

Instructional designer. An individual responsible for assisting faculty in creating content and implementing effective learning strategies that incorporate technology into their curriculum. In the context of this study, designers were those who

work directly with faculty and other clients to help them think more critically about the needs of all learners, about issues of access, about the social and cultural implications of the use of information technologies, about alternative learning environments, and about related policy development. (Campbell, Schwier, & Kenny, 2007, p. 2)

Learner-centered. Learner-centered teaching reflects an approach to instruction that places the focus on student learning and what students *do* to learn rather than the content to be covered or what the teacher is doing. A learner-centered approach stresses the importance of active engagement and social interaction as students construct their own knowledge (Blumberg, 2009).

Learning management system. Commonly referred to as an LMS, it is a web-based application used for administration of student records (tracking, grading, attendance etc.), the delivery of content and instruction, communication, and generally used in higher education contexts to support classroom and distance learning.

Location-based services. Depending on the mobile device, location-based services use a combination of cellular, Wi-Fi, and global positioning system (GPS) to determine a user's location. Location-based services integrate a mobile device's location or position with other information that subsequently provides added value to the user (Spiekermann, 2004). Accessing a user's position data through this service enhances mobile application products.

Mobile learning. The learner's ability to move fluidly across time and place with access to content, information, and discourse anytime and anywhere via a handheld device and a wireless connection (iPhone, iPod, Smartphone, cell phones, iPad, Personal Digital Assistants, MP3 players, tablet computers). This definition broadly includes applications such as podcasts, vodcasts (video), e-textbooks, communication tools (email, chat, instant messaging, blogs, wikis, calendars, and organizational tools), the use of location services for location tracking and awareness, social networking, virtual worlds, and gaming.

Pedagogy. The art and science of teaching including instructional methods, the activities, methods, and work of the teacher/instructor.

Summary

The focus of this study was on university instructional designers and faculty developers and how they planned to address or were currently addressing and supporting requests for mobile learning implementation from faculty.

Benefactors of this study would be university instructional designers, administrators, faculty development personnel, and others responsible for planning, implementing, and supporting mobile learning implementation requests. This research provided insights into the current challenges, practices, and successes of instructional designers and faculty developers in support of m-learning initiatives within university faculty development centers from a constructivist, learner-centered, and authentic framework. In addition, this study would be of interest to others concerned with the planning, implementation, and support of mobile learning such as a university's

information technology department that is responsible for the university's computers, network, and technology infrastructure.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Simply stated, faculty development is about improving the practice of teaching and learning as well as the practitioner. Faculty development centers, which house programs for faculty members and people who support them, offer professional development for instructors and teachers in higher education. Within these centers, careful consideration is given to the successes and generation of “ideas, beliefs, and convictions about teaching and learning” (McGriff, 2001, p. 309). Faculty development offerings include a wide range of skills training: how to use interactive whiteboards, implement clickers in the classroom, use advanced Web tools to support student learning, or build a course in the university’s learning management system.

Personal and professional development offerings in faculty development centers may include topics such as sustaining creativity throughout your career, effective faculty mentoring, creating learner-centered syllabi, designing a grading rubric, and design and implementation of active and cooperative learning. Faculty leadership initiatives include topics such as conflict management, courageous leadership, influencing without authority, decision making and ethics, integrity, and preparing future leaders. Also centers may provide workshop topics that help faculty better understand the institution’s

mission along with a broader and more integrated sense of a department's and college mission.

According to the Professional and Organizational Development Network in Higher Education (POD; 2007), faculty development centers generally consist of three primary areas: faculty development, instructional development, and organizational development. Faculty development in higher education entails supporting the instructor or faculty member from a teaching perspective as a scholar and researcher, and as a person. The Professional and Organizational Development Network in Higher Education points out that not all universities or colleges include all three of these areas; however, most faculty development centers are underpinned by a philosophy that faculty are the driving force behind the institution. McGriff (2001) claimed that a highly skilled faculty is the core of a quality academic institution. As such, the professional development of faculty members not only as individuals, but also as scholars and leaders, supports the productivity and mission of the university as well.

According to Ouellett (2010), colleges and universities have a history of commitment to the development and success of faculty members relative to their academic discipline expertise and research. The sabbatical provides an example of a long-established form of faculty development designed to provide time for scholars to further their research in their respective fields. Doctoral and research universities were among the first to establish educational development centers, the very first being the Center for Research on Learning and Teaching (CRLT) at the University of Michigan in 1962 (Baepler, 2010; Cook & Marincovich, 2010). Early in the 1960s and 1970s, the success of faculty was almost exclusively defined by their research and publishing

records of accomplishment (Gaff & Simpson, 1994; Ouellett, 2010). As Gaff and Simpson (1994) explained, “Institutions created various mechanisms for encouraging their faculty to learn and to keep up to date in their fields--sabbatical leaves and support for such activities as completing an advanced degree, traveling to professional meetings, and conducting research” (p. 168). Ouellett (2010) explained that the student rights movement of the 1960s caused a reevaluation of what defined faculty success and ushered in a movement toward excellence in teaching. As the baby boomer generation headed off to college in the late 1960s and 1970s, higher education institutions found themselves with a broader range of students (Ouellett, 2010). These students brought with them a desire to be involved along with a sense of activism that focused on the quality of teaching and the right for students to evaluate their professors (Sorcinelli, Auston, Eddy, & Beach, 2006). Gaff and Simpson wrote that student protests in the late 1960s and early 1970s brought attention to irrelevant courses and lack luster teaching, exposing “the myth that all that is required to be a good teacher is to know one’s subject” (p. 168). Sorcinelli et al. (2006) labeled this period the Age of the Teacher with a focus on the design and practice related to the development of teaching skills and excellence in teaching (Gaff & Simpson, 1994).

Ouellett (2010) wrote that in the mid to late 1990s, faculty development had evolved into a broader effort--one that encompassed personal development including self-reflection and personal growth, instructional development that encapsulated course and student-based prerogatives, and organizational development. No longer could faculty be content with being a ‘sage on the stage’; instead, student learning became a priority. Sorcinelli et al. (2006) labeled this the Age of the Learner. Sorcinelli et al. also noted

that during this time there were “accelerated changes in academic work that had enormous implications for faculty development” (p. 3). During this period, new and complex resources emerged, including options for faculty regarding instructional and organizational development (Ouellett, 2010).

The current stage of faculty development is called the Age of the Networker. Faculty development programs are experiencing continued growth and faculty developers are called upon to “preserve, clarify, and enhance” faculty development while networking with faculty and institutional leaders in response to the challenges of teaching in the 21st century (Sorcinelli, et al., 2006, p. 28). According to these authors, teaching in the 21st century is fraught with challenges; they identified five primary concerns that occupy the minds of faculty developers in this Age of the Networker.

In their study, Sorcinelli et al. (2006) found that faculty developers were concerned about supporting faculty as they tried to balance new and multiple roles. Faculty developers were also worried about helping faculty members teach from a learner-centered perspective and helping them appropriately assess learning outcomes. Sorcinelli et al. discovered that faculty developers were worried about supporting faculty members who found themselves teaching unprepared students as well as those who desired to integrate technology into the learning environment in a strategic manner. In addition, the authors learned that faculty developers were concerned about supporting and training adjunct faculty members, increasing the organizational effectiveness among departments, and establishing interdisciplinary collaborations.

These primary concerns, along with current demands for higher education to do more with less, place increasing pressure on faculty members, which in turn expands the

complexity of their roles and their ability to adapt to rapid-fire change (Lefoe, Olney, Wright, & Herrington, 2009). McGriff (2001) claimed that faculty development is part of a life-long learning endeavor for university instructors and a key to the transformational changes taking place in higher education. In other words, for faculty members to progress in their teaching and research and meet increasing demands on their time and expertise, life-long learning should be a mainstay that is buttressed by resources found in university centers for teaching and learning. McGriff believed instructional designers are “well-trained professional[s] for assisting faculty members and serving faculty development programs to better utilize innovative instructional methodologies, strategies, and techniques” (p. 308). Instructional designers embedded in faculty development initiatives would essentially guide this transformation (McGriff, 2001)--a transformation initiated by changes in technology, demands from the institution and students, needs of teaching faculty, and the constantly evolving new ways of teaching and learning. These demands, in addition to administration requirements, place greater stress and responsibility on faculty development centers and the people who work within them.

Among the individuals working in faculty development centers are scholars and practitioners who play varying roles in the support of faculty members and instructors. Titles found in university centers for teaching and learning include director, program coordinator, faculty member, administrator, technology coordinator, instructional technologist, learning specialist, and teaching and learning consultant. Newer titles appearing in the rosters of these centers are senior interactive software engineer, senior educational web developer, learning technologies coordinator, studio educational consultant, and distance learning instructional strategist. The term instructional designer

is a title not generally recognized outside of the field of instructional technology (Liu, Quiros, & Demps, 2002). However, these newer titles reflect the growing trend toward integrating more sophisticated technology, creativity, and pedagogy into faculty support endeavors. Because faculty members have a broad range of demands placed on them and because their roles are expanding (Lefoe et al., 2009; Ouellett, 2010; Surry & Robinson, 2001), it is becoming increasingly more difficult for them to be proficient at things outside of their academic discipline. Siemens (2008) wrote that to expect subject matter experts such as faculty to be well-versed in a variety of technologies as well as pedagogies is unrealistic. However, the roles encompassed by faculty developers, instructional technologists, and instructional designers can help fill the void between a faculty member's area of expertise and expectations regarding quality teaching and technology integration within the university.

Instructional technology, sometimes referred to as educational technology, is the study and practice of "facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008, p. 1). Cook and Marincovich (2010) wrote that instructional technology is "a hook that brings faculty members to a center for pedagogical innovation not remediation." (p. 285). They believed that instructional technology should not be the primary focus of faculty development centers because emerging technologies can overwhelm a center and inhibit it from carrying out other responsibilities. Preferably, faculty teaching and learning centers should have staff who are knowledgeable about instructional technologies and who can also focus faculty on pedagogy and course outcomes (Cook & Marincovich, 2010).

Surry and Robinson (2001) explained instructional technology as something primarily concerned with how to use emerging hardware and software for teaching and learning. In addition, instructional design encompasses the technology to support teaching and learning and also offers a more systematic approach (or methodology) to the facilitation of learning and performance improvement. Instructional design provides a process that generally begins with the designer analyzing the learner's needs, identifying gaps in the learner's knowledge and skills, developing appropriate instructional materials and activities, implementing and evaluating the results of the instruction, and then making refinements where necessary.

According to Molenda and Pershing (2008), instructor performance is improved by a systems approach that focuses on "high-value objectives, weeding out irrelevancies, thus reducing instructional time, which conserves the resources of educators" (p. 76). Breaking this down further, the instructional designer is the individual who applies this systematic approach to the design and creation of instructional materials, content, strategies, activities, and then evaluates the results (Lohr, 2008; Morrison, Ross, & Kemp, 2007).

The primary role of the instructional designer "is to be an educator to educators" (Siemens, 2008, p. 18). Siemens (2008) added that while the traditional roles of the instructional designer, such as context and content analysis, sequencing, and fostering interaction will remain, the new emphasis needs to be on examining knowledge as it resides within networks and to consider learning as developing multi-faceted networks. Within this framework, the role of the instructional designer becomes one of directing instructors and faculty to the appropriate tools and resources (Siemens, 2008). Smith and

Ragan (2005) believed that good instructional designers “insist” on the alignment of instructional goals, instructional strategy, and evaluation (p. 9). They summed up the essential stages of instructional design by encouraging designers to ask “where are we going” (analysis), “how will we get there” (strategy development) and “how will we know when we have arrived” (evaluation; Smith & Ragan, 2005, p. 10)?

The International Board of Standards for Training, Performance and Instruction (IBSTPI; 2012) established standards for instructional designers that are recognized around the world. The standards for instructional designers include skill sets for planning and analysis (i.e., needs assessment, analysis of the environment, and analysis of the learner), design and development of content and instruction, evaluation and assessment of the instruction’s impact and implementation, and management of the educational project or instructional design assignment. Additionally, instructional designers are now expected to have the ability to analyze the characteristics of existing and emerging technologies and their potential use. These skills, along with an ability to effectively collaborate and form productive relationships with others on a project, provide the foundation attributes of a strong instructional designer.

Furthermore, most position postings for an instructional technologist or instructional designer require a master’s degree or a Ph.D. in educational technology or a closely related field such as curriculum and instruction, with skills demonstrating the proficient use of current software and web-based applications. In sum, the role of the instructional designer is described in a number of ways, the essence being an individual who can create effective, engaging instruction; utilize

appropriate media in support of the instruction; and work closely with content experts to meet the learning needs of his or her constituents.

More recently, a perusal of instructional designer position postings from various universities garnered specific details of the desired qualities and skills sought in instructional designers being hired for faculty development centers. While these position postings loosely fit the definition of an instructional designer, they are presented here to offer a real-time and specific description of the skills and education requirements of today's instructional designer. For example, the New York Institute of Technology (2011) was seeking an instructional designer for their faculty development center who could also consult with faculty members as they reviewed and transformed curricula into online and blended courses; collaborate with other units on instruction and assessment-related projects; and coordinate development and review of online and blended courses. The University of Texas at Austin (2011) was seeking an instructional developer with a Ph.D. in Instructional Design, Educational Psychology, or Curriculum and Instruction with knowledge of instructional design models, strategies, and techniques along with knowledge of the practical trade-offs among various group learning structures. The University of Texas at Austin (2011) also required this individual to have task and learning outcome analysis experience, interface design experience with interactive instructional tools, and workshop preparation and delivery experience. Montana State University at Great Falls (2011) was seeking an instructional developer/consulting and research professional for their teaching and learning center who had experience as a teacher, a trainer, and a professional development instructor for adult learners, and who also had experience designing instruction for online learning environments.

Irrespective of title and responsibilities, “instructional designers are persons who demonstrate design competencies on the job regardless of job title or training and that ID competencies pertain to persons working in a wide range of job settings” (Kenny, Zhang, Schwier, & Campbell, 2005, p. 17). Instructional designers may be found in the military as well as private and public sectors. They can be found working in large corporations, financial services, hospitals, software companies, or any organization needing to develop effective, efficient, and engaging instruction. The work of instructional designers is evident in books, manuals, videos, pod casts, and multimedia. No matter where they work or what they are called (instructional designers, educational technologists, instructional support specialists, technology coordinators, academic technology consultants, etc.), these titles describe similar work responsibilities and skill sets.

Instructional designers who are armed with a complex and unique skill set have much to offer a university and are in demand for the variety of skills and knowledge they possess. When instructors and faculty need assistance with integrating emerging technology into 21st century curricula, they turn to centers for teaching and learning that are staffed by qualified instructional designers and faculty development personnel.

Emerging Technologies

Emerging technologies, a much bantered about term, can conjure up exciting images of the latest and greatest gizmos, gadgets, and games; more academically, it can refer to technology tools that support effective, efficient, and engaging learning environments. Over 20 years ago, Hannafin (1992) explained emerging technologies as “creating or extending functions and attributes across developing technologies” (p. 50). He believed that emerging technologies, to varying degrees, represented “the

technological capacity to present, manipulate, control or otherwise manage educational activities” (Hannafin, 1992, p. 50).

Whatever images or thoughts come to mind when one hears “emerging technologies,” no single, clear meaning or definition stands out (Veletsianos, 2010). Examining each word individually finds that emerging, according to Merriam-Webster’s online dictionary (n.d.), means to come into being through evolution, to manifest, to rise from an obscure or inferior position, to come into view. Technology, from the Greek word *techno* meaning art or craft, refers to the systematic treatment of an art or skill. When combined, the literal definition becomes the evolution or manifestation (coming into view) of an art form or craft.

Veletsianos (2010) suggested that the term emerging technology, in an educational context, be defined as “tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes” (p. 3). Harper (2010) reported that during a meeting of the Emerging Technologies Council at the World Economic Forum while he and others were discussing geo-engineering, nano technologies, and synthetic biology, they determined a broader definition of emerging technologies was needed. As a result, the Emerging Technologies Council began their preliminary definition of emerging technology as something arising from “new knowledge” or “the innovative application of existing knowledge,” which in turn leads to “the rapid development of new capabilities, which are projected to have significant systemic and long-lasting economic, social and political impacts” (Harper, 2010, para. 4). True to the etymology of the term, emerging technologies are evolving, manifesting

organisms that can be disruptive and are neither fully understood nor fully researched (Veletsianos, 2010).

Disruptive innovations, a term borrowed from industry and business, refers to products, processes, concepts, or services that meet consumer needs but may lack certain features or capabilities of more established products (Bower & Christensen, 1995). These products or processes interrupt the usual, the customary, and the status quo. Meyer (2010) claimed that disruptive technologies do not offer a “magical way” to change higher education but that disruptive technology “must interrupt our usual policies, practices, and assumptions” (para. Key Takeaways). She offered examples of disruptive technologies such as RSS feeds, social bookmarking, open source tools, cloud computing, virtual worlds, and mobile devices. In other words, a technology may be considered disruptive when it changes the usual way people do things. For example, first generation cell phones were designed to merely send and receive telephone calls, making it a sustaining technology and not a disruptive technology. However, once next generation phones added functions such as text messaging, taking and sharing pictures, making short videos, locating oneself in space, generating and responding to email, and accessing the Internet, they fell into the disruptive category. None of these newer uses (due to improved technologies) can be labeled status quo when considering a cell phone was initially designed as a simple two-way audio communication device. As Meyer cautioned,

No tool, on its own, is likely to produce disruption. Disruption takes upsetting the status quo, focusing on student-centered learning, changing relationships, sharpening our insight, and designing instruction to increase learning and lower costs. (para. Disruption and the Future of Higher Education)

Education has the potential to recognize and embrace emerging and disruptive technologies; however, implementing emerging technologies pose threats and challenges to well-established processes, procedures, and pedagogy entrenched in many higher education institutions. As Veletsianos (2010) noted, “Mature research has not yet been conducted on the numerous emerging technologies,” which he claimed impedes dissemination and diffusion (p. 16). Regardless, the term emerging technology instantiates thoughts of innovation, potential, a coming into view of the novel, and generally something that will challenge or disrupt the status quo.

So what technologies are considered emergent? The 2011 Horizon Report (Johnson et al., 2011) “examines emerging technologies for their potential impact on and use in teaching, learning, and creative inquiry” (p. 2). Among the emerging technologies highlighted in the 2011 Horizon Report were mobile technologies touted as being multi-functional and robust. The report referred to devices such as iPads, Smartphones, and tablet computers as mobiles because they are always on, always connected, and provide “doorways to the content and social tapestries of the network” while opening with a slight touch (Johnson et al., 2011, p. 12). More people than ever before are using mobile devices because they are “ideal as a store of reference materials and learning experiences, as well as general-use tools for fieldwork, where they can be used to record observations via voice, text, or multimedia, and access reference sources in real time” (Johnson et al., 2010, p. 10). Such uses of mobile devices include but are not limited to immediate communication, social networking, personal organizers, content dissemination, Internet access, and documentary learning (students recording, analyzing, and presenting field research findings in real-time).

According to the 2010 Pew Internet and American Life Project Mobile Access report (Smith, 2010), 59% of all adult Americans are wireless Internet users and 84% of laptop owners use wireless connections to go online. In addition, 9% of American adults go online using an mp3 player, e-book reader, or tablet computer. More recently, Brenner (2012) reported that 46% of American adults own a Smartphone and young adults (ages 18-24) appear to have above average smartphone ownership regardless of their education level or income. This growth, not only in mobile device ownership but also in wireless infrastructure, supports the ubiquity of handheld mobile devices; subsequently, more educational institutions are investing in networks and infrastructures that support wireless mobile access (Johnson et al., 2011).

Ubiquity of Mobile Technologies

The ubiquity of mobile technologies and the use of mobile devices offer anytime and anywhere access to the Internet, which serves as a portal to myriad educational and social resources. Ubiquitous computing as a concept was originally introduced by Weiser (1991) who wrote, “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it” (p. 94). Weiser and Brown (1996) identified ubiquitous computing as computers embedded in walls, chairs, clothing, light switches and cars, claiming that when computers are everywhere, they better stay out of our way. Swan, van ‘t Hooft, Kratcoski, and Schenker (2007) saw “ubiquitous computing environments as learning environments” where students have ready access to an array of digital devices all connected to the Internet whenever and wherever they needed them (p. 482). The ubiquity of mobile devices and their supporting technologies are becoming embedded in

the personal environments of millions of individuals, such that today's learner carries and uses his or her mobile device in a habitual and unthinking manner (Traxler, 2007).

Mobile Learning Explicated

The previous section defined and discussed varying interpretations of emerging technologies and how they might also be disruptive innovations or disruptive technologies. Disruptive technologies have latent qualities that may drive teaching innovation. Collins and Halverson (2009) wrote, "Many educators and technologists have made predictions as to how the processes of teaching and learning will be transformed by the new information technologies" (p. 9). These new information technologies and innovations require support from a university's infrastructure as well as training and pedagogical support from the university's teaching and learning centers. Mobile learning, with its potential to be disruptive to various aspects of teaching and learning, is an emerging technology worthy of deeper explanation.

Keegan (2005) spoke about mobile learning as a subset of distance education, believing that mobile devices should be described by their habituation. He claimed "that in the definition of *mobile* learning the focus should be on mobility. Mobile learning should be restricted to learning on devices which a lady can carry in her handbag or a gentleman can carry in his pocket" (Keegan, 2005, p. 3). He elaborated that mobile devices included PDAs, smartphones, palmtops, and mobile phones but not laptops. Traxler (2010) also noted that inclusion of laptops and tablet computers in a definition of mobile learning could be suspect because there is a lack of ownership, personalization, and unthinking spontaneity in addition to latency when they are booted up. Because laptops, netbooks, and most recently iPads can be considered "luggable," distinguishing

among the devices to be considered for mobile learning is challenging (Traxler, 2010, p. 130). When comparing m-learning with its compact, personal, and portable devices to elearning, Kukulska-Hulme and Traxler (2007) noted “informality, movement, and context ... will always be inaccessible to conventional e-learning” (p. 234).

Traxler (2007) desired to explain mobile learning within an informal learning context, noting that m-learning is “personal, contextual, and situated; this means it is noisy,” which he considered “problematic” when contemplating a definition of mobile learning because context is everything (p. 1). He believed mobile learning definitions should consider the underlying learner experience with an emphasis on ownership, mobility, informality, and context. He further described m-learning as learning that is “just-in-time, just enough and just-for-me” (Traxler, 2007, p. 5). Traxler also focused on the nature of mobility by noting that people can use mobile devices for learning while traveling, sitting, walking, or waiting, just about anywhere that offers cellular reception or wireless access to the Internet.

Attempting to ascribe one fixed meaning to mobile learning is also challenging because many terms and words have been used to define and describe mobile learning (El-Hussein & Cronje, 2010). Does mobile learning mean the mobility of the learner, the mobility of learning, or the mobile experiences of learners as they gain knowledge through a mobile device? El-Hussein and Cronje (2010) stated that if one uses a mobile device as the signifier, then “the concepts of mobility can be divided into three significant areas: mobility of technology, mobility of learner, and mobility of learning especially in [the] higher education landscape” (p. 17). They proposed that any type of learning taking

place in environments and spaces that considered the mobility of the technology, the learner's mobility, and the mobility of learning, defined mobile learning.

Early definitions of mobile learning had a technology focus and discussed the actual handheld device as opposed to its uses (Laouris & Eteokleous, 2005; Sharples et al., 2009; Traxler, 2007). Traxler (2007) called these early definitions techno-centric, constraining, and tied to current technological innovations. According to Sharples et al. (2009), a technology focus did not permit consideration of the nature of learning as part of an increasingly mobile lifestyle. Sharples et al. proceeded to explain mobile learning research as “the study of how the mobility of learners augmented by personal and public technology can contribute to the process of gaining new knowledge, skills and experiences” (p. 235). In addition, the authors couched mobile learning in a theoretical framework where context, a pillar of mobile learning, is created by people as they interact with their environment in an exploratory manner that “involves physical movement through conceptual space, linking experiences and concepts into new knowledge” (Sharples et al., 2009, p. 236). Conversation and context are critical elements for understanding the integration of mobile learning with education; mobile learning extends education into the world of conversation and everyday life (Sharples et al. 2009).

Laouris and Eteokleous (2005) used terms like spontaneous, intimate, personal, realistic situations, informal, lightweight, and networked to describe m-learning. They compared these terms to definitions found in e-learning: multimedia, interactive, hyperlinked, distance learning, more formal, and simulated situations. The newer m-learning terminology represents a shift in pedagogy and environment--a shift away from

devices to the mobile learner whose whole learning environment moves with him or her (Laouris & Eteokleous, 2005).

For the purposes of this research, mobile learning was broadly defined as the mobility of the learner in tandem with the handheld mobile device (iPhone, iPod, Smart phone, cell phones, iPad, Personal Digital Assistants, MP3 players, and tablet computers) and his or her ability to move fluidly across time and place with access to content, information, and discourse anytime and anywhere. In this definition, the exploratory, situated, and constructivist nature of mobile learning is implied while maintaining a learner-centered focus.

Mobile Learning in Higher Education

With the pervasiveness of mobile devices and the ever-present availability of Internet access on most university and college campuses, higher education is beginning to capitalize on the affordances that mobility of the learner can provide. Several significant projects involve whole universities embracing m-learning, e.g., Abilene Christian University and Duke University. Abilene Christian University (ACU; 2012) has a program called ACU Connected, which touts students holding a universe of information in the palms of their hands. ACU's mobile initiatives focus on how mobile technologies can be used to enhance learning while at the same time teaching students how to assess information, synthesize their thoughts, and contribute meaningfully to larger conversations.

The Duke University Digital Initiative (Duke University, n.d.) is a similar effort to support Duke faculty and student use of emerging technologies in the enhancement of teaching and learning. Duke's Center for Instructional Technology (CIT) provides

training (workshops, scheduled events, and customized training) and other resources for faculty interested in providing innovative and effective use of technology to enhance their teaching. The CIT provides digital equipment for loan such as iPads, iPods, flip video cameras, and Webcams that allow both faculty and students to experiment with emerging technology and mobility of the learner. As Kukulska-Hulme and Traxler (2007) observed, mobile learning is moving away from short term, small scale trials to a more sustained deployment in universities.

Fieldwork, often a part of course curriculum, is another area ripe for mobile learning where students can capture video, photos, and dialog in authentic contexts beyond classroom walls. Such categories for field work include botany (plant and tree identification), observation of animals in natural habitats, observation of communities as in social work or an ethnographic context, geology, environmental studies (water and air pollution), and art. According to Stewart and Hedberg (2011), mobile learning is well suited for inquiry and problem-based approaches (a main stay of field work) to learning because these approaches can be located within student experiences and in the students' physical environment.

Other studies involving the use of mobile learning include pre-service teachers using smartphones to supplant their developing pedagogies and their understanding of teaching strategies for an environmental education unit in local elementary schools (Ferry, 2009). Herrington (2009) studied students enrolled in an adult education postgraduate course using smartphones as data collection tools with the intent to create digital narratives for use by adult educators in their own teaching situations. Uzunboyulu, Cavus, and Ercag (2009) used text messaging combined with student photographs to

capture and illustrate local environmental blights, which in turn increased students' environmental awareness.

Shih and Mills (2007) used mobile learning with a literature class; the researchers had students use their smartphones to access content from a website, receive learning activity notifications through text messaging, participate in online discussions through a learning management system, and create digital stories as part of their course activities. Beddall-Hill et al. (2011) used what they called Social Mobile Devices (in their study, these were smartphones and iPads) as data collection tools for a mobile ethnography project. Students were able to observe and capture real-time information in fluid settings where participants were walking or doing something outdoors. Learning vocabulary and foreign languages (Cavus & Ibrahim, 2009; Lu, 2008; Thornton & Houser, 2005) have been and continue to be a staple of mobile technology use (Kovalik & Hosler, 2010). These are a few examples of how mobile learning can be used to offer contextually rich and situated learning opportunities for the mobile learner. However, mobile learning experiences and activities need the underpinnings of frameworks or models, as well as theory, to inform appropriate pedagogy for m-learning in higher education learning environments.

Frameworks and Models for Mobile Learning

When considering the adoption and implementation of an emerging technology such as mobile learning, it is important to be purposeful and deliberate about why that technology should be considered, how its use will support learning outcomes, and the availability of that technology to students and instructors. By ascribing to a model or conceptual framework, instructional designers and faculty developers will be able to

approach mobile instructional design or the pedagogical task of creating mobile learning units from an organized foundation. Conceptual frameworks provide coherency and a way to present ideas and practices so that others may readily understand. Frameworks can also be models informing or supporting action, processes, parameters, or specific practice. For example, Smith and Ragan (2005) explained instructional design models as “visualized depictions of instructional design processes, emphasizing main elements and their relationships” (p. 10). Miles and Huberman (1994) described a conceptual framework as a visual or written product that

explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them. Frameworks can be rudimentary or elaborate, theory-driven or commonsensical, descriptive or casual. (p. 18)

More recently, Ravitch and Riggan (2012) suggested that conceptual frameworks allow researchers to explore topics and themes not yet examined or examine old ideas and questions in new contexts. Frameworks or models offer educators, designers, and faculty developers the basis from which to identify and refine the issues, ideas, and challenges involved in creating instruction suited for mobile learning.

The following section presents three possible frameworks or conceptual models that might be applied to a mobile learning context: Park’s (2011) four types of mobile learning pedagogical framework, Motiwilla’s (2007) mobile learning framework for developing m-learning applications, and Koole’s (2009) Framework for the Rationale Analysis of Mobile Education (FRAME) process model for guiding the development of learning materials, mobile pedagogy and learning strategies, and future mobile devices.

Park's Pedagogical Framework for M-Learning

Park (2011) posited, “Instructional designers and teachers need a solid theoretical foundation for mobile learning in the context of distance education and more guidance about how to utilize emerging mobile technologies and integrate them into their teaching more effectively” (p. 79). She proposed a pedagogical framework derived from Moore’s (1997) transactional distance theory that viewed m-learning as an extension of distance learning. Moore’s transactional distance theory postulated that distance education may be thought of as a pedagogical concept; he applied the theory of *transactional distance* to the construct of distance learning. Moore believed that distance education, so labeled because of the separation of teachers and learners, led to “special patterns of learner and teacher behaviors” that profoundly affected not only how courses were taught but also how students learned (p. 22). He claimed the physical separation led to a psychological distance (communication gap) between the teacher and the online learner that created opportunities for misunderstandings and miscommunication. As a result, Moore labeled the psychological and communications space *transactional distance*, noting that the space or distance between the learners and the instructor was never the same. Park (2011) built on transactional distance theory, stating that “the transactional distance is influenced not only by a single communication medium but also by *diverse learning contexts* including multiple communication methods and channels” (p. 86).

Park (2011) added a new dimension to Moore’s (1997) model, one that could account for “individual versus collective (or social) activities by considering the importance of the social aspects of learning as well as newer forms of social technologies” (p. 88). As a result, she proposed a pedagogical and conceptual framework

(see Figure 1) based on high versus low transactional distance and individualized versus socialized activity. This generated four types of mobile learning activities in the context of distance education:

(1) high transactional distance socialized m-learning (HS), (2) high transactional distance individualized m-learning (HI), (3) low transactional distance socialized m-learning (LS), and (4) low transactional distance individualized m-learning (LI). (Park, 2011, p. 90).

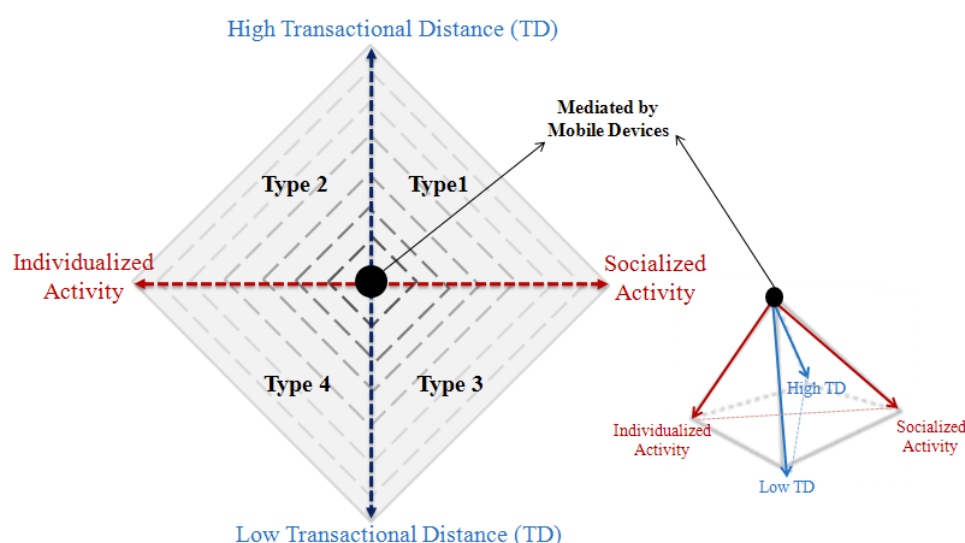


Figure 1. Four types of mobile learning: A pedagogical framework (Park, 2011, p. 89).

She defined high transactional distance and socialized mobile learning activity (HS) as a period when there is more psychological space between the learner and the instructor, learners are involved in group or collaborative learning projects, learning materials and instructions are provided to students via mobile devices, and the majority of transactions occur among the learners.

High transactional distance and individualized mobile learning activities (HI) are when the learners have more psychological space with the instructor, they receive

directed and highly structured content and resources through the mobile device, the individual learner controls their learning process, and the interactions occur primarily between the learner and the content (Park, 2011)

Low transactional distance and socialized mobile learning activity (LS) describes learners who are working more closely with the instructor (less psychological space), the instruction is loosely structured, and the learners are working collaboratively, engaging in social interaction and frequent communication. Park (2011) believed this type of activity “demonstrates the most advanced forms in terms of the versatility of mobile devices and learner’s social interactions” (p. 93).

Low transactional distance and individualized mobile learning activity (LI) refers to scenarios where there is less psychological space between the learner and the instructor and the content is loosely structured and undefined. In this type of activity, the instructor leads and controls the learning. Park believed that in this situation, instructional designers and teachers need to be mindful of the learner’s environment and provide support for questions and assignment completion.

Motiwalla’s Push-Pull Framework

Motiwalla’s (2007) mobile learning framework (see Figure 2) for developing m-learning applications considered the social constructive nature of learning, emphasizing personalized content, collaborative content, and connectivity. He believed that push and pull technology enriched students’ learning experiences. Push-pull technology refers to how users interact with the Internet via their web browser: push refers to services that are pushed out to the targeted user without the user requesting or initiating the request for information; pull refers to users requesting or actively seeking out information, pulling

that information to themselves. Motiwalla argued that the push strategy “can be used for sending personalized multicasting messages... to a group of mobile users with a common profile, thereby improving the effectiveness and usefulness of the content delivered” (p. 585). Content delivered using a combined push-pull strategy is delivered more effectively (Motiwalla, 2007).


	Personalized Content	Collaborative Content	
PUSH Mechanism	<i>Pedagogical Agents & Mentors</i>	<i>Communication Aids</i>	<i>Short message service(SMS) Instant Messaging, (IM) Alerts, Scheduling Calendars</i>
PULL Mechanism	<i>System Tools & Resources</i>	<i>Simulated Classrooms</i>	<i>Wireless markup language websites, Discussion Boards & Chat Forums</i>
	<i>Alerts, Scheduling Calendars, WML websites</i>	<i>SMS, IM, Discussion Boards & Chat Forums</i>	

Figure 2. M-learning framework (Motiwalla, 2007, p. 586).

Furthermore, Motiwalla (2007) claimed m-learning was best used as an adjunct to existing courses with “value add features such as alerts, personalized agents or communication aids, and access to interaction or discussion utilities that help users convert their dead-time to productive activity” (p. 594). However, a weakness of this framework is that it does not take advantage of or account for the contextually rich and authentic environments that mobile devices afford mobile learners; it is primarily concerned with requirements for developing m-learning applications.

**Koole's FRAME Model for
Mobile Education**

A third framework for investigating the pedagogy of mobile learning was espoused by Koole (2009). She proposed a model called FRAME--Framework for the Rational Analysis of Mobile Education (see Figure 3). Koole's model described mobile learning as a process resulting from the "convergence of mobile technologies, human learning capacities, and social interaction" (p. 25). Her model specifically addressed information overload, knowledge navigation, and collaboration that guide and inform the creation of course content as well as the design and development of teaching and learning strategies for mobile education. Koole's model considered not only the technology element of mobile learning but also the social and personal aspects of learning including constructivism and activity theory. She wrote, "The FRAME model describes a mode of learning in which learners may move within different physical *and* virtual locations and thereby participate and interact with other people, information, or systems – anywhere, anytime" (p. 26).

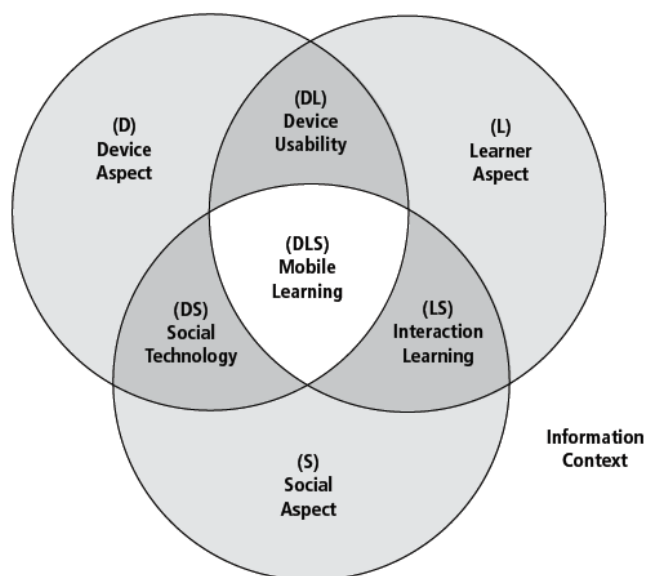


Figure 3. Framework for the Rational Analysis of Mobile Education model (Koole, 2009, p. 27).

According to the FRAME model, the three primary circles represent the device (D), the learner (L), and the social (S) aspects of mobile learning. Where the circles intersect and overlap are the attributes belonging to both aspects. The device aspect (D) represents “the physical, technical, and functional characteristics of a mobile device” (Koole, 2009, p. 28); whereas, the learner aspect (L) considers the emotions and motivations of the learner as well as how learners use prior knowledge and encode, store, and transfer information. Koole (2009) believed mobile learning could help learners use episodic memory--memory grounded in actual events and authentic experiences. The social aspect (S) of the model concerns social interactions and cooperation, which she posited were governed by rules determined by a learner’s culture. Device usability (DL) addresses characteristics belonging to both the device and the learner, e.g., cognitive tasks related to manipulating and storing information, portability (weight, size), and

aesthetics of the interface (how intuitive it is). The social technology intersection (DS) is where Koole considers the social aspect of mobile learning. She described this area as “the means of information exchange and collaboration between people with various goals and purposes” (p. 34) including such things as co-authoring documents and coordinating tasks and activities. Accordingly, she claimed her model placed more of an emphasis on constructivism where learning is a collaborative process and meaning and understanding are gleaned from multiple perspectives.

The overlap of device usability (DL) and social technology (DS) describes the affordances of mobile technology; the area labeled interaction learning (LS) “contains instructional and learning theories with an emphasis on social constructivism” (Koole, 2009, p. 27). The center, where all three aspects converge, represents (hypothetically) ideal mobile learning situations. She indicated that her model, through the consideration of all aspects within a mobile learning situation (i.e., the technical, social, and personal), could assist practitioners in designing more effective mobile learning experiences and help them “better comprehend the complex nature of mobile learning” (Koole, 2009, p. 41).

Pedagogies for M-Learning

The previous section presented three conceptual frameworks that might be used to inform the development and implementation of mobile learning. However, to effectively design m-learning experiences and activities, the underlying frameworks or models need to be implemented using appropriate pedagogies.

Pedagogy refers to the work of a teacher or instructor, the act or practice of teaching, and the principles and methods of instruction. Pedagogy is the way in which

teaching and learning processes along with the course environment (setting) are organized and implemented by the instructors (Collis & Moonen, 2002). When designing content and implementing instruction, pedagogical considerations abound: what the content focus should be; the desired learning outcomes; how the content should be presented; who the learners are and the gaps in their knowledge; the types of activities, materials, and technology that can support the desired outcomes; and the physical learning environment.

As Ryu and Parsons (2009) explained, advances in information and communication technologies (ICT) lead to new types of education systems that increase the “effects and expectations of the advent of new pedagogies” (p. 1). Merely using mobile devices for learning beyond the classroom does not address the potential learning outcomes that mobile learning affords but instead offers consideration for embedding learning activities within the technology (Ryu & Parsons, 2009). While embedding learning activities within the technology may suffice for some as mobile learning, it short changes the opportunities faculty have for creating richer learning environments.

Beckmann (2010) believed that when pedagogy drives the use of technology (and not the opposite), faculty and learners can engage more fully in the opportunities and challenges that m-learning provides. To embed learning activities within the course structure and to ensure effective and efficient course design for m-learning, it becomes incumbent upon faculty developers and instructional designers to consider not only frameworks or models to guide their pedagogy but also suitable learning theories. Nowhere are pedagogical considerations (or lack thereof) more evident than in mobile learning environments. Effective mobile learning needs to be based on theoretically

grounded pedagogical principles and implemented with deliberation and consideration for the learner, the content, the context, and the delivery mechanism. This is especially critical when using a technology in support of teaching and learning that becomes transparent when students are engaged in situated and contextually rich activities.

Learning Theories for M-Learning

The pedagogical approaches in practice today are derived from educational research and theories emerging from said research. Anderson (2010) astutely wrote, theories push us to examine the “big-picture issues and [to] grapple with the reasons why our technology use is likely to enhance teaching and learning” (p. 23). Yanchar, South, Williams, Allen, and Wilson (2010) explained that “theories are viewed as the principle mechanisms for advancing research and understanding,” allowing us to put forth terms and concepts, taxonomies and organizational schemes, advance knowledge, and “generate ideas that inform practice” (p. 39). Thomas (1997) wrote that “theory holds a central place in educational inquiry” and that theory has been loosely defined as “simply intellectual endeavor” (p. 75). He believed the word *theory* forced readers to glean its meaning from the given context; whereas, Merriam (1998) noted that theory is fraught with ambiguity. Carlile and Jordon (2005) explained that educational practitioners all hold some form of learning theory in their minds, whether they are conscious of them or not, because “all action is based on assumptions which may or may not have been articulated and tested” (p. 1). Anderson (2010) believed “much of our understanding of how and why learning happens and the best ways to design effective learning activities is enhanced when we work from theoretical models” (p. 36). Thus, it is incumbent upon any reasoned discussion of m-learning to present the salient learning theories underlying

the use of this emergent technology. The following sections provide a discussion of three learning theories that could be used to exploit mobile pedagogies: learner-centered teaching, authentic learning, and constructivism.

Theory of Learner-Centered Teaching

According to Siadat, Torniai, Gašević, Jovanovic, Eap, and Hatala (2008), meeting the needs of mobile learners means providing content adapted to the learning situation, “where the situational information is the major factor in determining how the learning content is to be tailored for the learner” (p. 1). The idea of tailoring instruction and instructional delivery to the learner is not new but represents a paradigm shift away from a more teacher-centric approach to instruction--a shift many colleges and universities are encouraging faculty to embrace.

A learner-centric approach affords greater autonomy and responsibility to the student, wherein the relationship among students and the instructor is more coordinate, collaborative, and active. Learner-centered teaching shifts the balance of power and decision-making away from the instructor and places it into the hands of the learner; after all, the students themselves will ultimately decide whether or not they want to learn (Weimer, 2002). Saulnier (2009) stated, “Because the instructional action now features students, this learner-centered orientation accepts, cultivates, and builds on the ultimate responsibility students have for learning” (p. 4).

Teachers have a need to control the learning process because losing that control and no longer being the sole content expert could result in students not learning (Saulnier, 2009; Weimer, 2002). However, instructors and faculty fail to understand that the need to be in control is often a result of their “own vulnerabilities and desire to manage an

ambiguous and unpredictable situation successfully” (Weimer, 2002, p. 27). Ambiguity and the unpredictable can be found in profusion in mobile learning contexts; students enter and exit authentic situations in the field (changing location and objects within their environment) or access information beyond classroom walls at any time without the immediate guidance of the instructor. The ubiquity of mobile devices and the mobile learning environments they support are antithetical to a teacher-controlled environment and beckon for a more learner-centered approach.

Because mobile learning offers students the opportunity to learn immersed within a specific context or rich and authentic environment, it is logical to let students make their own choices and decisions within the learning context, guided only by minimal instruction from the teacher. Taking advantage of the rich experiences m-learning can afford and transforming those experiences into specific learning contexts for students is challenging (Stewart & Hedberg, 2011); however, releasing the hold and allowing students to explore, discover, and create on their own is an important step in implementing a learner-centered approach. The highly personalized nature of mobile devices (ownership) provides an excellent platform for creating learner-centric educational experiences (Low & O'Connell, 2006).

Faculty concerns regarding delivering and covering content can be a significant roadblock in moving forward with a learner-centered design (Weimer, 2002). Weimer (2002) found that when instructors are wedded to the content, it prevented them from engaging the learners on their own terms and possibly limited deeper thinking. Faculty often believe more is better when it comes to content but Weimer acknowledged that with the explosion of electronic environments, the “teaching-as-transfer-of-information model

[is] pretty much obsolete” (p. 50). Faculty need to *use* content, not cover content, as a means to help students develop learning skills and promote self-awareness of learning (Weimer, 2002). As Saulnier (2009) explained, the need to cover content merely promotes the use of rote memorization skills and does little to help students develop learning strategies and metacognitive awareness. Mobile learning with its untethered ability to *use* content offers instructors the opportunity to support student learning skills in real-life scenarios, actively, and in a learner-centered manner. In this respect, the lines between context and content begin to blur--context being “the situation in which learning is occurring” (Siadaty et al., 2008, p. 2) and content becoming the situational information or the information with which a student interacts.

Authentic, Situated, and Contextual Learning Theories

Authentic learning theory. The mobility of learners in tandem with handheld mobile devices and wireless access frees the learner not only from tethered power sources but also from the walls of a traditional classroom. This freedom can position the learner in real-time situations where access to learning materials, varied environments, activities, peers, and instructors can occur while the learner is immersed in a specific context. Authentic learning, situated learning, and contextual learning are cousins derived from similar theories and frameworks that all describe a type of learning environment.

An authentic learning frame work typically focuses on real-world problems that are messy and complex. Role playing, problem-based activities, and case study participation in virtual worlds all offer venues for authentic learning (Lombardi, 2007). According to Herrington, Oliver, and Reeves (2003), students may “initially perceive authentic environments to be non-academic, non-rigorous, time wasting and unnecessary

to efficient learning” (p. 60). The authors posited that these feelings emerge because authentic learning, taking place in real-life or simulated situations, may appear less strict, less demanding, and less formal, thereby causing students to consider it frivolous and inconsequential. Herrington et al. further characterized authentic learning by stating it provided authentic activities with opportunities for students to examine tasks from different perspectives using a variety of resources, provided opportunities for students to collaborate and reflect, and provided authentic activities with real-world relevance. Herrington and Herrington (2006) wrote that the context for authentic learning needs to be all-embracing “to provide the purpose and motivation for learning, and to provide a sustained and complex learning environment that can be explored at length” (p. 4).

Situated learning theory. Closely aligned with authentic learning is situated learning, which places the learner center stage in an actual scenario. According to Brown, Collins, and Duguid (1989), knowledge is a product of the learner engaging in genuine activities occurring in the real world and that “authentic situations are not merely useful: they are essential” (p. 37). They believed activities within given situations co-produced knowledge and that “learning and cognition ... are fundamentally situated” (Brown et al., 1989, p. 32). Herrington and Oliver (1995) summarized situated learning by stating,

A situated learning environment provides an authentic context that reflects the way the knowledge will be used in real-life, preserves the full context of the situation without fragmentation and decomposition, invites exploration, and allows for the natural complexity of the real world. (p. 256)

In their seminal work, *Situated Learning: Legitimate Peripheral Participation*, Lave and Wenger (1991) discussed the importance of community and that learners participate in peripheral or ancillary learning within a learning community located in the

real world. They believed learning occurred within communities of practice and concerned “the whole person acting in the world” (Lave & Wenger, 1991, p. 49). As Lave and Wenger worked to evolve their theory of situated learning, they wrote, “Participation is always based on situated negotiation and renegotiation of meaning in the world” (p. 51). They espoused that situated learning called for a learning curriculum that consisted of “situated opportunities for the improvisational development of new practice” (Lave & Wenger, 1991, p. 97).

Stein (1998) defined situated learning as the knowledge and skills learned in “contexts that reflect how knowledge is obtained and applied in everyday situations” (para. 1), noting that learning is a matter of making meaning from the activities of our daily lives. Creating conditions within the learning environment is to situate the learning such that learners are able to experience the “complexity and ambiguity of learning in the real world ... creat[ing] their own knowledge out of the raw materials of experience” (Stein, 1998, para. 2). Choi and Hannafin (1995) acknowledged the impoverished nature of formal education environments when compared to real-life experiences, noting that formal education environments provide little support for an individual’s daily way of thinking and being. Anderson, Reder, and Simon (1996) believed that the action found in situated learning could not be described independently of the situation in which it occurred; they felt this claim was often exaggerated to mean “all knowledge is specific to the situation in which the task is performed and that more general knowledge cannot and will not transfer to real-world situations” (p. 6). They pointed out that how closely learning is bound to the context depends on the knowledge being acquired and on the way the material is being studied. Regardless, situated learning is a powerful perspective

that supports knowledge acquisition and real-world knowledge transfer that is not inert or decontextualized (Choi & Hannafin, 1995).

Contextual learning theory. According to Specht (2008), contextualized learning is a relatively new research area that merges recent developments in context-aware computing with pedagogical strategies that support more situated and context-aware learning. He posited that learning needs to be planned and structured and that this applies to tasks and learning situations as well as interactions with the social environment of the learner. Specht cited field trips, enhanced by computer-based tools, as an excellent pedagogical approach for contextualized learning, claiming learners collecting information “contextualize it with their own experiences and in the same time work on tasks with their peers and detect new perspectives and solutions to given problems” (p. 4).

Mobile learning supports the contextualization of learning by permitting instructors implementing mobile devices in their teaching practice to place subject matter and content into real-world situations. By placing the learner in real-life situations, instructors can engage students in activities that support life experiences, allow for the abstract to become more concrete, and support discovery and sense-making of complex environments. According to Johnson (2002), contextual teaching and learning is a matter of connecting the content of academic subject matter with the context of daily life. She wrote, “Context deserves our thoughtful attention. ... [and] content should be studied in context” (Johnson, 2002, p. 16).

These three similar theories (authentic learning theory, situated learning theory, contextual learning theory) can provide rich, legitimate, and contextual learning

experiences when implemented from a learner centered paradigm. In addition, when these theories inform a learner-centered approach to teaching, they offer constructivist ways for students to learn using mobile devices.

Constructivist Theory

One of the most popular approaches to learning, and one that provides a set of theories informing educational practitioners today, is constructivism (Anderson, 2010). Associated with early research done by John Dewey and Jean Piaget, constructivism has been explained, defined, and characterized by many practitioners and researchers with little consistency among them (Anderson, 2010). A constructivist practitioner believes the learner makes his or her own meaning from their unique experiences with the environment. In essence, knowledge does not exist independently or objectively from the learner but is created actively by the learner in a recursive, non-linear process. As the name implies, social constructivism offers a socially constructed view of how one creates knowledge. In this view, the learner creates meaning as a result of interacting with others and engaging in social activities such as those found in communities of practice or within public domains of knowledge (Fox, 2008). As Tobin and Tippins (1993) explained,

Knowledge is personally constructed, but socially mediated. ... From the outset, an organism constructs knowledge in the presence of others who are able to perturb the environment in such a way that a learner's experiences are constrained by the presence of others. (p. 6)

A social constructivist view takes into consideration not only what is going on inside the learner's mind but how the meaning is shaped, validated, and shared with others, all the while incorporating the new experience into an already existing framework.

In a similar vein, Vrasidas (2000) posited that knowledge is constructed through social interaction and in the learner's mind, such that if this knowledge is not processed

in the learner's mind or related to his or her experiences, the knowledge is meaningless. In social constructivism, there is an emphasis on shared meaning; knowledge is socially and culturally constructed by the individual, while previous learning serves as cornerstones upon which new knowledge is created or existing knowledge is modified. Most notably, learners create meaning from the contexts of their experiences as active participants and owners of their learning. Anderson wrote (2010), "Constructivists also stress the contextual nature of learning and argue that learning happens most effectively when the task and context are authentic and hold meaning for the learners" (p. 27). He added that constructivist learning activities are best focused on ill-structured problems, problems that are open ended and messy, forcing learners "to develop their capacity to develop effective problem-solving behaviors across multiple contexts" (Anderson, 2010, p. 2).

Because mobile learning offers "just-for-me," contextually rich learning opportunities, it is aptly suited for a constructivist theory of learning and a constructivist teaching approach. Constructivists who believe that learning arises out of an individual's need to make meaning out of specific situations recognize that this meaning is unique due to an individual's varying experiences in the world (Carlile & Jordan, 2005). The constructivist approach to teaching supports a learner-centered paradigm and "stresses the centrality of the learner, and the fostering of independent learning through the use of negotiated learning strategies" (Carlile & Jordan, 2005, p. 19). A constructivist grounded approach understands a student's autonomy; thus, the instructor acts merely as a guide, facilitator, or moderator, assisting the student's own discovery of meaning and understanding rather than accumulating information (Carlile & Jordan, 2005).

Because of its highly personal and unfettered nature, mobile learning lends itself well to constructivist pedagogy. Its anytime, anywhere, and just-for-me affordances make it conducive to activities that are spontaneous, creative, interactive, contextual and self-directed. As Schwartz, Lindgren, and Lewis (2009) explained, constructivism “enables us to consider students’ abilities to create new knowledge when they are outside of instruction and we no longer have control over precise instructional variables” (p. 35). Jonassen (2009) echoed this sentiment when discussing learning in the classroom or in the “wild” as a “complex, stochastic process” where “we delude ourselves into thinking that we can control meaning-making processes” (p. 28).

Challenges Implementing Mobile Learning in Higher Education

Technology implementation and integration can be challenging for both classroom and online instructors (Bingimlas, 2009; Groff & Mouza, 2008; Wedman & Diggs, 2001). Issues surrounding the technology itself, students’ accessibility to the technology (e.g., ownership of a mobile device with wireless access), and the instructor’s own technology proficiency and comfort with technology integration can pose daunting hurdles, not to mention how the nature of the university’s infrastructure, online security, and wireless capabilities can impact technology implementation.

Kukulska-Hulme (2007) believed many of the barriers to the implementation of mobile learning are usability based and perhaps discipline specific. She wrote,

Usability is typically considered from the point of view of issues or problems encountered by users, but good usability essentially means that learning can proceed without obstacles and might even be enhanced by the availability of certain features. (para. 2)

She listed several usability concerns that can cause barriers to mobile learning: the size and weight of the device, its small screen size, short battery life, limited memory capacity, network speed and reliability, and software that is appropriate for mobile devices. These barriers or conditions, which inhibit the implementation or ongoing use of mobile technology, can be examined from two perspectives: first order barriers and second order barriers (Ertmer, 1999).

According to Ertmer (1999), first-order barriers are those limitations or hurdles that are external to instructors and others implementing the technology. These extrinsic hurdles “include lack of access to computers and software, insufficient time to plan instruction and inadequate technical and administrative support” (Ertmer, 1999, p. 48). Second-order barriers are the internal feelings, attitudes, and beliefs of instructors and those implementing new technologies that inhibit or prevent implementation. Second-order barriers are “intrinsic to teachers and include beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change” (Ertmer, 1999, p. 48). Lack of confidence, competence, fear of failure (Bingimlas, 2009), and fear that students will not learn as effectively are other examples of intrinsic barriers to emerging technology implementation.

While great strides have been made in technology integration over the past few years, many of the external (first-order) and internal (second-order) barriers remain when it comes to faculty use of emerging technologies. Al-Bataineh and Brooks (2003) pointed out some of the issues that plagued early computer adoption in the classroom are still relevant today: “properly trained staff, adequate equipment, ongoing funding, and the successful integration of technology in order to maximize learning” (p. 473). In a similar

finding, Groff and Mouza (2008) discovered the most foreseeable hurdle for teachers using technology in the classroom was their lack of knowledge, skills, and experience with that technology in addition to the time it would take to acquire the necessary skills to use the technology. Faculty are extremely pressed for time and therefore might decline to learn and implement new technology because their time is scarce and/or they are not incentivized to do so (Rhoton, 2007).

In addition to time, another barrier to the use of emerging technology in teaching practices is the disruption it might cause to the instructor's tried and true pedagogy--a second-order or internal belief barrier. Groff and Mouza (2008) acknowledged that "computer-related instructional tasks require teachers to confront their pedagogical beliefs" (p. 30). Challenging a faculty member's pedagogy and philosophical beliefs about ways in which students learn and engage could be threatening and disruptive. Corbeil and Valdes-Corbeil (2007) posited that the benefits of mobile learning demand new pedagogies and new approaches to delivering and facilitating instruction. However, faculty members might not be ready to have their pedagogical approaches and beliefs challenged and questioned in order to integrate emerging technologies into their practice. Corbeil and Valdes-Corbeil also warned that the same old and boring content may be re-packaged and presented as new and high-tech, when in actuality nothing really changed.

Pachler et al. (2010) claimed that challenges to mobile learning arise from what they call "a transgression of boundaries" (p. 340), a trespassing that speaks to first-order (external) barriers.

The school has been, and still is, an institutional site, which insists on maintaining forms, frames and boundaries: of knowledge, of authority, of site/space/location, of time, of identities. The features and affordances of the devices all go in the direction of unmaking these *social*--rather than

technical--framings and boundaries. The introduction of the device thus poses the problem, first and foremost, of dealing with these social (and ideological/epistemological) issues. (p. 340)

These boundaries found in higher education institutions inhibit innovations that threaten more traditional pedagogical approaches. Pachler et al. warned that the “near ubiquity, [of mobile devices] especially among the young, makes it imperative for educational systems, institutions and educators to take them seriously as an integral part of the ... ‘learning landscape’” (p. 48).

Schneckenberg (2009) noted that in Europe where e-Learning implementation is lagging, there are visible barriers to technology: technical issues, budgetary restrictions (first-order barriers), and a lack of interest in technology among academics (second-order barriers). He proposed that the lack of educational innovations in universities are tied to cultural barriers within the academic community and that a faculty’s research performance, which is considered superior to anything else faculty do, serves to devalue their teaching performance, thereby diminishing faculty desire to innovate. If faculty are pressed and incentivized to do research and publish, then that leaves little time for revisiting and examining pedagogical approaches in light of emerging technologies such as mobile learning.

Wedman and Diggs (2001) discovered that barriers to technology use in teacher education were due to a lack of explicit expectations regarding the use of technology, limited feedback about how well the technology was being used, lack of technology support (including resources), and a lack of incentive or reward for integrating the technology. They found, as have others, that a lack of knowledge and skills about how to integrate technology with teaching also inhibited its implementation.

In addition to first-order (external) barriers such as time, support, administration policies, access to resources, and training, there remain the usability limitations (Kukulska-Hulme, 2007) or physical limitations of small, handheld mobile devices. In the case of many mobile devices, the physical size of the device's viewing screen as well as its keyboard may inhibit faculty from considering the device as an instructional tool. The small screen on some devices has limited viewing possibilities; for larger amounts of text-based content, the learner may be required to scroll excessively. The small keyboard associated with mobile devices or the sensitive virtual keyboard found on others may inhibit or make user input difficult, thereby limiting user interactions with the content, other learners, and the instructor. The limited battery life of many mobile devices might also be a barrier to mobile learning implementation, especially where fieldwork is concerned.

There is resistance to change when new technologies coupled with innovative practices threaten the very life blood of an institution—knowledge—as learning activities escape the confines of traditional education (Ryu & Parsons, 2009), in part due to emerging technologies like mobile learning. How institutions, their respective faculties, and their centers for teaching and learning address the ensuing obstacles, challenges, and opportunities becomes a pressing question. Despite these issues, students will continue to use mobile devices whether faculty and institutions embrace mobility or not. Pachler et al. (2010) summed up this point as follows:

When knowledge is ubiquitously available at any time in any place, when the canonicity of knowledge is no longer guaranteed by official authority, then school can no longer function as the gatekeepers for 'knowledge' as such: their legitimacy is challenged at many points, which manifests itself in forms of refusal and avoidance of school(ing); and the use by students of alternative routes to information and knowledge. (p. 341)

Mobile devices are not going to disappear. Their use and pervasiveness will only increase over the coming years as newer and more powerful ways of accessing information, communicating, and sharing with others via a compact and highly portable device become a greater part of everyday life. Therefore, it behooves those charged with supporting faculty development to be aware of the challenges and barriers that accompany the implementation of emerging technologies so they can be prepared to address the concerns and obstacles in support of faculty who embrace mobile learning.

Summary

Faculty development centers, replete with instructional designers and faculty developers, are the hub of professional development on most university campuses today. Instructional designers working within faculty development centers present a relatively new idea as universities attempt to provide richer and broader assistance for time-pressed faculty--faculty who struggle to keep abreast of technology as well as their respective disciplines. As such, designers and faculty developers need to provide appropriate support and pedagogical innovations for instructors who are seeking to implement mobile learning into their courses.

Three theoretical frameworks or process models have been presented as a way to anchor further exploration and discussion of mobile learning inquiries and implementation in higher education. To better understand how these models might or might not be frameworks for mobile learning, it is important to step back and examine the models in parallel to observe where they are similar, where they overlap, and how they differ. Table 1 provides a summary of the models and how each model approaches four key elements in mobile learning: the learner, social interaction and social activities, the

instructor, and the mobile device. I used these three frameworks to support my data analysis and to understand and interpret the results of this research.

Table 1

Summary of the Three Models

Consideration or Treatment of...	Koole's FRAME Framework	Park's Four Types Pedagogical Framework	Motiwalla M-Learning Framework
Learner	<ul style="list-style-type: none"> • Cognitive abilities • Memory • Prior knowledge • Emotions • Motivations 	<ul style="list-style-type: none"> • Near or far from instructor • Autonomous • Individual learning activities 	<ul style="list-style-type: none"> • Content delivered to learner (push) • Learner seeks content (pull) • Personalized content • Extended reach & mobility
Social interactions and/or social activities	<ul style="list-style-type: none"> • Cooperation • Conversation • Sharing • Means for information exchange • Situated and authentic 	<ul style="list-style-type: none"> • Social or collective activities • Activities mediated by less or more transactional distance from instructor. • Group learning, group activities, • Frequent natural communication among learners • Collaboration 	<ul style="list-style-type: none"> • Short message service (SMS) • Continuous 2-way conversations among learners • Interactive forum-dialog and comments (collaborative content)
Instructor	<ul style="list-style-type: none"> • Learner-instructor interaction 	<ul style="list-style-type: none"> • Psychological distance from learner/spatially separate. • Directs individualized learning experiences 	<ul style="list-style-type: none"> • Continuous 2-way conversations with instructor
Device	<ul style="list-style-type: none"> • How device enables communication & collaboration among multiple individuals and systems. • System connectivity • Wireless networks 	<ul style="list-style-type: none"> • Computational (software) and functional (hardware) aspect of the device drive the activities 	<ul style="list-style-type: none"> • Wireless handheld device tied to PC for use with discussion boards, chat course content • Need to understand technology while deploying good pedagogy

(table continues)

Table 1 (continued)

Consideration or Treatment of...	Koole's FRAME Framework	Park's Four Types Pedagogical Framework	Motiwalla M-Learning Framework
Learning theory	<ul style="list-style-type: none"> Situated, authentic, contextual, social constructivism 	<ul style="list-style-type: none"> Transactional distance (low or high) Constructivism (socialized learning) 	<ul style="list-style-type: none"> Social constructive theory Conversation theory

Each author provides varying perspectives, ideas, and approaches to mobile learning and the pedagogical frameworks that might inform mobile learning design and implementation. Motiwalla (2007) offered a framework to support the development of m-learning applications as a complement to classroom or distance learning. He advocated push-pull mechanisms: “The power of m-learning technology can be leveraged by complimenting the existing course with value-added features such as alerts, personalized agents or communication aids, and access to interaction or discussion utilities that help users convert their dead time to productive activity” (Motiwalla, 2007, p. 594). His model, while it considers the device and the needs of the learner, offers an administrative view of mobile learning, void of the rich contextual experiences mobile learning can provide.

Perhaps most relevant to this study were the frameworks offered by Park (2011) and Koole (2009). They presented more detailed and all-inclusive mobile learning frameworks that consider the device, the social and individual aspects of the learner, transactional distance (Park), and the interactions and social/collaborative aspect of learning (Koole). While Park focused on the psychological gap between the instructor and learner along an individualized to socialized activity continuum, Koole looked at

mobile learning in a more holistic context by considering the device aspect, the learner aspect, the social aspect, and where they intersected to form sub-elements. Koole (2009) suggested using her framework to address “contemporary pedagogical issues of information overload, knowledge navigation, and collaboration in learning” (p. 25); whereas, Park (2011) suggested her framework “be used by instructional designers of open and distance learning to learn about the concepts of mobile learning and how mobile technologies can be incorporated into their teaching and learning” (p.78). While all frameworks were considered when examining the data, I particularly wanted to see how these two frameworks manifested in my study. These authors presented a more comprehensive, constructivist, and contextual view of mobile learning, offering perspectives that were more precise, detailed, and prescriptive. In addition, these contemporary frameworks have not been used in the literature to date in the context of exploring faculty members’ inquiries and implementation of m-learning as experienced by instructional designers and faculty developers.

This literature review examined mobile learning as an emerging technology within three seminal learning theories that dominated the literature surrounding mobile learning: learner-centeredness; authentic, situated and contextual learning; and constructivism. Each of these learning theories offered ways of teaching and supporting learning that capitalized on the affordances of mobile learning.

This chapter also presented potential challenges and obstacles (first- and second-order barriers) that might impede and negate mobile learning initiatives. This background information served to inform the exploration of the impediments that were found in mobile learning planning and implementation based on the experiences of

instructional designers and faculty developers. The procedures and methods for this investigation are discussed in the methodology section of Chapter III.

CHAPTER III

METHODOLOGY

This qualitative study employed a collective case (multi-case study) methodology. This chapter introduces the research methodology that guided my study. Included sections address the study's purpose, theoretical framework, researcher stance, methodology followed, and detail of the procedures followed for collecting data.

Purpose of the Study

The purpose of this exploratory study was to gain a greater understanding of the activities, work, perspectives, and challenges encountered by faculty developers and instructional designers employed in a university center for teaching and learning as they planned for, guided, and supported requests for mobile learning from faculty members. This research sought to discover the pedagogical challenges, experiences, and obstacles encountered by these individuals and the solutions and guidance they offered faculty regarding mobile learning. The original focus was to explore what current demand was or current faculty needs were, if any, regarding mobile learning. Given the increased role of mobile technologies such as iPads, tablet computers, and smartphones in higher education, this study focused on how these professionals navigated the ill-defined technology waters and how they elucidated and reacted to the potential or existence of mobile learning on their respective campuses.

While definitions of mobile learning and what constitutes new learning technologies abound, mobile learning is still in its infancy with definitions ranging from a focus on the hardware and physical device to describing the abstract notion of learners creating a customizable learning environment around themselves. The definition of mobile learning for the purpose of this study attempted to go beyond the hardware device that enables mobile learning and sought to include the mobility of the learner and the mobility of the learning environment. Mobile learning is broadly defined as the mobility of the learner in tandem with the handheld portable device (smartphones, iPhones, iPad, Personal Digital Assistants, MP3 players/iPod, and tablet computers), a wireless Internet connection, and the learner's ability to move fluidly across time and place with access to content, information, and discourse anytime and anywhere.

To answer my primary research question (How are instructional designers and faculty developers planning for, guiding, and supporting faculty members who desire to implement mobile learning in their courses?), I employed qualitative methodology. Qualitative research lent itself to the exploratory and open-investigation nature of the research questions I sought to answer. Marshall and Rossman (2011) believe qualitative research to be a "broad approach to the study of social phenomena. Its various genres are naturalistic, interpretive, and increasingly critical, and they typically draw on multiple methods of inquiry" (p. 3). Flick, von Kardorff, and Steinke (2004) explained qualitative research as describing "life-worlds from the inside out," which "seeks to contribute to a better understanding of social realities and draw attention to processes, meaning patterns, and structural features" (p. 3). The authors added that qualitative research is more involved and more open than other research strategies. Denzin and Lincoln (2005)

viewed the qualitative researcher as a bricoleur, someone who constructed something from whatever was at hand by producing an interpreted bricolage--“a pieced together set of representations that is fitted to the specifics of a complex situation” (p. 4).

According to Merriam (2009), qualitative research has four primary characteristics: focus, process, understanding, and meaning. She explained that because the qualitative researcher is “the primary instrument of data collection and analysis, the process is inductive, and the product is richly descriptive” (Merriam, 2009, p. 14). The qualitative researcher desires to understand the participant’s perspective (not his or her own); this is often called the *emic* or insider’s view--a view emerging from the people (Stake, 2010).

Creswell (2007) wrote that a qualitative approach

is appropriate to use to study a research problem when the problem needs to be explored; when a complex detailed understanding is needed; when the researcher wants to write in a literary, flexible style; and when the researcher seeks to understand the context or settings of participants. (p. 51)

As such, this qualitative investigation was shaped by the researcher’s epistemology and theoretical perspective, which in turn informed the methodology and the methods used to conduct and report the research.

Researcher Stance and Research Design

Epistemology

Crotty (1998) stated that one’s theoretical perspective is shaped by the knowledge the researcher hopes to gain from the study as well as the characteristics that knowledge has. He claimed that one’s theory of knowledge, or epistemology, is embedded in one’s theoretical perspective or way of looking at the world and making sense of it. The

epistemology I brought to this study was social constructionism or the social generation of meaning, understanding, and knowledge.

According to Schwandt (2007), social constructionism is a strand of constructivism that focuses more on social processes and interaction, noting that it does have an affinity with the theories of symbolic interactionism and ethnomethodology.

Kafai and Resnick (1996) explained that constructionism involved “the construction of knowledge in the context of building personally meaningful artifacts” (p. 1). Crotty (1998) defined constructionism as a view

that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context. (p. 42)

This definition reinforces the idea that meaning is not discovered but instead is constructed by human beings as “they engage with the world they are interpreting”; therefore, “meaning (or truth) cannot be described as simply objective” (Crotty, 1998, p. 43).

I believe that truth and meaning emerge as a result of our interactions with others and with what we perceive as the real world. Meaning is not discovered but socially constructed and subject to interpretation. According to Crotty (1998), “truth, or meaning, comes into existence in and out of our engagement with the realities in our world” (p. 8). Thus, the meaning of the experiences and the subsequent conclusions from this study were not discovered in an objective sense, but rather socially constructed, interpreted, and revealed as university faculty developers and instructional designers shared their mobile learning stories and perspectives with me. Table 2 summarizes my stance and research design.

Table 2

Personal Stances and Research Design

Epistemology	Theoretical Perspective	Methodology	Methods
Social constructionism	Symbolic Interactionism	Case Study	<ul style="list-style-type: none"> • Semi structured interviews • Reflective journal • Participant created models/visual representations

Theoretical Perspective

Crotty (1998) wrote that one's choice of research methodology and methods "is something that reaches into the assumptions about reality that we bring to our work. To ask about these assumptions is to ask about our theoretical perspective" (p. 2). The theoretical perspective represents a philosophical stance supporting the researcher's methodology, which provides a context and process for that methodology (Crotty, 1998). Crotty explained that when researchers expound their theoretical perspectives, their view of the human world, and the social life within that world, they are better able to understand their assumptions and align them with their chosen methodology. In a similar vein, Merriam (2009) suggested that a theoretical framework is the researcher's scaffolding or frame that underpins the study and is derived from the orientation or stance a researcher brings to his or her study.

The theoretical perspective I brought to this study was that of symbolic interactionism, which was originally formulated by George Herbert Mead and based on the pragmatic views of John Dewey. Blumer (1969), a student of Mead's, was the first to

provide a clear formulation of the term symbolic interactionism. According to Blumer, symbolic interactionism has three simple premises: (a) “human beings act towards things on the basis of the meanings that the things have for them” including everything a human may note in his or her world; (b) “the meaning of such things is derived from, or arises out of, the social interaction one has with one’s fellows” (p. 2); and (c) an interpretive process is used by individuals in each instance where they need to deal with things in their environment.

Blumer (1969) further posited that symbolic interactionism “sees meaning as arising in the process of interactions between people” (p. 4). Therefore, symbolic interactionism “sees meanings as social products, as creations that are formed in and through the defining activities of people as they interact” (Blumer, 1969, p. 5). In other words, the actions of others inform the meanings an individual may attribute to another individual or specific object. The use of meaning by an individual occurs through a process of interpretation or, as Blumer believed, interpretation should be regarded as “a formative process in which meanings are used and revised as instruments for the guidance and formation of action” (p. 5). He viewed symbolic interactionism as a “perspective in empirical social science as an approach designed to yield verifiable knowledge of human group life and human conduct” (Blumer, 1969, p. 21).

Researcher Bias

A social constructionism epistemology coupled with a symbolic interactionism theoretical perspective influenced my interpretations and meaning-making from the data collected in this study. By reflecting on my beliefs and worldview, I was able to

understand the assumptions underlying my research and the perceptions and views I brought to the data interpretation.

My view of epistemology is such that I believe human beings bring meaning into whatever they encounter within their world, which is how they arrive at knowledge. Individuals construct knowledge and give meaning to their ideas in social contexts. Therefore, I do not hold that meaning lies 'out there' in an objective, non-interpreted, non-socialized state. Humans come to know and understand their world through their interactions and socializations with others. This socialization process allows people to make meaning of their environment and experiences, which is then shared with and uniquely interpreted by others. This process of meaning-making and meaning-sharing is wholly subjective and subject to individual interpretation as people shift and re-align while they interact with the world and each other. My worldview and epistemology informed how I interacted with the research participants, how I organized, categorized, and labeled the data I collected, all of which guided my final data interpretations. Blumer (1969) aptly wrote,

Let me begin by identifying the empirical social world in the case of human beings. This world is the actual group life of human beings. It consists of what they experience and do, individually and collectively, as they engage in their respective forms of living; it covers the large complexes of interlaced activities that grow up as the action of some spread out to affect the actions of others... . The empirical world, in short is the world of everyday experience, the top layers of which we see in our lives and recognize in the lives of others. (p. 35)

Researcher History

When considering topics for my dissertation, I focused on two related but distinct ideas. One was to research a topic or area of interest that is contemporary and the other was to investigate something related to my interest in higher education and

complementary to teaching, which might further enhance my employment options. The idea of combining the meteoric rise of mobile learning and the experiences of faculty developers and instructional designers with mobile learning offered a good match based on my experience and future “act-two” career endeavors.

Prior to becoming a full-time doctoral student, I had a successful career as a trainer and training manager for various software companies as well as being a manager of learning and development for a large, local financial services company. These experiences (over 20 years) and the professional development I not only received, but was also responsible for, gave me a deep understanding of what it takes to build a professional, knowledgeable, capable, and engaged work force. Upon earning my master’s degree, I also began teaching part-time in higher education and became passionate about quality teaching and technology innovations that support teaching and learning. Thus, my desire to pursue a doctorate in educational technology took hold, coupled with a desire to better understand professional development in the academy.

Soon after beginning my doctoral studies full-time, I had the opportunity to create content for and deliver faculty development workshops about learner-centered syllabi as an internship. This opportunity, followed by my workshops on learner-centered syllabi, piqued my interest in faculty development centers and the individuals who support faculty in the scholarship of teaching and learning. Subsequently, other opportunities came my way to conduct faculty workshops and research related to building an online community of inquiry (Kovalik & Hosler, 2010), engendering critical thinking in online discussions (Hosler & Arend, 2013), and student perceptions of Quality Matters® elements in online teaching and learning (Hosler, 2010). When reflecting back on my

research and prior work experiences, it seemed logical to combine my skill set and interests with mobile learning, instructional design, and faculty development into a dissertation topic.

As a doctoral student, I have developed a keen interest in research and the experiences of others in higher education. This interest prompted me to achieve a doctoral minor in Applied Statistical Research Methods, which served me well during this qualitative investigation. Because individuals socially construct meaning and perceive their environment through continuous interpretation, a qualitative or naturalistic study provided a good fit for my interests and background. Furthermore, I believe people have unique and interesting stories to tell about their experiences in the work world that can help inform and enlighten others who might find themselves in similar situations.

Case Study as a Qualitative Methodology

Case study research comes by many descriptors; it is associated with qualitative research and a belief that the study of how individuals interpret their social reality needs to occur in situ and at the local level (Gall, Gall, & Borg, 2007). According to Merriam (2009), “case studies can be characterized as particularistic, descriptive and heuristic” (p. 43). Stake (1995) described case studies as “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (p. xi). Stake further noted, “Two principle uses of case study are to obtain the descriptions and interpretations of others” (p. 43).

Creswell (2007) described case study research as the “study of an issue explored through one or more cases within a bounded system (i.e., a setting, a context)” (p. 73). He viewed case study research as a methodology, “an object of study, as well as a

product of the inquiry” (Creswell, 2007, p. 73). He also proposed the exploration of cases “over time, through detailed in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports)” (p. 73). Yin (2009) recommended using case studies when “how or why questions are being posed, the investigator has little control over events, and the focus is in a contemporary phenomenon within a real-life context” (p. 2).

Merriam (2009) wrote that a bounded case, a single entity with contextual boundaries, helps to “fence in” what the researcher intends to study. This bounded system then forms the actual case--one bounded with a finite number of participants, finite data collection, and a finite time for observations. The boundary for this study was seven centers for teaching and learning and nine faculty developers and instructional designers working within them. By concentrating on multiple cases (a collective case study), I was able to illuminate, interpret, and “uncover the interaction of significant factors characteristic of the phenomenon ... [focusing] on holistic description and explanation” (Merriam, 2009, p. 43).

Yin (2009) defined case study as a research method consisting of two parts. Part one of his definition presents case studies as an “empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident” (Yin, 2009, p. 18). The second part of his definition attempted to clarify the roles of data collection and analysis in case studies:

The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and relies on multiple sources of evidence, with data needing to converge in a triangulating

fashion, and [the case study inquiry] benefits from the prior development of theoretical propositions to guide data collection and analysis. (Yin, 2009, p. 18)

These descriptions and attributes of case study research fit the nature of my study of faculty developers and instructional designers working in university centers for teaching and learning as they encountered requests for mobile learning support. While no direct observational field experiences were included in this study's methods, Yin pointed out that "case studies need not always include the direct and detailed observational evidence marked by other forms of qualitative research" (p. 19).

A collective case study methodology allowed me to gather first-hand, narrative accounts of faculty developers' and instructional designers' experiences with mobile learning inquiries and ideas, as well as the issues and challenges they faced while supporting this new learning modality from a pedagogical perspective. I sought to document and explore the richer, descriptive narratives faculty developers and instructional designers provided when talking openly about their experiences planning, guiding, and supporting mobile learning at their universities. Merriam (2009) believed "an applied field's processes, problems, and programs can be examined to bring about understanding that in turn can affect and perhaps even improve practice" (p. 51). It was my intent that the results of this multi-case study be used to inform others interested in how faculty developers and instructional designers address the inquiries and the support needs of faculty regarding mobile learning.

More precisely, exploring multiple cases (also known as collective case study; Creswell, 2007) allowed me to interpret and attempt to make sense of mobile learning initiatives, implementations, and practices in higher education through individuals' unique and self-reported experiences. Creswell (2007) encouraged researchers to select a

variety of cases to illustrate an issue and to “show different perspectives on the issue (p. 74). He recommended no more than four or five cases for investigation because that number provided “ample opportunity to identify themes of the cases as well as conduct cross-case analysis” (p. 128). Creswell defined cross-case analysis as a second step following within-case analysis, which allows the researcher to examine themes across all the cases to determine commonalities among the cases. Yin (2009) believed that with cross-case analysis, the findings were likely to be more robust and having more than two cases could strengthen one’s study even further. In this study, I investigated nine cases.

My constructionist/symbolic interaction approach buttressed the belief that

individuals develop subjective meanings of their experiences--meanings directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas. (Creswell, 2008, p. 8)

Under a symbolic interactionism theoretical framework, where meaning is never immutable, I established case study methodology as the appropriate lens for examining a shifting, emerging, and ultimately ambiguous world where meaning, language, and thought came together in a social act and interpretive process.

As Stake (2005) noted, “Coming to understand a case usually requires extensive examining of how things get done, but the prime referent in case study is the case, not the methods by which the case operates” (p. 444). He further categorized case studies into three types: intrinsic, instrumental, and collective. This study was an instrumental case study extended to multiple cases. Stake defined an instrumental case as a case chosen to provide “insight into an issue or to redraw a generalization. The case is of secondary interest, it plays a supportive role, and it facilitates our understanding of something else. Here the choice of case is made to advance understanding of that other interest” (Stake,

2005, p. 445). I exploited this collective case study to illuminate and to understand more clearly the issues surrounding the support and guidance of faculty mobile learning endeavors through the perspectives and experiences of faculty developers and instructional designers.

Case Study Setting

I interviewed nine faculty developers and instructional designers from six university teaching and learning centers in the United States and one from a teaching center in Australia. The majority of the participants resided outside of Colorado; therefore, I interviewed them via telephone and a free audio/video conferencing tool.

The first set of in-state interviews (two) occurred in an academic building at the local university. For the out-of-state participants, I asked them to find a quiet room for the interviews while I participated from my home office. The participants and I mutually decided upon a time and date for the interview that was most expedient for the participant.

Participants

Qualitative samples generally represent purposive sampling--a sample that the researcher deliberately selects to achieve a specific goal and from which the most can be learned (Merriam, 2009; Miles & Huberman, 1994). I employed purposeful sampling to find study participants. Creswell (2007) explained purposeful sampling as a way for the researcher to "select individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study" (p. 125).

The criteria set for the contributors in this study required that they be adult faculty development personnel and/or instructional designers over the age of 21 who (a) worked

full-time in their university's center for teaching and learning and (b) who met certain qualifications described below. Initial contact with these participants was through an email solicitation asking if they would like to volunteer to be in the study if they met the required criteria.

Six participants came by way of my email solicitation to the Professional and Organizational Development Network in Higher Education listserv. The other three participants were from universities with which I had prior contact and relationships. By purposefully targeting my request for participants and explaining the necessary qualifications in my solicitation email, I warranted that participants met the necessary qualifications to be in this study--this is called criterion-based selection (LeCompte & Preissle, 1993). The targeted individuals provided an understanding of the specific phenomenon I was investigating. The criteria my participants met for this research were as follows:

- They were adults over the age of 21
- They worked with faculty members directly (either part-time or full-time) from within a university center for teaching and learning or an educational technology center
- They had experience or related educational background in instructional design, educational technology, or curriculum and instruction and/or prior experience supporting faculty teaching practices in some manner
- Part of their position responsibilities included supporting faculty who desired to integrate technology into their teaching practices, particularly that of mobile learning

Miles and Huberman (1994) wrote, “Samples in qualitative studies are usually not wholly prespecified, but can evolve once field work begins” (p. 27). Merriam (2009) called selecting samples from within the case while data is being gathered “ongoing or theoretical sampling” (pp. 81-82). However, she claimed that most importantly, the researcher needs an adequate number of participants and activities to address her research questions. Fortunately, I found sufficient participants through my relationships with two universities and the solicitation email. As a token of my appreciation for participants’ time, I provided them with a \$30 gift card.

Data Gathering to Address Research Questions

Prior to initial data gathering, I sought subject matter expert review of my interview questions from a small panel of authorities. These experts were two instructional designers (one working in an Educational Technology Center and the other working in a Continuing Education and Academic Outreach center) and a PhD. faculty developer/researcher who works in an Office for Teaching and Learning; all are from universities offering graduate degrees in education. These authorities provided constructive feedback to my first-round of interview questions. Because the experts were now familiar with my interview questions, which sensitized them to the study, I excluded them from participating in the actual case. Creswell (2008) suggested that a pilot test of interview questions allows the researcher to adjust the questions based on feedback from a small number of individuals who complete and evaluate the instrument.

The subject matter experts’ reviews of my interview questions assisted me in several ways. First, they helped me fine-tune and edit questions that were ambiguous, vague, or misleading presuppositions, or which deflected from addressing the primary

research questions. Secondly, discussing the interview questions with several experts ensured the clarity of the questions and that the study's participants would interpret the questions in the manner intended by me.

Stake (1995) claimed, "Formulating the questions and anticipating probes that evoke good responses is a special art" while advocating that research related interview questions be worked out in advance (p. 65). He added that even mental rehearsal of interview questions should be routine. Once the expert advice and suggestions were collected, I made the necessary adjustments to the interview questions.

I gathered data from the study participants in three ways: semi-structured interviews, journals, and constructed models or visual representations. According to Kvale and Brinkmann (2009), semi-structured interviews are an activity that

seeks to obtain descriptions of the interviewees' lived world with respect to interpretation of the meaning of the described phenomenon. It comes close to an everyday conversation, but as a professional interview it has a purpose and involves a specific approach and technique; it is semi-structured-- it is neither an open every day conversation nor a closed questionnaire. It is conducted according to an interview guide that focuses on certain themes and that may include suggested questions. (p. 27)

Merriam (2009) suggested that semi-structured interviews include a mix of more and less structured questions, flexibility in the questions, and specific data requirements from all respondents. Although pre-formed questions guided the interviews, the open nature of the questions and issues to be explored permitted me to respond to "the emerging worldview of the respondent and to new ideas on the topic" (Merriam, 2009, p. 90).

Kvale and Brinkman described the interview as a way of "obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena," which were the experiences of the developers and designers with mobile

learning (p. 3). The authors believed that the interviewer and the interviewee together during the conversation create knowledge. The variety of participants found within the universities, coupled with the participants' range of responsibilities involving technology and faculty development, permitted me to answer my research questions.

Securing Participants

After receiving Institutional Review Board (IRB) and dissertation committee approval (see Appendix A), I solicited via email for volunteers (see Appendix B) and received responses from eight; two elected not to participate after receiving the consent letter (see Appendix C). At the same time, I sent email invitations to individuals from the universities where I had contacts and through snowballing (referrals to qualified participants from my university contacts) I secured three more participants, resulting in a total of nine study participants. Confirmed participant volunteers came from a community college in the Midwest--1, a university in Australia--1, universities in the Rocky Mountain Region—3, and universities in the Midwest--4.

Participant Overview

Table 3 provides a summary of participant data in aggregate. Each participant is described more fully, along with his or her unique story, in chapter IV.

Table 3

Participant Descriptive Data

Participants	Number
Gender	
Males	5
Females	4
Age Range	
26-35	2
36-45	5
46-55	2
56+	0
Education level	
Ph.D.	2
Doctoral course work completed, no dissertation	2
Master's degree.	5
Average number of years in faculty development	5.55

Data Collection Methods

The first round of interviews was completed between May 17 and June 4, 2012; two interviews took place in person at a place convenient to the participants. The remaining seven interviews were conducted using free video/audio conferencing software along with an audio recording program. Only the audio portion of the interviews was recorded. For the first three interviews, I used the free video/audio conferencing software, but the audio degraded significantly when the video was live on several occasions. Therefore, I used only the audio portion of the free conferencing software for the remaining interviews. Due to the semi-structured nature of the interviews, which allowed for relationship building and tangential conversations, the average length of the

first round of interviews was 62 minutes. Interviews were transcribed within five days (on average) after the interviews were completed.

The second round of interviews (follow-up interviews) occurred between September 11 and September 18, 2012, approximately four months later. The follow-up questions were derived from data obtained in the first set of interviews and designed to see if anything had changed regarding mobile learning in the four month time frame. All of these interviews were conducted via the telephone and recorded using a handheld digital audio recorder. The only exception was the call to Australia, for which I used the free video/audio conferencing software, audio only. All interviews were transcribed within five days (generally) after the interviews were completed. The average length of the follow-up interviews was 32 minutes. The first and second interview questions are located in Appendices D and E.

Mobile Learning Journal/ Model Request

Approximately two months after the first interview, I requested that participants journal about mobile learning (triggered by question prompts) and construct a model, concept map, or drawing of how they saw mobile learning unfolding on their campus, accompanied by an explanation of their model. The instructions for the model creation and journaling exercise are located in Appendix F. All participants provided a model or diagram of their ideas and concepts of mobile learning; only two participants provided brief reflective passages about mobile learning.

Researcher Reflection

During the course of this study and particularly during the data collection period, I made journal entries about my personal experiences and ruminations regarding the study.

I did this online using a free software program. This software program allowed me to store my journal in a secure area in the cloud. Bazeley (2009) wrote that a qualitative researcher's reflective writing provided "a critical source of interpretive understanding as concepts are dissected and ideas explored" (p.18). Journaling also provided background context for me when I began sifting through the transcribed interviews, participant journals, and models. In my journals, I noted questions and observations about the participants, their responses, and high level interpretations. Janesick (1998) wrote that journaling allowed individuals to examine their own thoughts, behaviors, and beliefs, giving them an active voice. As such, she believed journaling to be a powerful research technique for both the researcher and the participants in a study.

Answering the Research Questions

It is important for researchers to have a clear vision of how their data collection methods answered their research questions. To that end, I include Table 4, which links the study's research questions to my data collection activities. In addition, Table 5 illustrates how my primary interview questions aligned with my research questions.

Table 4

Data Sources for Research Questions

Research Questions	Data Source
Q1 How are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?	Semi-structured interview
Q1a What, if any, pedagogical approaches, conceptual frameworks, or models are they using when guiding faculty and addressing requests for mobile learning implementation and mobile pedagogical support?	Participant journal Participant model, concept map or schematic of mobile learning Semi-structured interview
Q1b) What are some of the barriers and challenges instructional designers and faculty developers face when planning for, supporting and guiding faculty as they implement mobile learning?	Semi-structured interview Participant journal

Table 5

Interview Questions Aligned to Research Questions

Research Question	Interview Questions (1st and 2nd Interviews)
Q1 How are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?	<p>How do faculty/instructors come to you with their requests for support or questions?</p> <p>How <u>do you</u> define or explain mobile learning?</p> <p>What is happening on your campus related to mobile learning?</p> <p>Describe current requests from faculty regarding mobile learning. What do you think is driving these requests?</p> <p>How would you describe the faculty members who are seeking assistance with mobile learning? (adjunct, tenured, experienced technology users, novice technology users, young faculty members or more mature faculty members).)</p> <p>Describe any preparations or plans you or your department are making to meet the needs or requests for mobile learning from faculty.</p> <p>What is your team/department's plan for supporting faculty concerning mobile learning in the near future?</p> <p>Can you share with me materials you use with faculty (brochures, emails, web page information, job-aids etc.) related to mobile learning or mobile learning initiatives?</p> <p>Since our first interview on _____(date) describe any new ideas, perceptions, or concepts you have about mobile learning.</p>

Table continues

Table 5 (Continued)

Research Question	Interview Questions (1 st and 2 nd Interviews)
<p>Q1a</p> <p>What, if any, pedagogical approaches, conceptual frameworks, or models are they using when guiding faculty and addressing requests for mobile learning implementation and pedagogical support?</p>	<p>Describe your background knowledge of and/or experience with mobile learning.</p> <p>How do you define mobile learning?</p> <p>What does mobile learning in higher education mean to you?</p> <p>What models or frameworks come to mind that you would consider following to support faculty interested in implementing mobile learning?</p> <p>Reflecting back on inquiries you received or work you did around mobile learning, how did you handle those requests, what did you do? What kind of results did you see? Is there anything you would have done differently?</p> <p>Describe any lessons learned</p>
<p>Q1b</p> <p>What are some of the barriers and challenges instructional designers and faculty developers face when supporting and guiding faculty as they implement mobile learning?</p>	<p>Describe any obstacles you have encountered or obstacles you foresee regarding mobile learning.</p> <p>Do you think faculty are prepared to use mobile learning? (how or how not)</p> <p>What are your most significant challenges (frustrations) in dealing with mobile learning? How do you anticipate overcoming them?</p> <p>What support do you need as a faculty developer/instructional designer to support mobile learning at your university? (information, experience, training, models etc.)</p> <p>Is the idea of using mobile learning catching on in your institution?</p>

Data Analysis

Warren (2002) proposed that “researchers often choose qualitative interviews over ethnographic methods when their topics of interest do not center on particular settings but their concern is with establishing common patterns or themes between particular types of respondents” (p. 85). Such were the efforts in this study--I analyzed a series of interviews and visual representations in order to answer my research questions designed to investigate mobile learning efforts as experienced by individuals working within centers for teaching and learning. Remaining consistent with a social constructionism epistemology and a symbolic interactionism theoretical framework, I proceeded to interpret and derive meaning from the conversations and visual representations.

After reading the complete transcripts for each participant several times, I began the task of data reduction. As Miles and Huberman (1994) described it, data reduction is “a process of selecting, focusing, simplifying, abstracting, and transforming” the collected data (p. 10). As part of data reduction, Miles and Huberman suggested the researcher write summaries, code the text in accordance with observed themes and patterns, create clusters, and partition the text-based data. The authors noted that the coding and pattern-seeking processes involved analytic choices designed to sharpen, sort, focus, and organize the data so the researcher can draw and verify conclusions. Gall et al. (2007) described this as analytic induction, where the researcher combs the data “bit by bit and then infers that certain events or statements are instances of the same underlying theme or pattern. Thus, themes and patterns are induced from the data” (p. 28).

Analytic induction is the process whereby researchers build their “patterns, categories and themes from the bottom up... while working back and forth between the themes and the database until they establish a comprehensive set of themes” (Creswell, 2007, pp.38-39). Schwandt (2007) defined inductive analysis as working from the rich data of a case to a more general conclusion or “seeking to construct hypotheses by mucking around for ideas and hunches in the data rather than deriving those hypotheses in the first instance from established theory” (p. 147). An iterative, inductive, and reductive back and forth approach allowed me to use multiple sources of data as evidence to see how data converged on similar facts or findings from which I drew conclusions and observations.

As part of the data reduction, I broke apart the transcripts into more manageable chunks by eliminating introductions, relationship building conversations, and irrelevant small talk. This was followed by analytic induction to derive my primary codes (codes gleaned from the data as opposed to deciding on codes *before* data analysis began). Subsequently, I labeled appropriate portions of the transcripts with those codes. After successive and repeated reviews and analysis of the transcripts (focused coding), and assigning and reassigning the codes to ensure as much coding consistency as possible, categories emerged.

I analyzed the categories first on printed versions of the reduced transcripts and then again online, using various colored highlighting tools within my word processing program to represent emerging categories. As Merriam (2009) advised, the categories I created for synthesizing the themes were “responsive to the purpose of the research, exhaustive, and mutually exclusive” (p. 185). The next step involved deciding what the

categories meant relative to my research questions, while noting regularities or themes, examining explanations, seeking plausibility, noting relations among variables, and noting what did not fit with the emerging themes.

Bazeley (2009) contended that while a rich, thick description derived from themes is an integral part of the qualitative data analysis, it alone is not sufficient. She suggested that the “data must be challenged, extended, supported, and linked in order to reveal their full value. Themes are only significant when linked to “form a coordinated picture or an explanatory model” (pp. 8-9). Through the process of initial coding, focused coding, and looking for what was missing from the data, I made notes describing, comparing, and relating the data and the emergent themes.

After identifying relevant themes and triangulating the data, a deviant case surfaced. This case became evident through the process of cross case analysis and noting that the themes emerging from the deviant case did not match themes provided by the other cases. This irregular case allowed me to probe deeper into the goings-on of instructional designers and faculty developers regarding mobile learning on their respective campuses and served as a strong point of comparison.

As an additional data source, I examined the findings in light of two mobile learning frameworks--the Park (2011) and Koole (2009) frameworks--as well as the pedagogies discussed in the literature review. By comparing my findings to the mobile learning models, I determined whether or not Park's and Koole's models reflected how my participants were approaching mobile learning from a practical, pedagogical, and learning theory perspective. Comparing and contrasting my findings with the models

suggested ways of conceptualizing and articulating the differing views on mobile learning.

As I collected data and transcribed files, I built a case study database (evidentiary database) that was separate and distinct from my case study narratives, notes, and drafts (Yin, 2009). This database housed folders containing reduced interview transcriptions, participant visual models and their explanations, a PDF document of my research journal, and a spreadsheet tracking my activities and interactions with the participants. As described by Yin (2009), this evidentiary database allowed me to keep the raw data separate from my case study work, thereby making the data more objectively reviewable by interested parties since it was not comingled with my organization, interpretations, and analyses of said data. Yin believed that a separate case study database was pivotal because (in principle) it would permit “other investigators [to] review the evidence directly and not be limited to the written case study reports. In this manner, a case study database markedly increases the *reliability* of the entire case study” (p. 119).

Data Interpretation

Trustworthiness

As Merriam (2009) wrote, all research is concerned with producing valid and reliable knowledge in an ethical manner. Being able to trust research results is critical for individual practitioners in applied fields. She added that research results were “trustworthy to the extent that there has been some rigor in carrying out the study” (p. 209). Guba and Lincoln (2005) concisely summed up validity or the ability to trust the researcher’s results as follows:

How do we know when we have specific social inquiries that are faithful enough to some human construction that we may feel safe in acting on them, or, more

important, that members of the community in which the research is conducted may act on them? To that question there is no final answer. (pp. 206-207)

Rigor in quantitative research is measured by a study's reliability and validity; however, reliability and validity in the context of qualitative research are often referred to as dependability and credibility. By detailing the data gathering and interpretation process, I hope I transparently supported the integrity of this study and addressed concerns of trustworthiness.

Dependability and Credibility

Yin (2009) and Merriam (2009) believed the best way to establish internal validity or credibility (congruency with reality) was through multiple sources of evidence or triangulation of the collected data. Triangulation means the researcher "makes inferences from data, claiming that a particular set of data supports a particular definition, theme, assertion, hypothesis, or claim. Triangulation is a means of checking the integrity of the inferences one draws" (Schwandt, 2007, pp. 297-298). In short, the purpose of triangulation is to examine one's conclusion, theme, or assertion from more than one angle. As themes emerged, I was able to triangulate the data from the first and second interviews as well as from the participant models.

Triangulation uses two or more data points to confirm an emerging finding. For example, what was revealed during the first interviews I compared to participants' visual representations of mobile learning as well as to patterns from their follow-up interviews. Then, I compared the data with the constructs, descriptors, and ideas represented by the Park and Koole models to further confirm my understanding. As Merriam (2009) explained, the process of triangulation is one of "cross-checking data collected through observations at different times or in different places, or interview data collected from

people with different perspectives or from follow-up interviews with the same people” (p. 216). Marshall and Rossman (2011) believed that triangulation and member checking offer a more robust validity to knowledge claims and a “more accurate, objective, and neutral representation of the topic under inquiry” (p. 42). According to Stake (2005), triangulation is “a process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation” while “identifying different ways the case is seen” (p. 454). He further explained that the diversity of perception triangulation provides helps the researcher identify the different realities within which people live.

Member checking or respondent validation (Merriam, 2009) offers a second strategy for increasing a study’s internal validity or credibility. Member checking requires the researcher to validate her interpretations and recordings of events, conversations, observations, and interviews with the individuals involved in those aspects of the study. In this study, I employed a two-prong member checking approach. First, due to sporadic audio difficulties, I asked each participant to review the entire original transcript of the first interview and to fill-in or clarify parts in the transcription that were labeled inaudible. For the second segment of member checking, I asked each participant to review their story (see chapter IV) to ensure I had captured and interpreted their experiences, ideas, and observations in an accurate and truthful manner. In both instances of member checking, all participants complied, providing valuable input to ensure the credibility and trustworthiness of my data analysis and interpretation. Through member checking, participants were able to “recognize their experience in your interpretation or suggest some fine-tuning to better capture their perspectives” (Merriam, 2009, p. 217).

Dependability, also referred to as reliability, speaks to the replicability of the research by another. Schwandt (2007) noted that some researchers argue whether reliability has any meaning in judging the accuracy of field work (i.e., its fictional); whereas, others point out the importance of using established, well documented procedures, and accepted methods for recording one's work and analyzing transcripts. Stake (2005) explained that no matter how well or cleverly the researcher writes, she passes along to readers some of her own personal meanings and fails to pass along others, which makes replicating a case study in an exact sense impossible despite the most transparent of methods and procedures. The use of triangulation and member checking, however, offer accepted protocols for ensuring the dependability of the data. By using more than one source for my observations, results, and conclusions, I added trustworthiness and dependability to the results reported.

Transferability

The transferability or generalizability of a qualitative study is limited by the "sensitivity and integrity of the researcher" (Merriam, 2009, p. 52). Flyvbjerg (2006) wrote that the lack of generalizability surrounding case study research is a misunderstanding. He claimed formal generalization "is considerably overrated as the main source of scientific progress" (p. 226). He also believed that case studies are misunderstood because the method "maintains a bias towards verification, understood as a tendency to confirm the researcher's preconceived notions, so that the study therefore becomes of doubtful scientific value" (p. 234). Flyvbjerg posited that this notion demonstrated a lack of knowledge about what is involved in case study research,

maintaining that it offers its own rigorous process at it “[closes] in on real-life situations and test views directly in relation to phenomena as they unfold in practice” (p. 235).

Marshall and Rossman (2011) believed that transferability in qualitative research could be accomplished by the researcher referring to original theoretical frameworks that illustrate how data collection and analysis is informed by models and concepts (theoretical parameters). They also noted that the burden of transferring the conclusions and results from one context to another (outside of the original case) rests with the reader. Stake (2005) referred to this as knowledge transfer: “Even less understood is how a small aspect of the case may be found by many readers to modify an existing understanding about cases in general, even when the case is not typical” (p. 456).

To offer readers of this study the opportunity to transfer the experiences and knowledge-gains presented, I have transparently documented and coded the data systematically and inductively to derive final observations or conclusions from said data. In addition, data were triangulated and member checked ensuring accurate representation of participants’ responses along with an audit trail of the data for external reviewers. I conducted the research for this study in a manner reflective of the highest standards of ethics and professional protocols and in full compliance with Institutional Review Board standards and expectations.

Study Limitations

No research, whether it is quantitative or qualitative, is without its limitations. According to Marshall and Rossman (2011), limitations rest in the study’s design and its conceptual framework. Centers for teaching and learning and the individual experiences of the developers and instructional designers who worked within them constrained the

design of this study. As such, this study might have been limited by participant bias, whereby participants told me what they thought I wanted to hear. Notably, seven of the nine participants did not respond to my request for a brief journal entry, which reduced the richness of triangulation. Therefore, I was not able to use the journal entries as part of my data.

Furthermore, I did not specify teaching and learning center criteria regarding the characteristics of or responsibilities found within the center. In hindsight, I discovered that some teaching and learning centers have different focus areas, e.g., a focus on instruction, administration, or technology. Furthermore, smaller centers for teaching and learning could be housed within various schools or be specific to a discipline. For example, the medical school of a large university, the college of nursing, or the college of education could have its own team of instructional designers and faculty developers housed in a small center within that college.

This study surveyed a small and idiosyncratic sample that offered its own unique perspective on the research questions I investigated. I leave it up to the reader to make his or her own decision about the applicability of this study to other settings. Stake (2010) summed up limitations inherent in emergent, interpretive case study research when he wrote, “Qualitative research is subjective. It is personalistic. Its contributions toward an improved and disciplined science are slow and tendentious. New questions emerge more frequently than new answers” (chapter 11, section 1.8, para. 1).

CHAPTER IV

INTRODUCTION TO PARTICIPANTS

In this chapter, I introduce the stories and background information of the eight individuals employed in Centers for Teaching and Learning across the United States and one individual employed in faculty development in Australia. The purpose of this chapter is to provide the reader with a glimpse of the perspectives and experiences these individuals had with mobile learning in their respective roles and on their respective campuses.

The roles and responsibilities represented in these stories range from a director of a teaching and learning center, to instructional designers, to a consultant, with each individual contributing similar and unique renderings of mobile learning. Purposefully chosen, these participants entrusted me with interpreting and understanding their experiences as instructional designers and faculty developers facing the adoption and challenges imposed by a new and emerging technology. Through our interview sessions, I came to know each individual and appreciated his and her generous contributions to the study. The participants, as experts in their own right, provided me with a “nuanced view of reality,” which in turn permitted me to respond to my research questions (Flyvbjerg, 2006, p. 223).

The following narratives describe individuals in the context of their working environments, conveying depth and breadth in their perceptions and experiences

surrounding mobile learning on their college campuses (see Table 6). Collectively, their stories present a multi-case case study, providing a snapshot of their experiences and a scan of mobile learning at a specific point in time, all within the context of university faculty support. As Stake (2005) aptly wrote, “Many a researcher would like to tell the whole story but of course cannot; the whole story exceeds anyone’s knowing and anyone’s telling” (p. 456).

Table 6

Participant Data

	Gender	Age Range	Education	Position title	Years in faculty development
Brent	M	26-35	M.A., Instructional Design and Technology	Instructional Designer	About 3 years
Dominic	M	36-45	Ph.D. in Educational Leadership M.Ed., Educational Administration	Director	5 years + 10 years in community-based teaching
Anna	F	26-35	M.A. in Curriculum and Instruction, specialization in Educational Technology. Doctoral coursework completed in Curriculum and Instruction	Manager	About 8
Mike	M	36-45	M.Ed., Instructional Technology; Doctoral coursework completed in Educational Psychology	Director	Almost 6 years
Hannah	F	36-45	Master's degree in Information, Communication, and Technology (ICT) and Digital Learning,	Instructional Designer	7 years
Alaina	F	46-55	Ed.D. in Curriculum Instruction M.Ed. in Educational Research	Faculty Developer (40% of her time)	10 years
Sam	M	36-45	M.S. in Instructional Technology	Coordinator	11 years
Steve	M	46-55	M.Ed.	Instructional Designer	About 11 years
Emily	F	36-45	M.A. in Curriculum and Instruction	Senior Instructional Designer	About 12 years

Note. M.A.: Master of Arts; M.Ed.: Master of Education; M.S.: Master of Science; Ph.D.: Doctor of Philosophy; Ed.D.: Doctor of Education.

Alaina

I think there are going to be things we can do through mobile learning and mobile apps that are going to be superior to what we can do either online or in the classroom.

Alaina, age range of 46-55 years, is a faculty developer at a public institution located in the Mid-west offering undergraduate, graduate, and doctoral degrees, consisting of a student population of approximately 25,000. The university is considered a low research activity university by the Carnegie Foundation (2010). Alaina worked in the Office of Faculty Development in addition to her assistant professor responsibilities in the department of medical education.

With over 10 years' experience in faculty development as a curriculum developer/instructional designer, Alaina discussed her belief that faculty and instructors should not be using technology just for the sake of implementing technology. She expressed concern that when faculty members consider technology use in their courses, they might focus on the technology itself rather than how it could support their teaching. While working with faculty, Alaina viewed her instructional designer role as helping faculty move beyond the technology. She explained, "It isn't technology for technology's sake, but to get some pedagogy in here, let's get some learning theory in here, some instructional design principles in here." These beliefs drove her work in faculty development where faculty members sought her help by dropping into the faculty development office or making an appointment for a consultation. She pointed out that the technology services arm of the university is responsible for teaching and supporting the learning management system (LMS), although she worked closely with them on various issues, especially if the need involved instructional design concerns.

Mobile Learning Defined

When it came to mobile learning, Alaina advocated for personal learning environments and believed mobile learning offered an effective way for students to create their own, customized learning network and assembly of tools in support of their learning.

Mobile learning to me is a student being able to create a personal learning environment using their phone or their laptop or their iPad or tablet or whatever. You know they're able to learn on the go. They don't have to have their laptop, they don't have to be in a lab, they don't have to be in a classroom, but can pretty much access learning from anywhere and access learning in a variety of ways.

She elaborated that personal learning environments allow students to seek information that is unique to their needs and supports achievement of their own personal learning objectives. "So rather than being stuck in what the school provides, what the university provides, they're going out and finding their own tools," she added. She also mentioned the use of social networking tools and book marking tools as applications students might use when building their personal learning environments, tools readily accessible through mobile devices.

Alaina believed that mobile learning extended beyond accessing a learning management system and included the use of applications and Web sites that offer students "a number of different ways to be able to learn through their mobile devices." She referenced taking advantage of the mobile device's affordances such as the built in location-based service to design activities such as geocaching, which permits students to learn navigational techniques in a hide and seek manner as they search for hidden items.

She also expressed concern that today's student, who is comfortable with technology and the ubiquity of hand-held devices, might be met by universities that are not prepared to handle all of a student's mobile devices. Alaina clarified,

If we are not incorporating the use of those devices in our classroom instruction, they're going to be wondering what's going on and why not. Why aren't we using these? Why couldn't this be an app instead of a piece of paper? Why couldn't we just take this quiz online, instead of having to fill out a scantron sheet?

Drawing from her medical education support role, Alaina believed medical faculty better understood mobile learning and how to use it in a way that took advantage of the mobile learner with a mobile device. She believed this was especially true when medical professionals were managing and accessing patient records: "It's kind of a given, that all of this patient tracking is going to be done on a mobile app through any phone, any tablet, any laptop. You know it's all going to be Web-based." Medical education at her university appeared to be at the forefront of planning for mobile learning because content would need to be covered in less time due to mandates from the Liaison Committee on Medical Education (LCME). According to Alaina, these mandates would potentially drive faculty requests for ways to make accessing content more compact and efficient. In this case, the anytime anywhere mantra of mobile learning would make time-strapped medical students more effectual.

Mobile Learning Experiences

Alaina explained mobile learning was currently not "a distinct conversation that's happening right now [on campus]. I think it will, as it evolves, because students will ask. It also will [advance] because of some of the work [faculty development] is doing." She added that the majority of questions she saw on campus were about how to integrate

technology in a face-to-face class. She stated, “Over the next three years, we will see a distinct shift into more blended and more mobile teaching environments.” Recently, Alaina began exploring digital textbook options, asking questions such as,

What is the functionality of the e-Textbook platform or app.? Does it allow for searching, annotations, highlighting, searching annotations, sharing of annotation and/or highlighting, printing, offline access, bookmarking? It is cross-platform, browser and device independent? What is the cost to the institution and what is the cost to the student?

Alaina’s personal experience with mobile learning involved the use of a mobile device as part of a student response system (clicker) and as a way to poll students efficiently. She also shared her informal mobile learning experience while on vacation. She used her smart phone’s location-based service to locate and understand the various battles fought on the fields of Gettysburg. The mobile application she used (called “Battle App”) was developed for the Civil War Preservation Trust. It offered a location-based guided battlefield tour with virtual signs, audio, and video content. Alaina explained,

When we were at Gettysburg, you could use your phone and they had maps of the battle that showed you where you were standing, where the different soldiers and troops were and where they were moving. . . . But it really gave me a sense of, instead of just reading about this battle, you were there and all of a sudden you could see it. . . . You know, really cool things like that, which I think mobile learning’s going to afford us.

Who Is Asking About Mobile Learning?

Alaina pointed out that younger, newer faculty members were more likely to embrace mobile learning because they came from programs that used a learning management system, so they immediately wanted to know about the university’s LMS or what type of student response systems were being used at the university. By her account,

some veteran faculty members were looking for ways to improve their teaching and were open to exploring different ways of teaching. Alaina surmised that students also would push implementation of mobile learning and mobile access to content by asking if there was a specific application for something and why it was not being used for the course, in turn driving veteran faculty members toward mobile implementation.

Frameworks or Models Informing Mobile Learning

When asked if she had considered models or frameworks to use if called upon to support an instructor's request for mobile learning, Alaina referenced early adopters as a model. She believed it was important to work with these individuals who were eager to embrace new technology so they could spread the word. She elaborated,

You really find those people who are excited about it and want to learn about it and you really focus your attention on them and have them become the teach the teacher, train the trainer type of people, where they'll go out and start spreading the news.

Another model Alaina spoke of was the Community of Inquiry, a conceptual framework that identifies critical elements necessary for a successful educational experience (Garrison, Anderson, & Archer, 2000). She posited that this model would lend itself well to mobile learning because it offered teaching considerations that went beyond technology. She believed using this model would make mobile learning more learner-centered; it would "be about the student being able to build their community of inquiry themselves, that personal learning environment, but also be able to use mobile learning to create connections, create learning communities, either small or large." Alaina has used this model to create an online support portal for part-time faculty and graduate teaching assistants.

Challenges to Mobile Learning

Because she believed mobile devices offer students the ability to create personal learning environments (PLE), Alaina was aware that instructors do not know about the tools and their uses within a PLE. She felt the lack of knowledge might inhibit mobile learning adoption by faculty members. Faculty members were also challenged to implement mobile learning because they were not sure how to integrate technology effectively into their classrooms, and they did not want to spend their time learning to use it. She said,

It seems like it's not just new instructional methodology, although it is different than anything we've ever done, but it's needing to understand mobile devices. . . . and just being able to have the time to really explore all the options and really explore what other people are doing right now. I think that's the biggest challenge.

Alaina felt faculty might initially resist implementing mobile technology because “unless they really want to get re-energized and re-vitalized in their teaching . . . they just don't want to struggle with it.”

In closing, Alaina summed up her perspective about mobile learning's greatest challenge clearly: “I think the real challenge is right now for education to figure out how we're going to use mobile learning.”

Alaina's Visual Representation of Mobile Learning

Alaina's detailed model represented mobile learning as evolving from the traditional learning management system (see Figure 4). Her view illustrated how content, learning activities, self-assessment and assessment led to or influenced mobile learning, which then sponsored a host of activities and experiences. These activities and experiences in turn led to a more social and networked type of LMS--one that addressed

the need for learners to have creative spaces to connect with the larger community and to share their experiences.

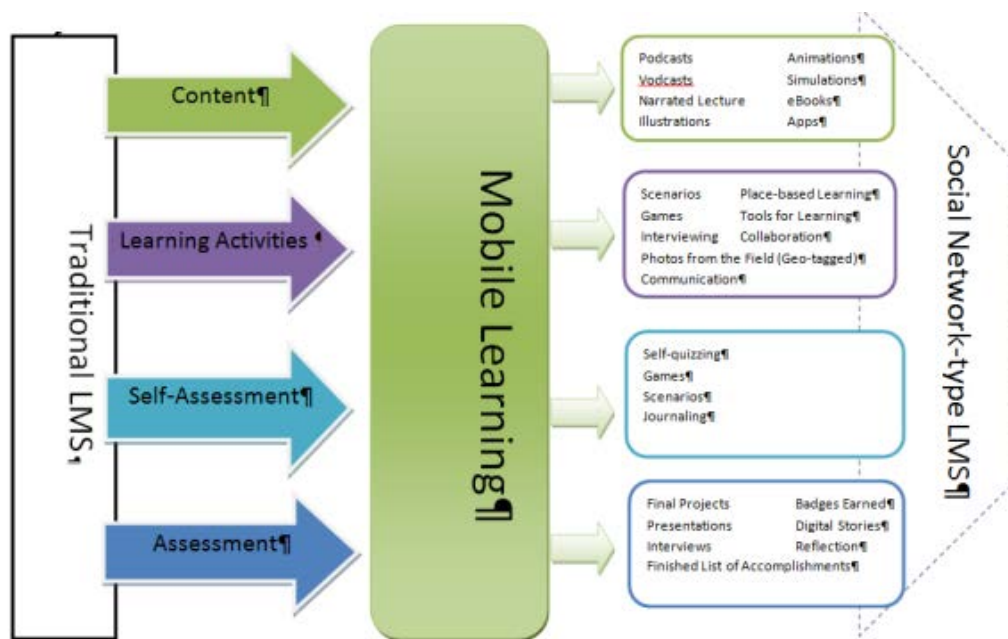


Figure 4. Mobile learning visual representation as perceived by Alaina.

Alaina explained the thinking behind her diagram:

The four parts of the learning equation are content, application (learning activities), self-assessment, and assessment. My model takes these four parts and translated how these might be accomplished with Mobile Learning. An interesting disequilibrium that is happening is that social and mobile learning are challenging the traditional locked-down Learning Management Systems . . . because they cannot handle the connected learning, communication, collaboration that is happening in social networks.

Anna

I think of mobile learning as anywhere, anytime learning on a device that is mobile.

Anna, in the age range of 26-35 years, has been working with and supporting faculty and instructor development in higher education for almost eight years. She

considers herself an educational developer and has completed all of her doctoral coursework for a terminal degree in curriculum and instruction. Anna holds a master's degree in Curriculum and Instruction with a specialization in Educational Technology and Teacher Education. Her previous position titles included Academic Technology Consultant and Lecturer in the School of Education, where part of her lectureship included faculty development.

Currently, she is responsible for the implementation of and migration to a new learning management system at her university; faculty members needing assistance contact her mainly through email. This public university, located in the Rocky Mountain region, is considered a very high research university by the Carnegie Foundation (2010). It offers doctoral, graduate, and undergraduate programs and has an approximate student population of 33,000.

Mobile Learning Defined

Anna interpreted mobile learning as the ability to learn anytime and anywhere with a portable device; extending learning beyond the classroom walls. She included laptops in her description of mobile devices along with cell phones and tablet computers. To her, mobile learning is using “a device that allows a learner to access learning opportunities at any time in any place that they would like to.” Her idea of mobile learning offers a flexible way for students to access content and extends their time learning beyond typical classroom hours.

Mobile Learning Experience

While noting she had “no formal learning experiences around mobile technology,” Anna felt she would “have to do some work too. I know about making

accessible PDFs, but I'd want to make sure that I'm covering all the basics to really make sure that everything is accessible by the mobile device.” Anna pointed out that early in her career teaching abroad, she started considering the use of mobile devices for learning when she found herself teaching educational technology in a dispersed geographical area. As she described it, Anna presented mobile technologies to her students (in-service teachers) as an option for them to support their students located in dispersed geographical areas--students who had limited access to educational facilities including computers. She explained many students had access to mobile technologies, while most schools lacked resources.

During the years 2005 to 2010 while teaching abroad, Anna encouraged these in-service teachers to consider using cell phones to support content access by their students. She believed this allowed in-service teachers to extend “learning beyond the classroom walls.” Anna encouraged the use of e-books and audio books “to help students with literacy and encouraging students to access them through their mobile technology.”

Mobile Learning on Campus

When asked about current experiences and interest in mobile learning on her campus, Anna noted not much was going on: “nothing formal has been happening.” But she was quick to remark, “I know students have been using mobile technology to access learning on campus. But it hasn't been [from] an initiative where leadership said, ‘we're going to tap into this and we're going to start exploring this in a formal way’.”

Interestingly, students seemed to be at the heart of mobilized access to content at her university. As Anna disclosed, her university had recently implemented a new learning management system that had a mobile component students could not initially

use. The previous LMS allowed students mobile access to course content, but the mobile module in the university's new LMS had a problem that prevented anything beyond the first page of a PDF file to be displayed on iPads. The new learning management system's mobile module worked well for other mobile devices:

Students have contacted us not too happy with some of the functionality of the mobile technology and that lets me know that despite the fact that we haven't rolled it out in a formal way, they are expecting it. I think that the next step would be to [have] mobile technologies available.

Anna mentioned specific student comments: "we could access PDF documents quite easily and online with our mobile device and we can't do that with [the new LMS] and that's a problem." She believed the initiatives for mobile learning will be student driven because students were seeking to have the mobile functionality they lost reinstated in the new learning management system.

Contrary to her observation that students were driving the need to implement mobile learning on campus, Anna pointed out that the majority of the student population physically came to the campus; therefore, learning opportunities were highly accessible and in close proximity to the student. According to Anna, this proximity meant "there is less of a need to consider accessing a mobile device, as there would be in places where it's difficult to get to schooling," i.e., places that are geographically dispersed and resource strapped such as in Africa or the Caribbean. Anna perceived a difference in terms of needing mobile access to course content out of necessity compared to "accessing mobile content for convenience sake."

As a side note, Anna spoke about her desire to see the university better address student needs by being proactive in their approach to mobile learning and "addressing potential issues of accessing online learning opportunities with mobile devices." She

explained that it would send a positive message to students and faculty members if the university formally adopted a plan for mobile learning, showing “that the university recognized the various ways people could access learning.” Later she pointed out that the campus web site was “accessible mobile, but not designed in a way that is easily accessible” or formatted for clear reading on a mobile device.

Frameworks or Models Informing Mobile Learning

When asked about a model for supporting faculty members and instructors regarding mobile learning, Anna responded that a pilot test of mobile learning was necessary. She envisioned a pilot program offering a sound way to model ideas and implementations of mobile learning where instructors studied and learned from their practice.

Perhaps those who are interested, taking them through designing their courses to support mobile learning and then having them implement it and getting feedback from their students about how well-designed and how accessible the course was. There are opportunities for us to do that here.

Anna also discussed the importance of using resources in support of mobile learning endeavors. She believed that access to reliable and useful resources such as those found on the Internet or on one of the university’s blogs could help faculty by defining mobile learning and offering ideas for best practices of mobile learning in the classroom. She advocated for coupling this with one-on-one consultation to “address the immediate need and then using that information to help get the word out.”

Last, Anna explained she returned to her “trusty old instructional design principles,” e.g., implementing course goals, focusing on clear learning objectives, and creating student assessments. All of these elements are critical and need to be in place

before any consideration of mobile learning. She added, “There needs to be some consistencies, things that students can predict with the design of [a course].” Relying again on her instructional design experiences, Anna would ask faculty members using technology tools, “What are you going to do to help your students use this tool successfully?” and “What are the things that instructors should be doing to make learning activities and content accessible by mobile devices?”

Challenges to Mobile Learning

Not wanting to “knock” faculty members and instructors, Anna believed challenges to mobile learning and faculty preparing to implement mobile learning were found in instructional design issues. She believed faculty do not know how to design effective courses and that this will carry over into their implementation of mobile devices for learning:

They struggle with designing courses well period. [Courses] which meet objectives and . . . assess student learning. And so I think that in order to design a course for mobile learning, there are some other things you have to consider, for example, document accessibility at the lowest level. So if they struggle so much with just designing the course well, I’d be concerned with [their struggles] designing for mobile learning.

More importantly, she cited faculty members and instructors lacking in awareness that their courses might have some or all of these shortcomings.

In addition, Anna discussed the lack of time facing faculty members when it came to learning and implementing something new along with key questions that needed to be answered: “What is it, how do I do it? Who is doing it, and where do I go for help?” She acknowledged a resistance to change and a fear of new things, which when coupled with the technical aspects of mobile learning, management issues, associated costs, and lack of senior administration support, could all inhibit mobile learning endeavors.

Visual Representation of Mobile Learning

In her role as a manager, with an educational developer background, Anna's perception of mobile learning was informed by a systematic and project planning view. Her model (see Figure 5) represented a concern for the larger picture from a campus-wide implementation perspective. She explained her model:

I believe our institution has to engage in systematic planning focused on the implementation of mobile learning initiatives as opposed to merely reacting to student and instructor requests for support. This will help to establish a vision for its use, which will help to inform policies and the allocation of resources required to support its use in teaching, learning, and administration.

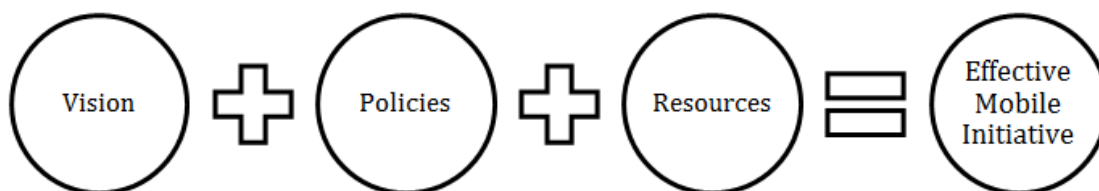


Figure 5. Anna's view of the necessary elements for a mobile learning initiative.

In lieu of reacting to specific instructor and/or student requests for mobile learning, Anna believed that an institution requires a solid purpose and plan for implementing mobile learning in order to avoid uncoordinated, one-off efforts. Notably, consideration of the learner, faculty member, mobile device, pedagogy, and the learning environment were missing from her model as most likely they were too granular for initial systematic planning considerations.

Brent

Mobile learning is the ability to consume and contribute information to a community without being tied to a physical location.

Brent, in the age range of 26-35 years, works in a residential public university located in the Midwest with a student population of about 14, 900 undergraduate and 2,200 graduate students. This university is considered a high research activity university with a very high undergraduate enrollment profile (Carnegie Foundation, 2010). Brent is an alumnae of his workplace and has been working there as an instructional designer and technology specialist for almost two years (with an additional two in faculty development). He described his position as “primarily faculty support, but more from the technology standpoint. We try very hard to, well we have been trying very hard to, broadcast our office as more pedagogical support with the use of technology.”

While describing his position as an instructional design and technology specialist, Brent emphasized the fact that his team did not answer the university’s help desk phones but were more focused on advanced learning technologies, which went beyond being a support desk technician. As he said, “The help desk flags some calls as more of a pedagogical issue and they [faculty members] may need some pedagogical assistance.” He clarified that the help desk then escalates a support ticket to his area where someone contacts the instructor and sets up an appointment to assist them with their pedagogical-technology needs. Brent added,

We do also handle level 2 support for our learning management system. So if there’s a question that the help desk can’t answer with regard to how to do something within our learning management system, they’ll get those tickets to our group because we’re the ones that did the testing on the back end of the system.

He appreciated how some of the faculty he supported “are constantly working with new technologies to incorporate into their classes and so we’ll get phone calls and emails from instructors trying to do specific things with technology . . . related to coursework.”

He added that once he and his colleagues helped someone, their follow-up, coupled with word of mouth about their work, garnered repeat and new business from faculty:

So after we meet with them and help them with whatever it is they’re trying to do, we’ll send them a follow up email a week later just to make sure everything is on task and they don’t have any further questions. That will typically spark an additional conversation on an additional topic as well.

In addition, his department has been dealing with issues surrounding the university’s recent change in learning management systems and an attempt to re-brand who they are. Brent explained:

We recently changed locations on campus, we recently changed learning management systems, and so we’ve been struggling since then to kind of rebrand ourselves and get our name out there. . . .It’s kind of an ongoing struggle to brand ourselves as being a group of instructional designers who can help faculty, but also separating ourselves from the help desk.

Mobile Learning Defined

When asked how he defined mobile learning, Brent was quick to respond, stating his definition “would involve the ability to consume and contribute information to a community without being tied to a physical location.” He explicated further:

The ability to consume and contribute obviously is with wanting students to be engaged in the learning and have an active role in their learning. We want them not only to consume information that the instructors are pushing out to them, but also be able to contribute back to a broader community, whether it’s the class as a whole, something specific to the institution, or even contributing to you know, the world wide community, the academic community.

He saw mobile learning, whether it was on a mobile device or a tablet computer, as a form of distance learning that was “not only learning within an academic class, a structured academic class, but it can also involve [students] learning on their own.” He envisioned students actively engaged with social media and social networking through their mobile devices while using the mobile device to access discussion forums within the learning management system.

Mobile Learning Experience

Regarding his own experiences with mobile learning, Brent explained that from an academic perspective, he did not have much experience with mobile learning in a formal sense. However, he considered himself a strong proponent of mobile learning, which he believed offered students access to a myriad of open educational resources currently available. He explained how he is always “very much connected to technology through the use of my iPhone and iPad. . . .constantly flagging news articles and things that I like to share with both my personal and professional networks,” noting his mobile device use had been mainly personal and “not tied to an academic course.” Brent used his mobile devices in much the same way he envisioned their use by students on campus.

Mobile Learning on Campus

When asked to describe what he perceived was happening on campus regarding mobile learning, Brent replied, “The short answer is very little.” He acknowledged that the university “is slow on the uptake” of mobile learning. Candidly, he offered, “As of right now, our faculty are really not interested in mobile learning to be honest.” The most frequent requests he received from instructors were how to format video and audio segments so they were accessible to students on mobile devices. However, he viewed the

LMS as a starting point for mobile learning as students become accustomed to accessing course content through their mobile devices.

Brent mentioned his university has a mobile browser that is part of their new learning management system, but a formal announcement about the browser had yet to be made. More recently, the university began implementing non-academic uses of mobile devices in an effort to support students more efficiently. Brent explained, “Groups in the alumni office have been working on mobile websites and mobile content delivery. But as far as academics go, to the best of my knowledge, there aren’t any new initiatives or ad hoc groups that are doing those types of things.” He added that if such ad hoc groups were implementing mobile learning, they were not consulting with instructional designers.

When queried further about ad-hoc mobile learning groups on campus, Mathew mentioned there was “a group of people who have common interests. It’s not a department on campus. It’s not an academic program. It’s just this group of people who are interested in mobile learning.” This informal group was comprised of faculty members from a variety of departments as well as student employees who had an interest in mobile learning. He added that the ad-hoc group had a university website. They created an iTunes application with campus maps, dining hall menus, and a few university events listed, but it was very limited. He thought the unofficial efforts of this group had diminished. Because there was a university-wide initiative in support of e-learning where making courses more engaging was a priority, he speculated that effort would most likely evolve into some aspect of mobile learning.

Who Is Considering Mobile Learning?

Although he experienced few requests from faculty for mobile learning outside of adapting audio and video segments to mobile devices, Brent believed faculty members who were more technically savvy themselves would be the ones most interested in using mobile devices for educational purposes. He posited that new instructors who used mobile devices in their day to day activities, or in their more recent college education, were “bringing their past experiences to [the university] and generating that initiative and that development.” Faculty members teaching for more than 30 years and in a face-to-face venue appeared to be not as interested in pursuing mobile learning in their courses, Brent noted. He further delineated his perceptions:

From what I can tell, it’s typically the younger instructors who are full-time instructors but not necessarily tenured, or tenure-track and not adjunct. A lot of our adjunct instructors have too many other things on their plate to be able to focus on developing courses for mobile learning. Our adjunct instructors are typically handed the information about their course at a point that’s too late for them to develop anything for mobile learning.

Models Informing Mobile Learning

Brent is a strong proponent of universal design as a guiding framework or model to support learning and mobile learning endeavors. Universal design in a learning context entails the creation of materials and learning environments that can be used by as many people as possible and involves alternative access to information. He acknowledged that many instructors seemed to be “dedicated to putting up one version of a concept and not understanding that students have different ways of learning.” With mobile learning, Brent explained, universal design considerations offer multiple ways for

students to consume information, something instructors need to be mindful of. He offered this example:

If you're looking at something from an iPhone and you can't see the flash video, you're most likely going to be able to see a text version of the transcript. So that at least provides some information to students on what they would have gotten out of the video.

Brent was also cognizant of instructional design considerations as a framework for informing mobile learning pedagogy. The example he provided focused on learning objectives and how, or if, a mobile learning unit would align with and support those objectives.

I was trained in not implementing a new piece of technology just because it's cool and it's fun to use, but making sure that it fits within what you are trying to accomplish. If you're teaching a fully online class, why do you need mobile learning? You know, why is accessing content from a mobile device necessary? Is mobile learning relevant to this specific course?

He reasoned that "mobile learning is something that needs to fit within your learning objectives for the course." Brent explained that in addition to challenges with faculty members using learning objectives, he believed the university was behind the times when it came to online learning in general. This was due in part because the development and delivery of online courses were left to the discretion of department chairs; hence, there was "no vetting of the instructors" to insure they were prepared to teach online in a pedagogically effective and engaging manner. If the university is behind in their online learning endeavors, then how can they move forward with mobile learning at this time?

Challenges to Mobile Learning

According to Brent, among the most notable obstacles to online learning acceptance that included mobile learning were "academic integrity and authenticity of student participation." He explained that many instructors were uncomfortable

administering tests and assessments online for fear the student completing the assessment was not actually the student registered for the class. Brent countered this concern by advising instructors, “There’s not much you can do in a face-to-face class either, especially with a large lecture class of 100 students. You’re not going to know every single student in that room.” Again he returned to his instructional design education and offered suggestions to faculty members “to develop assessments that are not multiple choice, that are not easy to forge and cheat on.” He believed this fear of student authenticity and concern for integrity would carry over to faculty members’ adoption of and interest in mobile learning, especially among more seasoned or mid-career instructors.

Another challenge Brent discussed was institutional support from the university’s administration. While there was a desire and effort underway to enhance and revitalize the university’s online learning initiatives, the Provost had not taken a firm stance on mobile learning. Brent believed this would impede faculty members from trying mobile learning. On the other hand, Brent noted instructors were becoming less fearsome of using technology in the classroom, “whether it be a teacher work station in the classroom to show slides, or a small percentage of faculty using clickers in the classroom. I think that the having to learn technology is slowly fading as an obstacle across the university.”

Brent hypothesized that cultural issues also would impact the adoption of mobile learning on his campus. He explained that the third largest population of students on campus comes from China where teaching and learning is done differently. By his account, “The problem is that in China, they don’t use learning management systems and their learning is completely different from how learning in AmSama is perceived and is

delivered.” This in turn added another layer of challenges to mobile learning-- international students’ acceptance of learning management systems and mobile devices for learning.

Visual Representation of Mobile Learning

A simple hierarchical grid is how Brent portrayed mobile learning (see Figure 6). Primary concepts of mobile learning he believed important were the instructor, the learner, theories about mobile learning, engagement, resources, and mobile pedagogy. Brent took a pragmatic view, explaining that currently a few groups on campus were implementing mobile learning: academics, alumni relations, and admissions.

Mobile Learning					
Instructor	Student/Learner	Theories	Engagement	Resources	Mobile Ped.
Academics					
				Alumni Relations	
				Admissions	

Figure 6. Brent’s model of mobile learning for his campus.

Brent supported his observations:

Each concept pertaining to mobile learning does not necessarily have an impact on the groups using the technology. For example, Admissions would not take learning theories into consideration when deciding to implement mobile learning. Alumni relations are primarily focused on reaching out to alumni, and therefore the instructor and student/learner concepts are not important.

His pragmatic view offered insight into whom and for what purpose a group or individual might want to implement mobile learning. Brent’s model implied a broader interpretation of mobile learning--one that encompassed the use of mobile devices for

convenience and easy access to university specific information, not singularly learner or pedagogically focused.

Hannah

I actually think of being in the middle of the Outback and having access to learning in whatever capacity that can look like.

Hannah, an instructional designer who lives in Melbourne, Australia, supports faculty members at a public university in Perth. She presented as a unique participant in this study because she is far away from the instructors and faculty members she supports, and she was a full-time consultant to the university. She explained, “I’m not actually staff per se. I’m not on the staff payroll list. I actually have my own business and so I provide the support to [the university] as a consultant.” She clarified,

I consult and sort of report into the Center for Learning and Development, but because I’ve been there for a year or two now, everyone sort of knows me, so I have faculty that just contact me and say ‘ok, I need this, what’s your workload like?’

Falling in the age range of 36-45 years, Hannah has over seven years experience in faculty development and over 20 years of experience as an instructional designer, which included time working in the United States as a senior instructional designer for a large financial institution. Her faculty development experience was comprised of several years at a Texas university before moving back to Australia. She holds a bachelor’s degree in Adult Education and a master’s degree in Information, Communication, and Technology and Digital Learning.

Hannah works for a large, multi-campus institution established in 1991, serving communities in Western Australia. The university claims 27,000 enrolled students comprised of undergraduate and graduate students with approximately 5,500 international

students. It is the largest provider of psychology and community studies in Western Australia and offered associate, bachelor's, master's, and doctoral degrees, as well as vocational education courses.

Faculty members obtain Hannah's help through the university's Center for Learning and Development where they discuss their needs with the center's team leader. If there is no one available to help on campus, the team leader sends the instructor to Hannah. From there, Hannah's reputation for quality support and word of mouth among faculty members garnered most of her assignments. She consulted with faculty clients as well as "sessional staff" (affiliate or adjunct faculty) using several different types of video conferencing tools, email, and cell phone. Having worked on campus for about six months, many instructors have met Hannah and worked with her in person.

Mobile Learning Defined

Hannah discussed mobile learning as something beyond information access in a classroom, an extension of online learning. She described mobile learning as activities an individual can do at any time, from any place--something that offers a unique, in-depth experience. This in-depth experience, she elaborated, offers the learner the opportunity for creating her own personalized learning. "What [applications] are we going to have available or what technology is going to be available to allow you to use your mobile phone to customize what you're going to learn?" she questioned. Hannah believed higher education is at the beginning of mobile technology, but new avenues of "personalized learning [are] going to impact how we use our mobile phones in a personalized world."

She provided an example of being able to quickly search for the status of parrots at the local zoo, discovering what is happening with them as a way to extend learning

beyond the classroom and beyond the university's learning management system. She noted, "Mobile learning goes beyond just the classroom. . . . It means being able to Google. It means being able to learn about the local zoo and what's happening with the parrots at the local zoo." She added that mobile learning means access to open, online courses such as Massachusetts Institute of Technology's (MIT) Open Courseware while sitting at a bus stop or using a tablet computer to access instructional videos wherever it is convenient for the learner.

While discussing perceptions about mobile learning, Hannah expressed concern that there is not free Internet access available to everyone in a ubiquitous manner and that both technology and consumers of technology need to advance more quickly.

I feel like there's a lot of technology coming out, which is great. A lot of it is useless and a lot of it is certainly useful. But, I feel like we're not advancing fast enough. . . . I would like to ask to have the technology and the speed of development move beyond two to three years. I would like us as a culture to be able to adapt to a faster speed of development in technology.

Most succinctly, Hannah summed up mobile learning as "watch this space," adding,

The dynamics are going to change, those involved will hopefully grow, it's going to be an evolving topic right now. I think that the material, you know the research and everything that is coming out is so new and fresh. In 6 to 12 months' time, it could be outdated.

Mobile Learning Experience

Hannah's exposure to and use of mobile learning was tied to her personal experiences with using mobile devices in her own graduate education. "As a student, of course I'm using my iPad, using 'mobile learn' [the LMS module] as a student," but she hastily added her experience with mobile learning was not broad. To supplement her personal experiences with mobile learning, Hannah has conducted informal research and reading about what is happening in the academic arena of mobile learning.

In terms of mobile learning on campus, Hannah said the university had not taken up the idea of mobile learning as quickly as she would like, but she pointed out that the university “is actually rolling out mobile learning this year, which is terrific.” The mobile learning rollout entailed a phased approach involving certain units and departments. She clarified, “We’re not going to flip the switch and everyone will have it, it will be a systematic rollout.” This rollout included mobile access to the learning management system. Hannah added hopefully, “Fingers crossed, it will also mean that units or parts of the unit that are delivered will include a mobile learning element. They’re still trying to figure out what that will exactly look like.” However, she noted they were in the early planning stages of this and she had been involved in only a few meetings discussing what this would look like with other faculty members.

Based on her experiences with e-learning, Hannah is afraid that mobile learning could become a dumping ground for content, just as she saw with e-learning. “There’s a lot of crap out there with e-learning and I’m presuming as mobile learning comes out, there will be a lot of elements to follow that are included in courses or core units, [which are] just not used effectively.”

Who is Considering Mobile Learning?

While in the early stages of mobile learning considerations, which has senior administration support, Hannah explained that she is not seeing requests from faculty for guidance with mobile learning ideas because it is too early. When queried about whom she thought would be most interested in mobile learning, she considered younger faculty and those seeking tenure (early career faculty) would be most likely to explore mobile

learning. She speculated that these individuals would not only embrace the technology but also become the technology champions.

They will be easier to bring into and utilize the mobile technology. Now given that, it's also really important that we try to [work with senior faculty] and get them to use the mobile technology as well. We don't simply have younger staff coming in and showing faculty who have been there for a long time how to do it.

She expounded on this idea saying she hoped senior, tenured faculty would also consider mobile learning, become champions of technology, and talk about it with their peers: “Basically [spreading] the word.”

Frameworks or Models Informing Mobile Learning

Because the university was in the early stages of implementing the mobile learning module of their LMS, no particular framework or model came to mind when Hannah reflected on how faculty could use mobile learning in their classes. She explained, “I’m assuming you integrate the tried and true methods, but we’re going to have to start research.” Research to Hannah meant reading articles about mobile learning coming from the United Kingdom and the United States. She said, “I’ve been reading about a couple of the programs that have actually developed an online component incorporating mobile learning, but my main focus has been on faculty development and rollout.”

Interestingly, while Hannah talked about considering the time-tested methods and frameworks used in developing effective teaching, she expressed that mobile learning required a different approach and perhaps different models. She stated, “It’s not like we’re absorbing traditional methods that have been tried and tested for years. It’s something that’s a little bit more groundbreaking.”

Challenges to Mobile Learning

Grounded in her experiences as a faculty developer, Hannah immediately spoke of the university's infrastructure when asked about impediments she foresaw regarding mobile learning:

The first one that springs to mind is the actual technology itself. Making sure that it works. From the university's standpoint, that we are set up technically, the IT [information technology] department is fully onboard, is fully conversant, is ready to go when we start rolling this out.

She was concerned that faculty trying to work with new technology could become frustrated if they had to deal with infrastructure issues while learning a new technology. She provided an example of a recent attempt at implementing mobile access to the university's LMS. After much campus-wide marketing about the mobile module, it was not launched when promised due to various technical difficulties. She determined, "There's trepidation going into it because the dates have been set back. It hasn't boded well with faculty. . . . It's created a here we go again type of feeling with the faculty."

Secondly, she expressed concern regarding faculty members' adoption of mobile learning due to their workloads and time constraints. She parroted their concerns:

I won't be able to attend any sessions to learn about this, this is now something else that I have to do, taking boards...those sorts of issues, the fear of it. Um, the issues that faculty already have with technology adoption through the process of online learning, I think that's going to transfer across to mobile learning.

Furthermore, while Hannah knew she had support from senior administrators, she was also concerned that a lack of visible support could impede mobile learning efforts. She hoped senior officials would "walk the talk" regarding moving ahead with mobile learning:

I would like to see them retaining the committees, getting the meetings, getting the committees involved with the rollout of mobile learning. I wouldn't want them to send a representative. I would like to see [senior administrators] at the actual meetings.

Visual Representation of Mobile Learning

Hannah created a concept map depicting her view of mobile learning as it could potentially unfold at her university (see Figure 7). She illuminated her ideas about mobile learning by placing faculty at the hub of her concept map, followed by “elements that are needed to support faculty.” She perceived mobile learning as a part of the “whole picture that impacts faculty. In many ways, the issues associated with mobile learning and faculty development significantly overlap” into such areas as instructional design, resources, workload, and support.

Faculty are in the center of her concept map because “there are many corresponding issues that faculty must work with and through to be able to confidently provide quality learning to students while using mobile technology.” While Hannah mentioned the learner in the explanation of her model, it was in the context of receiving quality learning from instructors as opposed to a learner-centered, constructivist approach to teaching. She presented the student as part of a faculty member's workload, reflective of a concern for how faculty members will manage quality instruction using mobile devices or new technologies in addition to their other responsibilities. She defended her faculty focus because she works with faculty regularly. She stated, “If it's going to work for the faculty, they're going to be in a better place to deliver the content they want, you know better quality, then the students will be enhanced by their learning experience.”

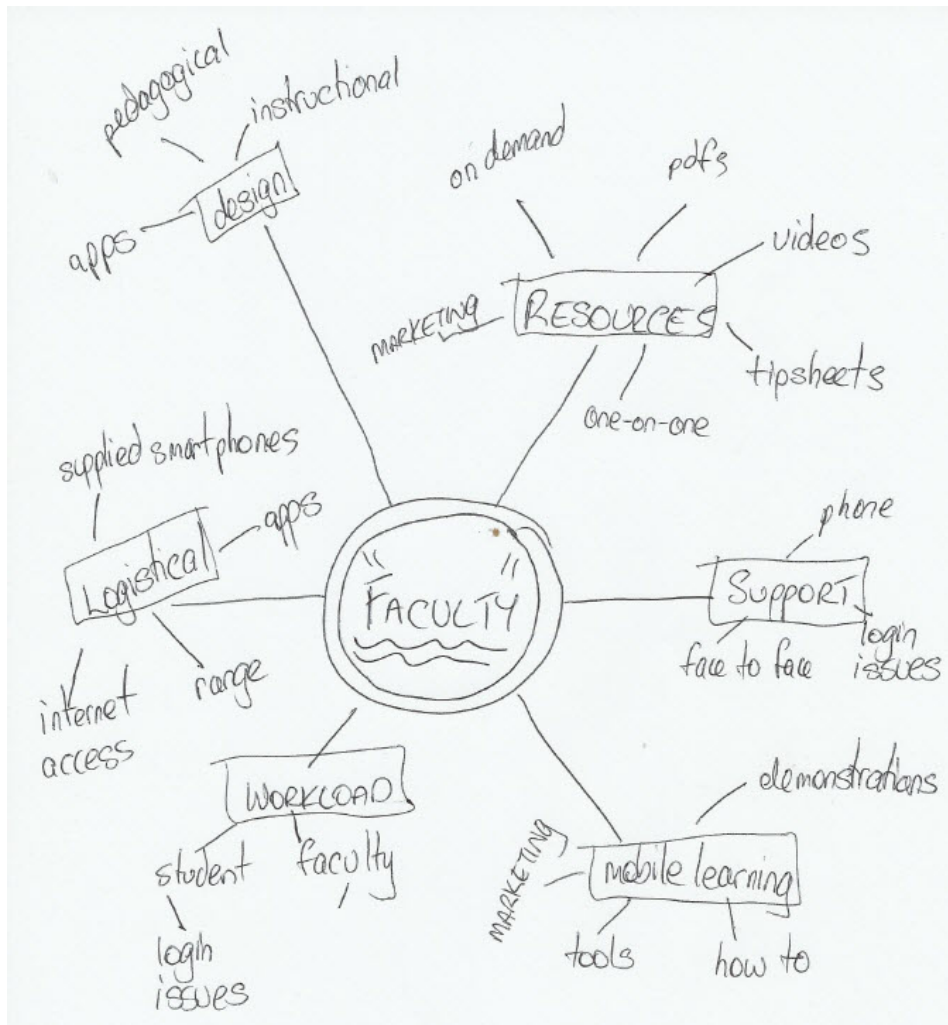


Figure 7. Hannah's concept map of mobile learning.

Dominic

What is the learning that needs to happen? And then can technology support that?

As director of his university's teaching and learning center, Dominic was responsible for running the center, which included undergraduate consultants, a graduate student who is a senior education consultant, and a senior faculty associate. Located in the Mid-west, this university has an extensive multi-campus system, among the largest

regional systems in the country. It is a public university, demonstrating high-research activity according to the Carnegie Foundation (2010). As of fall 2011, this university had approximately 27,000 students on its main campus.

From the faculty development center at this university, Dominic and his team organize and lead efforts for various faculty development initiatives. Additionally, they maintain a studio for consultation, a “faculty classroom”, and a library of about 900 books and other resources. These resources are for individual instructors, faculty professional development learning communities, and various workshop/events. Dominic, who holds a Ph.D. in Educational Leadership, did not claim to be an instructional designer but rather an individual whose interest and focus has been in experiential learning and adventure education.

Dominic actively recruited new faculty members to his workshops by working with human resources to gather the names of new faculty each fall and used this as a spring-board for introducing the services and support his center offers. He and his team also maintained a Website of faculty resources and produced a newsletter that he hoped “inspired” people to seek out their services and resources. As Dominic explained, “People choose to come and they come to us with ideas that they want to work on that they saw at a conference, [or what] they heard their friend was doing, [or if] they noticed a problem, they wanted some input on [something].”

Ever mindful of where the university’s leadership wants them to be strategically, Dominic facilitated focus groups and offered workshops designed to reach others within the university community. His efforts support faculty members in their scholarly growth and professional work. He detailed, “Our center’s comprehensive, so we don’t just focus

on teaching. We talk about research and service and community and those types of things too.”

While his center offered an array of development opportunities, it did not provide specific technical support to faculty members but instead provided pedagogical guidance to faculty seeking to integrate technology into their teaching practices. For example, the center offered mobile devices (iPads) for faculty to check out and explore on their own. However, Dominic pointed out that the university was trying to be platform agnostic and avoid endorsing any one mobile device or operating system:

I believe [we] made a decision that we weren't going to try to do anything platform specific, but we would be trying to leverage Web based technology if we're going to design anything. . . . People are going to access things through the Web so that we're not developing applications for like the iPad or whatever they call it on the Android.

Because he worked for a large, multi-campus university, Dominic contended, “There’s pretty much recognition that there is no way to standardize” on any one type of device or platform.

Mobile Learning Defined

In describing mobile learning, Dominic took a broader view, attributing the physical act of being in motion as a key part of mobile learning. He explicated, “The brain needs motion literally from the body to receive stimuli, whether that’s from the outside or chemical responses from inside the body. There is no learning without sort of being mobile.” He saw mobile devices as merely the facilitator of mobile learning, noting that how the device was used in support of interaction and learning was the key to mobile learning. For him, “the essence of mobile learning would be the ability to take in, do something with and then put back what you’ve learned for others to see, value, use,”

noting that the learner is central to these activities. Dominic speculated that his ideas about mobile learning might be distinct from the university's definition of mobile learning, which "would probably be synonymous with distance learning." He added that mobile learning could also be an adjunct or dominant part of distance learning. His perspective on mobile learning was that it was like any other service offered by the university, claiming mobile learning would not be "any higher on a totem pole than say student services, or the student accessibility center, or the student media studio or the Writing Commons," all services that support student learning.

Mobile Learning Experiences

When asked about his own experiences with mobile devices, Dominic mentioned taking online classes himself. As a faculty development person, he and his colleagues were "working to develop and assess and validate learning experiences that happen in that medium of distance learning." He did, however, mention the formation of an ad hoc tablet computer user group that met about three times a semester. During these meetings, the user group exchanged ideas surrounding the question, "What could we do with these things?" and "Where does the tool fit in?" According to Dominic, the ad hoc group represented people who used mobile devices "on a regular basis and they're exploring it for things [related to] their own [purposes], how to use it in the field, to using it in the classroom."

We talk about what are those things that are out there, that are trending and helping students accomplish certain things. If you do tree identification, what application helps do the best job of getting to the right information the quickest? Do you actually use a tree identifier; do you actually use a camera?

He posited that faculty using mobile devices would have an effect on students: “We’ll have faculty who are exploring different things for different reasons and that will eventually trickle to the students at some point.”

The art school at the university began requiring iPads for students in the fall of 2012. By his account, “the technology is mobile enough to stimulate and facilitate the learning process whether you’re at home sketching or you’re actually in the studio getting notes from your professor or something like that.” He pointed out that the iPad works well in this situation because “you do not have to wait for paint to dry” as you would in an actual art class.

Dominic said the art faculty members “have an interest in the total design of an art project, not just the end result. So being able to use the technology to capture different stages of a project allows for the incorporation of reflection.” In this case, he explained, the journaling or reflection portion of the assignment allowed faculty members to provide more “input which then allows for a work to be recreated or to be modified. So, we’re taking people through that experiential learning process that’s facilitated through or with technology in mind.”

Dominic credited the faculty members interested in mobile learning with a growth mind set, citing the work of Stanford psychologist Carol Dweck (2006). Mindsets come in two flavors, fixed and growth, as he explained:

The growth mindset is “oh I can learn from this experience” and they [faculty members] do and they grow. And then there’s sort of the fixed mindset where [faculty members say] I’m not really good at it and I’ll never be good at it, or you know, I’m just super smart and this is the only thing I do.

He believed that at least 90% of the people he works with have a growth mindset and they “do fall in every category of part time, non-tenure track, tenure-track, tenured,” young, and more senior faculty members as well.

Frameworks or Models Informing Mobile Learning

To guide the counsel he offered instructors, Dominic drew from several books: *The Art of Changing the Brain* (Zull, 2002), *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses* (Fink, 2003), as well as models of experiential learning and Bloom’s (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) taxonomy. He explained that he would draw from these books and models whether he was supporting someone implementing mobile learning or someone who wanted to improve her classroom teaching.

He also employed instructional design questions to inform the framework he used to advise faculty about their teaching. He said,

We start back at, what are the learning outcomes you need to accomplish and then we work from there. . . . And now what do we do? How do they [students] demonstrate that they understand this concept of supply and demand, or demonstrate x, y, or z? In this environment, you have these tools. You can build a Wiki or they [students] can contribute to a discussion. . . . That’s just learning practice. I would say the same thing to a person who wants to work on their face-to-face classroom. Let’s packet this a little bit. You have about 7 to 10 minutes of attention, then what are we going to do? How do they reflect on what they’ve done?

His line of questioning, founded in instructional design principles, presented a more experiential position on advising faculty members, one where the instructional strategies and outcomes required experiences or creating something. Dominic summed, “So, we’re taking people through that experiential learning process that’s facilitated through or with technology in mind.”

Obstacles to Mobile Learning

Web-enabled devices in the classroom present one of several challenges to the use of mobile learning. Dominic explained that many among the faculty at his university did not want Web-enabled devices in their classroom for fear of disruptions and dishonesty. Besides a concern for dishonesty, he discussed challenges faced by faculty members using and implementing the university's learning management system: those with a "fixed" mindset, who said, "I can't do it, but somebody's forcing me to do it. I have to teach this distance learning course and I hate it and I don't want to do it." He further clarified this resistance in the context of faculty members learning to use and integrate technology tools:

If faculty want to do it, faculty would embrace this if they could. If this was the only thing they had to embrace, they'd be all over it. But the reality of a research institution with faculty members and teaching faculty, [this] change is not helpful. Change is not something we want to do because we have so many other things to do. You know if it was to learn the technology and become really proficient in technology, that means I have to drop a couple of my office hours. Or does that mean I can't take the extra time to follow up with those couple of students. Or . . . is this going to take away from my research time? . . . Why would I need to take the extra time to re-tool my entire stinking course if it's a technology that's going to change in two years? And that's the burn.

Dominic indicated that faculty members became frustrated with changing systems and evolving devices, which necessitated re-working their course content to accommodate the new learning management system. This did not imply faculty members were unwilling to learn new ways technology could support learning, but their time was at a premium. They wanted to know what they could relinquish to make time for learning new tools.

He observed that while faculty members might not have time to effectively implement mobile devices in their teaching, those who had a mobile device carried it

with them in a routine manner, which might encourage its use as a teaching tool. He quickly added, “People aren’t necessarily finding that golden apple of learning to be within a handheld device or mobile device.” In other words, the mobile device is not the panacea for poor learning outcomes.

Visual Representation of Mobile Learning

Dominic’s view of mobile learning placed the individual (self) at the center of a concentric circular model, or as he clarified, “a traditional ecological model.” In his model (see Figure 8), he portrayed mobile learning as kinetic, moving within one’s circle of experience, thus categorizing what happened by which ring an individual was in. The “self” is surrounded by the course, community, and the world. He theorized, “Mobile learning and mobile devices perforate those rings allowing experiences, reflection, hypothesis generation, and active testing to happen in each ring and between rings. This raises the level of engagement and deep learning-- all mediated/facilitated by ML.”

In this model, there was no mention of the instructor or the learner directly. However, one could assume that either role was represented by “self,” in which case his perception of mobile learning transcended a teacher centric approach, the walls of the classroom, and the boundaries of a university. Dominic’s model depicted the interrelationships and larger experiential influence mobile learning could have on individuals, their local communities, and the global community. The model offered a macro view of how mobile learning is devoid of time and place encumbrances, unobstructed, and seamless.



Figure 8. Dominic's expansive view of mobile learning.

Steve

It's really learning on the go or accessing resources on the go and the devices we tend to have more of on our campus are phones.

Working at a public, suburban-serving community college of approximately 9,800 full and part-time students, Steve, age range of 46-55 years, is an instructional designer who supports faculty but not from a formal faculty development center. As he explained it, "I do outreach and form faculty learning communities" under the Academic Affairs department at this north-central community college. He spends a majority of his time assisting faculty members in making enhancements to their courses grounded in adult learning theory. He referred to his work as "faculty development with some instructional design on the side." Steve's faculty development initiatives include supporting faculty with course development, faculty mentoring, recruiting, writing policy, as well as implementing a course quality program across the campus.

Instructors find Steve facilitating faculty brown bag lunches and small group training sessions in his office when they need help. They also find answers to their questions on an Intranet site Steve established that offers resources for designing classes and creating effective course assessments. This site also has an announcement feature and events calendar keeping faculty up-to-date regarding training sessions either he or the technology team was offering. He added, “I also work closely with the Deans, so when the Deans hire people, they’ll recommend that they meet with me or send a cc email, saying hey, I just hired this person,” which alerted Steve to contact new hires and offer assistance.

Steve pointed out he did not handle issues such as password resets, students’ technical problems, virtual classrooms, or specific questions about the learning management system. Instead, he supported faculty from a pedagogical perspective, noting the college’s information technology (IT) group addressed how to use a feature or reset a password. Instead, Steve asked questions grounded in instructional design such as “show me how that aligns with your course objectives” when faculty members inquired about a specific technology or instructional strategy.

Mobile Learning Defined

When asked how he defined mobile learning, Steve replied, “Mobile learning in one perspective is kind of learning on the go,” whether accessing content and information by phone or tablet computer. While he believed mobile learning has a place in higher education, he cautioned about a fundamental gap in instructors’ ability to teach effectively without mobile technology.

Mobile learning has a place, but the gaps that I see are really in college faculty having a strong pedagogy background and understanding the educational process.

It's great to add more bells and whistles . . . but what I see is that a huge amount of higher ed people have no educational background other than self-taught. . . . So sometimes people want to add bells and whistles when their course isn't even congruent between the lesson objectives and the [course] activities, or it is not a very student-centered course.

Steve elaborated further saying that at his community college, if instructors were to add mobile learning “on top of a not so good course,” it would make no sense and therefore, is not where the support focus should be. “We have a huge knowledge and practice gaps in pedagogy and applying pedagogy to the college classroom,” he explained. Because of these gaps and lack of sound classroom pedagogy, Steve believed “to talk about mobile learning, it's a very premature conversation in most of the instances on our campus.”

Mobile Learning Experiences

Steve learned how to use a tablet computer by “downloading apps to play with”, experimenting with access “to different systems on our campus.” He admitted to no formal mobile learning experiences. He did mention the availability of a tablet computing cart (iPads) that faculty members had access to for use in their classrooms. He pointed out faculty used the tablet computers for student response systems (clickers) as well as polling (surveys) for student opinions and input.

Steve also mentioned video conferencing--a few instructors have office hours in the form of a video conference and text messaging from mobile phones for reminding students when an assignment is due. Referred to as self-starters who generally work autonomously, Steve talked about instructors who use a tablet in their classroom to be more efficient: “They use them for attendance; they use them to make their job easier, versus student-centric uses.”

Students are also using their phones to make their learning more accessible. He cited the example of students who “take a picture of their computer screen if they can’t understand how to do something. They’ll send that to the faculty member and say this is what it looks like, but I can’t figure out how to take this to the next step.” He also mentioned that students are recording labs and dissections with their smartphones for playback at a later time.

More recently, Steve began considering the use of social media as an effective way to communicate succinctly with students, which offers a communication channel that does not require an expensive smartphone or tablet computer. He believed sending a 140-character message was more efficient than opening up the LMS and four or five clicks later sending out an email to students. He clarified, “You know, it’s much more immediate... There are technologies that are still fast enough, free enough and simple enough... to push information.”

Who is Driving Mobile Learning?

Steve believed “individual instructors’ passion around their subject and technology” and “how technology can enhance student access to their subject” to be current drivers of mobile learning interest. He added, “Some faculty are driven by the knowledge of the current job market... There’s some pretty hands-on folks who say you have got to be able to do this stuff” in reference to using mobile devices in college since that knowledge will be expected of students in the work place.

Although his experience with faculty regarding mobile learning was limited, Steve observed a variety of faculty members using mobile tools: “A few of them are younger, tenured, so maybe fourth year or fifth year faculty. I would say 30-something...

They are big consumers of technology.” By Steve’s account, two things have the potential to drive mobile learning

We are attracting a pool of job applicants who bring more sophisticated teaching/online/blended hybrid courses to the college. It is my belief that they will be our early adopters of more mobile tools. Second, our student services side of the house has prioritized the development of mobile access for student services like applications, financial aid, library etc. I believe this will end up in more sophisticated users at the classroom end.

Frameworks or Models Informing Mobile Learning

Steve firmly believes andragogy should underlie any mobile learning consideration and implementation. At the community college, he saw many nontraditional, adult students who were self-directed, autonomous, and mature learners. This population has access to mobile devices, and he has advocated for consideration of their specific needs when contemplating mobile learning. Secondly, Steve believes this demographic should be able to use mobile devices in a creative manner, one that does not tie the mobile device to the learning management system. He elaborated:

The learning management system can be clunky. It’s kind of like the government to me. It’s a warehouse. We need something, and especially for the size of our system, mobile learning is that flexible, creative, thinking outside the box something. That’s why I likened it with andragogy from that standpoint.

Besides an andragogical framework, Steve spoke of the analyze, design, develop, implement, and evaluate or ADDIE process model as a fundamental framework to draw from for mobile learning. The ADDIE model and its accompanying line of questions present a tried and true process used by instructional designers and curriculum developers to guide and create effective courses and instructional materials. Steve used the ADDIE model to see how technology ideas from faculty aligned with their course objectives and assessment strategies.

Steve also discovered a Website that associated Bloom's taxonomy (1956) with various mobile device applications, which he thought provided a quick and non-overwhelming way to align objective(s) with an application that supported the objective. He provided an illustration suggesting students purchase a \$.99 flashcard application to help them remember specific content, much like hand written 3x5 cards were used for memorization of specific facts. He summarized, "Now with all of these apps aligned with Bloom's taxonomy, it's going to be easier both on the instructional design end and the student learning end" to find mobile applications that support student learning.

Challenges to Mobile Learning

Early in the interview, Steve pointed out how faculty members during their first few years on campus were overwhelmed by the amount of paperwork, systems, and deadlines to which they had to acclimate, leaving little time to think about innovative technology, especially with a heavy teaching load. Moreover, "When we talk about mobile . . . we're still very very very much into lecture." He also noted that online learning "is still suspect" in some areas of the college.

According to his observations, most of the teaching activities on campus were centered on lectures and tests, which "don't really lend themselves to other things, [such as] expanding and facilitating learning using mobile technology." He described the student population as "first generation college students and underrepresented college students" of "modest means" working full-time outside of college. Because Steve's college serves the underrepresented, faculty time was often concentrated on "training people at a community college how to be students," referring to non-course-specific time faculty spent helping students understand the behaviors necessary for success in college.

When asked about obstacles he foresaw regarding implementation of mobile learning, Steve again referenced how ill-equipped faculty members and instructors were when it came to understanding instructional design and using learner data to refine their instruction. He explained,

They are content experts; they are subject-matter experts... So, what we have is an overload of people who are ill-prepared for their job. Already we don't know about pedagogy and course design and now you're having me make data driven decisions about how I know people are learning in my class, and now by the way, let's add some technology on top of that. They revert to "I'm just going to post my PowerPoints and give the test."

He found it frustrating at times talking to instructors who had no grounding in pedagogy when mentioning mobile learning and using tablet computer applications. He pointed out, "They can't understand why they would go to that extra work to do that when it doesn't, [when] it's kind of this nebulous cloud thing for them."

Another challenge Steve discussed was the strong union system in place at his community college. He believed it to be an inhibitor to technology innovation and implementation because faculty support personnel could not tell union-member instructors what to teach or how to teach. He exclaimed, "So the pace of innovation has been impacted by, in my opinion, the union contract. [They] don't have to do anything because it's not in [their] contract." He clarified that often the union contract was used as a "block to innovation or when faculty members feel overwhelmed or fearful of change." Steve felt faculty members who did not understand "the foundational elements of the pedagogy and andragogy that underlie their instructional process" perceived suggested innovations to their instructional strategies as "just more work."

Visual Representation of Mobile Learning

Steve's vision of mobile learning was triangular-- the base of the triangle represented the firm foundation in pedagogy and andragogy he believed necessary "prior to adding mobile learning strategies to our campus options." The andragogical and pedagogical base supported subject matter expertise and curriculum development that need to be in place before implementing mobile learning tools. His model (see Figure 9) underpinned his observations about faculty members and instructors being proficient first in teaching and what necessitates good teaching practices before introducing mobile learning. Steve postulated, "We spend the majority of our time working in the lower sections of the triangle."

Interestingly in his model, there was no mention of the learner, reflecting a faculty centric view. This prompts the question if faculty members are still in the early stages of understanding effective andragogy and pedagogy, then when and how will they begin to understand and implement mobile learning, at the top of the pyramid? As Steve pointed out, "the majority of our faculty needs are NOT in any extravagant or highly technical tools. It is basic education 101; how to write objectives and align course objectives with content."

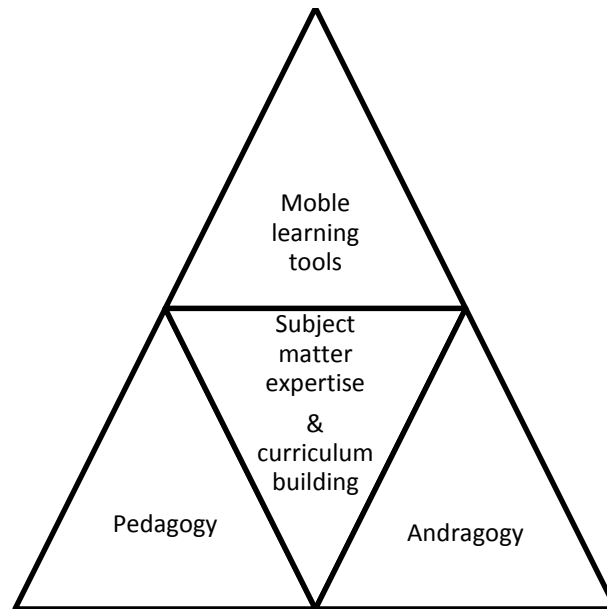


Figure 9. Steve’s vision of mobile learning on his community college campus.

Emily

We should be thinking more about how to do that--to truly guide their own learning with these devices.

Possessing a Master of Arts in Curriculum and Instruction, Emily, age range 36-45 years, supports faculty members in the Arts and Sciences College at a large, public university located in the Rocky Mountain region. She primarily supports undergraduate instructors who have questions about the learning management system as well as initiating pedagogical discussions with them regarding the integration of technology into their teaching practices. She admitted that faculty members usually sought her out for the “how do you do this” type of question, which she attempted to turn into a “why do you want to do this” question, followed by “what type of technology is available that might

help you accomplish this” question. These queries reflected Emily’s background and training as an educational technologist.

Emily, referring to herself as an educational technologist or instructional designer, uses outreach and community building with various departments to alert faculty about the support available to them. Outreach consisted of her attending departmental meetings to explain the various offerings her teaching and learning team offered: seminars, workshops, and university-sponsored grants for technology integration initiatives.

Mobile Learning Defined

When asked to define mobile learning, Emily explained that she saw mobile learning as students using “something they carry around with them to guide their learning” and something they use “in their learning process to get information and make connections online.” She added that while ruminating about a definition of mobile learning, cell phones and tablet computers (iPads) came to mind, as well as the emergent or “up and coming” nature of their use. She acknowledged that mobile devices were “not fully adopted yet and not fully developed.” According to Emily, mobile learning provides a way for students to guide and take control of their learning, and a way for them to network and make connections. She expressed that mobile learning needs to be about the device as a tool that “gets the exploration going with the student” and drives student curiosity.

Mobile Learning Experience

Emily does not have formal training or professional experience with mobile learning. Her experiences have been with her own personal use of mobile devices. She explained her experience:

I guess I should use my smartphone or iPad more to learn what kind of apps are out there that maybe I could do something with in the classroom. I saw kids that were middle school age, 5th grade, and 8th grade now, and I'm thinking about what they might use in their own learning. . . . what kinds of things that might be useful to them.

Emily said the university did not have a formal plan for integrating mobile devices in support of teaching and learning that she was aware of, hence her self-exploration. She discovered she was using her mobile devices at work to test out different applications, e.g., looking for ways students could use their mobile device in the university's student response (clicker) system.

Later, Emily mentioned a few faculty members "will come to us with an idea of something they want to do with mobile technology. I definitely think they are the outliers and the innovators. But they wanted to use their iPads." In this example, the faculty member wanted to use an iPad for projecting materials because the iPad was small and convenient. Another faculty member brainstormed an idea to use the iPad for audience interaction with her theatre class while they performed on stage.

Emily spoke of a small ad hoc group formed to explore their interests in mobile learning. She described them as getting together "to sort of try to get the momentum going towards mobile learning." But she added hastily, "I don't know that there's been any other real movement with that."

Without official university support, Emily thought independent projects might begin to include a mobile learning component. For example, when she worked with a department transition to the new learning management system, part of her work meant making sure the new LMS content would work on mobile devices. While she did not believe mobile devices needed to be tied to the LMS, she thought the learning

management system offered an entryway for using mobile devices for learning. She predicted, “So if they start seeing they can use the LMS on [the mobile device], they’ll think about other things they can do with it.”

Outside of Emily’s area, the information technology team announced mobile access to students’ course schedules and grades for the coming semester. The information technology department created “mobile-friendly” access to class schedules, book lists, and grades for student use and convenience. The class schedule information included the time, location, course instructor’s name, and used the mobile device’s location-based service functionality to map the student’s route to the classroom building by car, bike, or foot.

Who Is Driving Mobile Learning?

The rising popularity of mobile devices, along with the increasing ubiquity of wireless connections, is creating a momentum surrounding new handheld technologies. Due to these factors, Emily believed interest in mobile learning would most likely be driven by the consumer popularity of handheld devices. She sensed students would drive mobile learning, explaining nothing much would happen “until students are really requesting, we want to do this, we want to do that. I think that as students get more mobile devices, or smart devices they can afford, that’s what’s going to be really driving it.”

By her account, tablet computers appeared as “cool things” for students to have; with their increased visibility, interest in mobile learning should increase as well. Emily related, “I think that faculty are looking for ways to engage [students] and adapt to them,

so they know [students] are carrying these things around in their hands, maybe they should try [to adapt].”

As far as faculty interest in mobile learning, Emily observed that faculty members who asked questions about mobile devices for learning are individuals in her age range of 36-45 years, not tenured, and often called early career faculty. She pointed out the instructors interested in mobile learning were the “more senior instructor or instructor level--their primary function is teaching and they don’t have other pressures” in terms of service and research. She discerned that faculty members at the university were very interested in improving their scholarship of teaching and learning but did so based on research, data driven evidence, and student feedback,. She speculated that because current research regarding the effectiveness of mobile learning in higher education is sparse, faculty might be hesitant to employ mobile devices in their teaching.

Frameworks or Models Informing Mobile Learning

Emily paused briefly when asked about any models or frameworks she would consider when supporting of faculty requests for mobile learning. She responded, “No, I don’t think I’ve gotten that far in thinking about a framework. I think I might start thinking about that now. That’s a great question.” She continued by saying perhaps she should look at a specific framework, but currently “it is challenging enough to get faculty to clearly align learning goals with class activities and exams.”

Challenges to Mobile Learning

A primary concern Emily discussed relative to mobile learning on campus was the personal economic conditions of students who could be asked to procure technology for use in their coursework. She explained:

If you're going to do an iPad initiative, then find a way to supply them. For everyone. I spoke with one faculty member, she wanted her students to do videos, create videos in the classroom, but she really worried about two or three students in her class she knew wouldn't have access to any kind of video recording equipment.

She believed the same situation would apply to mobile or handheld devices; not all students would be able to afford the device and data plan that might be necessary for a mobile learning activity. Emily believed instructors were concerned about introducing mobile devices into their courses because of the inequalities it might engender. "Faculty are very afraid to try it because they know not everybody's got [a mobile device] and you're definitely leaving out a population that can't afford it," she lamented.

Emily also discussed how some faculty members were concerned about laptop use in the classroom; she was fearful students would not pay attention. She thought this could carry over to the use of a mobile device in the classroom. She asserted that faculty members believed if they "encouraged students to use mobile devices in their class, students would do other things than what they should be doing while in class, . . . whether it be a laptop, a cell phone, or an iPad."

Last, when asked specifically what she thought constrained faculty members from using mobile devices, Emily replied that some faculty members perceived themselves as too old to learn new technology and were uneasy integrating it into their courses. "When I think about it, definitely we have people who say 'oh I'm old, I don't know about this stuff' or 'you know I'm not good at technology it's too hard to learn that'." However, she injected optimistically,

The challenges with helping the faculty, [is helping them] see the benefits of [mobile learning].... We are trying to remain open to meeting the faculty member where he or she is with adoption of technology so they can gain comfort on their own terms.

Visual Representation of Mobile Learning

In the shape of a Venn diagram, Emily included textual details in her mobile learning model. Both the instructor and the student were front and center of her model and equally represented. Her details included consideration of attitudes such as “afraid of risk” on the part of faculty members and “don’t know as much technology as faculty think” on the part of students. Her model (see Figure 10) reflects the attitudes students and teachers have toward mobile learning and technology as opposed to pedagogical considerations. She illuminated about her model:

I have two circles listed to the outside of each circle for faculty and students, to represent that a few people in these groups have access to mobile technologies, know a little about them, but have not really ventured to use them for learning in the traditional classroom. ... I think that people who do have these available may use them for teaching and learning on their own, but not particularly in a teacher/student typical role.

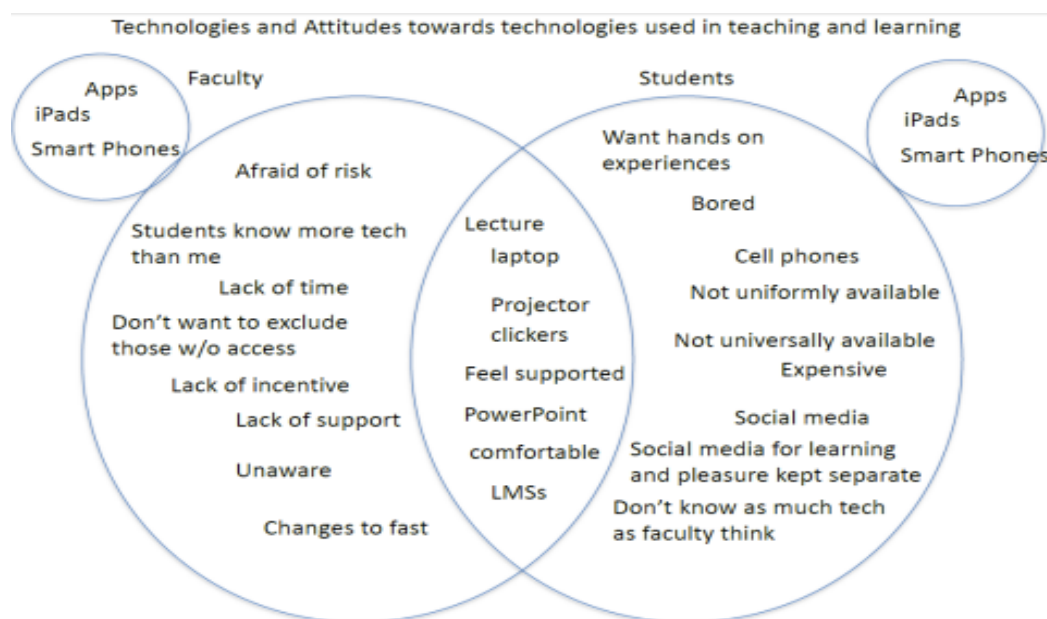


Figure 10. Emily’s model representing the attitudes of faculty members and students toward technology.

Neither the pedagogical aspect of teaching with technology nor the context (learning environment) for using mobile devices were presented in this model. The model did highlight instructor and student concerns about the affordability, accessibility and support necessary for mobile learning, and other challenges such as faculty members' lack of time and incentive. Emily concluded, "They may use them [mobile devices] to support their traditional roles but have not yet fully integrated them in the educational setting."

Mike

I don't really give it special treatment. So to me it's just like another tool that we can use in the classroom.

Mike, age range 36 to 45 years, is a technology and distance education director for a large university's College of Education, where he considers himself an instructional designer. He completed his bachelor's degree in communication studies, earned his M.Ed. in instructional technology from his current employer, and has completed doctoral coursework in educational psychology. Mike oversees a small staff as well as an instructional resource center, which encompasses all technology support for the College of Education. In addition, his distance education responsibilities include support for the university's learning management system as well as a variety of video conferencing tools. He is also responsible for training faculty on how to use distance learning technologies and supports their online course development efforts.

With almost six years of full-time experience doing instructional design and faculty development work, instructors seek out Mike and his team either by walking in, scheduling a time to meet, or emailing them a question. He explained, "We try to provide, I don't want to call them clinics, but sort of hands on workshops where faculty

can actually gain some knowledge and then...actually build their courses while they're learning." He viewed his job as having two sides: a technical side and a pedagogical side.

Mike carries out his responsibilities at a public, Mid-western university with an extensive-campus system, among the largest regional systems in the country. His university demonstrates high-research activity according to the Carnegie Foundation (2010). As of fall 2011, they had approximately 27,000 students on their main campus. Because the university is large and dispersed, Mike keeps abreast of other campus technology support efforts by participating in the University's Council of Technology that meets once a month. During those meetings, participants "basically vet ideas and concerns that [they] have about all facets of technology across campus." While he noted campus-wide faculty development efforts were spread out and complex, an internal list-serve helped him, as well as his counterparts in other departments across the campus, keep current with technology issues as they arise. He also maintains close contact with the university's distance learning center.

Mobile Learning Defined

Mike explained his idea of mobile learning by stating it offers a different medium to support distance learning. "Mobile devices can remove many of the constraints of traditional educational settings; learning can happen wherever and whenever," he said. He posited that mobile learning provisions a more learner-centric approach to teaching because "learning moves with the learner," noting that smart devices can provide context not previously experienced. He further described mobile learning as "any technology that I use...that is portable, handheld, a little larger than handheld, and maybe uses multiple operating systems or multiple ways to interact."

He clarified his definition, stating that personal response systems such as clickers could also be considered mobile devices along with handheld devices such as tablet computers, smartphones, and laptops. On campus, Mike saw more tablet computer and netbook type of devices than actual laptops; however, he explained that laptops were still prevalent in the form of the newer and lighter laptops. He observed, “I’m seeing much more smaller devices. Less of the big laptops like I used to. And what I mean by that is those big, honking, you know, 20 lb. laptops.”

Mobile Learning Experience

Mike is primarily a personal consumer of mobile technologies, which informs his on-campus experiences with mobile learning.

I’ve owned several laptops over the years, both as a student and then as a worker at [his university]. I’ve had an iPhone in my possession since the beginning when they came out. I’ve always had an iPhone as my mobile device to talk on since I think 2007. I’ve had an iPad for work for about a year so.

His experience with mobile devices involved both training faculty members how to use the device in a classroom setting as well as his own experiences teaching with a mobile device. His mobile device usage entailed searching the Web for information from his iPhone, sending and receiving emails and text messages, and response systems (clickers). He has used his tablet computer (iPad) for taking notes with a popular note taking application:

So I take notes, I don’t do a lot of composing on here. I do use it for email, I do use it to look up information via the Web. As you can see video conferencing, with Skype and Facetime. I can also access our [LMS] both as a student, an instructor and an administrator because there’s an app for that which you can actually download.

Mike explained that his College had one iPad cart available for faculty to borrow. The cart comes stocked with iPads for instructors to use with students in their classrooms.

Students use these loaner iPads for the duration of class and then return them to the instructor. He acknowledged that using the iPad cart in this manner was open to the instructor's ideas for sourcing mobile technology. He added that activities conducted in the classroom with the tablet computer "would typically be an activity that they could do in a computer lab, but it could be more extensive. They could send the student to take a picture of something and then like journal about it." He pointed out that not much was happening with the new loaner-tablet computer cart, remarking that he and his team were in the beginning stages of circulating mobile technology among instructors. Most of the time, he observed the loaner iPads being used in the classroom as a replacement for a computer lab. He concluded by saying people have told him, "You know Mike, I bought an iPad and I don't really use it. It kind of sits around."

Piece-Mealed Efforts

Because there is no centralized mobile learning center or initiative, Mike believes campus mobile learning efforts are "piece-mealed. We as an institution need to address mobile learning, but we don't have a guiding light for that yet.... We don't have a mobile learning center.... The Colleges kind of do their own thing," he explained. Because his College was only beginning to consider mobile learning, there were no new or innovative implementations of mobile devices. Mike acknowledged that the "primary motivator [to use the tablets] is that [instructors] are not scheduled into a computer lab because computer labs are scarce"; therefore, "if you're in another classroom and you don't have computers, iPad's are next best thing," referring to the tablet computer cart with the loaner iPads for classroom use. He cited how this reflected more of a practical orientation toward the use of mobile devices than a pedagogical one. Although later, he

admitted that he tries to “inject a pedagogical piece” when working with faculty members.

Who Is Considering Mobile Learning?

When asked about faculty members on campus interested in using mobile learning, Mike explained that it appeared to be a mixture of individuals. “I have full time folks who are tenure track who are doing it. I have adjuncts who are doing it. It just depends on, there’s really no, I guess there’s no one type of person.” He elaborated by saying that a faculty member’s use of mobile devices was most likely contingent upon their comfort level with the technology: “I can think of now, 10 people who I know would be fine using it. But then I can think of 10 who would really struggle, or who would not see the value of it. They would say ‘why are we going to use this? I can just use a chalkboard’.” He noted a tension among those who might be prepared to try mobile learning and those who were more comfortable with the status quo.

Frameworks or Models Informing Mobile Learning

Because the use of mobile devices for teaching and learning on campus was in its infancy, Mike believed it was too early for consideration of a framework or model to inform his support of mobile learning. However, he disclosed that when instructors are in a faculty development session, he tries to infuse sound pedagogy and instructional design principles into their technology implementation ideas, drawing from his instructional design background:

I always inject a pedagogical piece because that’s my background; I’m always saying ‘well, you can use a clicker, anybody can use a clicker. But what do you want to do with a clicker? Do you want to give a test? Do you want to prompt students for information?’

His line of questioning about the implementation of technology reflected his belief that using mobile devices is not about the device itself but about using the device in such a manner that learning is supported through engaging, planned, and purposeful activities.

Challenges to Mobile Learning

Similar to his comment about faculty who consider the chalkboard to be as efficient as any other classroom communication device, Mike talked about faculty members and instructors who did not see the need for mobile learning and were resistant to change. “Many instructors are leery of mobile learning technologies because they fear a loss of control,” he claimed. He added, “I think a lot of the onus is going to be on the instructor to provide a meaningful learning experience with the technology.”

He also revealed his concern that students might walk off with the loaner tablet computers, which would cost his department money. “If I let [the iPad] get checked out into the wild and three or four don’t come back, I’ve just lost \$1,400 for my department.” Therefore, his immediate challenge was about buying and maintaining multiple iPad carts and keeping the devices secure.

Visual Representation of Mobile Learning

Mike’s model (see Figure 11) of mobile learning took the form of an outer triangle surrounding an inner triangle composed of the learner, the teacher, and information. While the learner was in the inner triangle, it was positioned at the top of the triangle, indicating a hierarchy and a more important role: the role of teacher and information were underneath in a supportive capacity. By his account, he viewed “three key entities interacting: Learners, Teachers, and Information. The small bubbles or

circles that float between the three entities represent the space between learner, teacher, and info and *this* is where Mobile Learning happens.”

The outer bounds of the triangle represent elements perceived as peripheral to the learner and teacher but elements that influence the quality and mobility of learning. Mike explicated, “The external part of the model, Pedagogy (foundation) sits at the base while Mobile Devices (means) and The Cloud (digital networks) provide structure and space for Mobile Learning to happen.” Interestingly, there was no mention of network connectivity. Perhaps this meant the availability of a network connection (cellular or WiFi) was assumed and so ubiquitous as to be transparent to both the teacher and the learner.

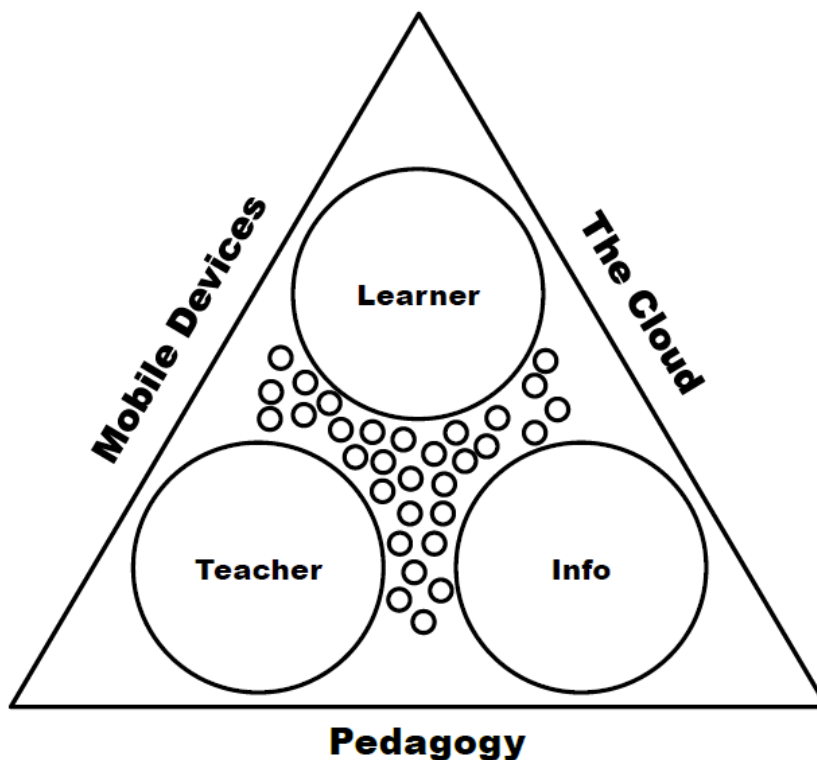


Figure 11. Mike's model of mobile learning.

Sam

What might you do differently in your teaching with the fact that this device is mobile, can be moved around the room, can be moved outside the room?

Sam, age range 36-45 years, possesses an undergraduate degree in elementary education and earned his Master of Science degree in Instructional Technology after he decided he did not want to be a classroom teacher. At the core, he considers himself an instructional designer and manages other instructional consultants at a public metropolitan research university in the northwest. His workplace is considered a doctoral/professional dominant university with a very high undergraduate enrollment (The Carnegie Foundation, 2010) and a student population of approximately 19, 700.

He described his responsibilities as “a mix of both instructional design practice and instructional design consulting and faculty development.” He summed up his role by stating he was responsible for finding out what instructors needed, their goals, and then exploring whether or not “the affordances of a mobile device bring something that is better than more traditional technologies” to their teaching practice. Sam believed in being proactive in his faculty support efforts and understanding how his team could better meet the needs of faculty.

When it comes to mobile learning, Sam’s situation is unique; the university has launched an administration-supported, mobile learning initiative campus-wide. Out of the nine participants in this study, Sam’s case is the most unique, departing from the general experiences and mobile learning climate expressed by the other eight individuals in this study. Not only were mobile learning and teaching with technology initiatives being supported in an overt and top-down manner, but his team and others also received

funding to procure mobile devices for various faculty members as well as loaner devices for students.

At least the last two state of the university addresses that the President has given, he has hit heavily that we need to be better at and more involved in innovating with technology and teaching. [Our] mobile learning initiative actually came out of a task force that the President put together of people [investigating] what [we] should be doing to further the use of teaching and learning with technology.

This effort was designed to explore the implications of a mobile student-learning environment on effective teaching and learning practices. As the university's Web site informed,

What are the opportunities and the challenges for teaching and learning when teachers and students possess tools that allow for rapid access to information and the ability to connect to a course nearly anytime and anywhere? ...To what extent does this environment allow instructors to move from providing information to fostering growth in students' information literacy and higher-order thinking skills?

The university also established a mobile learning scholars program that supported faculty exploration of questions related to teaching and learning in an anytime, anywhere, information-rich learning environment. This was Sam's world and divergent case environment.

Mobile Learning Defined

When asked about his definition of mobile learning, Sam described it as being "learning that occurs using a tablet or smart phone," which he explained possess characteristics uniquely different from laptops: the device boots up more quickly, has no "lid" needing to be flipped opened, and can be efficiently used for "short bursts of activity." He observed that the convenience and the handheld nature of the mobile device made it more conducive to spontaneous learning and information seeking: "I might act on some ideas in the moment and improve my learning in some kind of, you know, just in

time acting on thoughts or new insights gained or something that I couldn't do if I was using another kind of device."

Sam commented further saying he is trying to move faculty toward a view of mobile learning that takes "advantage of the inherent capabilities within smart phone devices to do things that you couldn't do if you were teaching in a computer lab." He believed students would be more inclined to act in the moment: "just-in-time acting on thoughts or new insights gained or something that [they] couldn't do if [they were] using another kind of device." He envisioned students working in a classroom, tablet computers in hand, and moving around showing each other what they were doing, collaborating in small groups, while noting this could not happen in a computer lab.

Outside of a classroom environment, Sam discussed students engaging in place-based quizzes and other context rich activities:

Where the students actually have to be in a location to answer the question being asked or scavenger hunt kind of things where they're gathering information of various types, whether that be visual information through capturing photos, whether that be you know, gathering data into a spreadsheet that they're going to analyze.

He lamented that faculty initially considered using the tablet computer as a replacement for a desktop or laptop computer, using the tablet computer as "a poor man's computer lab where they're looking at information on the Internet or looking at Google Earth or things like that." Sam did not discount those activities, but he noted they did not optimize the devices' mobility. His point was he wanted faculty members to consider "what might [they] do differently in [their] teaching with the fact that this device is mobile, can be moved around the room, and can be moved outside the room?"

Mobile Learning Experiences

Sam explained that he has owned a tablet computer (iPad) for over two years and has used the device for his own professional development and personal benefit. He provided details and outlined the university initiative regarding mobile learning when asked about his mobile learning experiences.

Mostly I have gained my experience by working with our faculty cohorts in mobile learning. So we have a program that we've been doing since, it's been a little more than a year, called Mobile Learning Scholars, and in the Mobile Learning Scholars program, faculty apply to teach a course where every student in the course is equipped with a mobile device.

His team worked with faculty members as they implemented mobile learning strategies in their courses, followed by write-ups from the faculty detailing their experiences. These write-ups were then shared with others. Sam explained, "A lot of my experience is coming [from] working with them, seeing what they're finding useful, less useful, what works, and what doesn't."

New to the university, an entire master's program in applied historical research required tablet computers (iPads only) of its students. In this program, faculty members, working as a team according to Sam, began "to think about how what goes on in one course might influence what goes on in another with regard to the mobile learning that's used." Sam saw this approach as more integrative than one by other faculty members. As a pilot project, Sam and other stakeholders believed limiting the mobile device requirement to a tablet computer (iPad) made sense because it eliminated faculty members needing to insure a particular application was available across different operating systems.

Ultimately the vision for [the university] would be if this became something that we really adopted campus wide, on a larger scale, I think the desire would be to

do [so] in some way that's platform agnostic. Right now as a pilot, as a learning exercise, we've intentionally gone with a single device.

Faculty Using Mobile Devices

According to Sam, faculty from all different ages, length of service, and disciplines sought help with mobile learning. "I would say in fairly equal mix, the adjuncts are participating along with their, you know full time colleagues." He noted that mid-career faculty are "comfortable enough in their careers that they are willing to get out and explore, but are still kind of, ...young enough for the devices to feel more comfortable to them." Sam observed that many faculty members have purchased tablet computers (iPad's) for their personal use and as a result are thinking about how to use the device in their teaching practice. He also noted that some of the tablet computers on campus were provided by the faculty member's department as well as through the Mobile Learning Scholars program.

One innovative activity that a construction management professor implemented was a scavenger hunt done outside where students were tasked with identifying construction methods and materials from various building projects around town. As Sam explained, "So they actually had to go out and take photos of buildings, pieces of buildings and things where they were identifying materials [and] methods of construction." The professor included a project requirement where students needed to place a small object representing the university in every photograph because she did not want students downloading the photos from Internet.

Other examples of mobile learning Sam cited were audio and video recordings by pre-service teachers during their professional year in a public school. In this example,

pre-service teachers recorded conversations with supervisory personnel, video and audio taped themselves teaching, and recorded their reflections in real-time. He elaborated,

They would do little blog entries from the field where they were able to reflect more in real time about how their teaching experiences were going, as opposed... [to remembering] for later and document[ing] it when they got back to a computer.

More recently, Sam assisted faculty members preparing to use mobile devices in their fall semester courses. For example, “an instructor wanted his students to be able take video and photos from a field experience and integrate them with writing in some way.” According to Sam, he and the instructor discussed a variety of ways to accomplish this, keeping in mind technical considerations (Internet access) as well as pedagogical considerations (reflective journaling). The result was having students build an e-book from a downloaded application that allowed students to journal their experience, incorporate videos and images, and work independently of a wireless connection.

Interestingly, various faculty members at Sam’s university were initially offered tablet computers for experimentation and investigation in an *unstructured manner*. As he described it, this meant specifically not launching a project with goals and measurements in place, but rather “If we stick them in the faculty’s hands...and let them sort of start using them and capturing some of the vision, then maybe they’ll incorporate some mobile learning strategies into their teaching.”

Pedagogy Versus Skills Tension

Because mobile learning was beginning to take hold at the university, Sam became aware of what he labeled a “tension” between faculty learning how to use mobile devices and mobile applications with effective pedagogical practices. By his account, “They don’t discount the pedagogy, but I sense that there’s a certain tension sometimes

between our desire to make sure they really understand the effective pedagogy of their device and their desire to develop tool skills.” He illustrated this point with an example of how faculty members or students might want something that does not align with best practices or current theories or “the desires of faculty and students are different from the strategic priorities as outlined by University administration.”

According to Sam, faculty appreciated and valued effective course design and pedagogical considerations, but they appeared most interested in learning how to use the device along with various applications. “At times they kind of go, ‘yeah yeah, I’ve heard that in other contexts, let’s get down to brass tacks and show me where, what buttons to push and what to do to’,” he explained. Sam believed faculty wanted more workshops focused on the “how to” of mobile devices and applications rather than complementing skills knowledge with sound pedagogy. He was quick to add that many of the early mobile learning adopters had extensive exposure in pedagogical practices from other workshops offered through the center for teaching and learning.

So if there’s ever any tension, it’s really between us wanting to make sure that they’re [faculty] well-equipped to think about effective pedagogy at the same time as they’re thinking about technology, and their sense that they’ve already understood effective pedagogy and they just want to move on to technology. And sometimes they’re right and sometimes they’re not right, you know, in terms of assessing their own grasp on what the pedagogy can really, how the technology can be used with greatest pedagogical effectiveness.

Frameworks or Models Informing Mobile Learning

When asked about models or possible frameworks to guide how he supported faculty with mobile learning requests, Sam mentioned cohorts and how faculty members have come together to learn more about mobile learning as work-groups. Various groups

of faculty meet to discuss their successes and questions surrounding mobile learning and its support of student learning. Sam explained,

They were meeting every other week as a group, and talking about what's going well in their courses, what challenges are they facing, helping each other to . . . trouble shoot, not the technology necessarily, sometimes that, but more often a kind of pedagogical trouble shooting. Well, have you tried doing it this way? And thinking about, you know, alternative approaches to achieving the goals . . . and getting feedback about what is going on.

When prompted for more specifics about a framework informing his guidance and counsel, Sam responded he was not using or referencing any model or framework culled from the literature. He said, "We probably should, but haven't done a lot of reviews of formal frameworks and literature for mobile learning." However, he spoke passionately about his guiding principle when talking to faculty about mobile learning--to help them envision what they can do with the device because it is a computer "that has the characteristics of instant on, high mobility, you know connectivity from wherever [you are]."

Related to his involvement with mobile learning, Sam spoke of digital fluency. According to Sam, digital fluency represents a core skill and proficiency that all students should have when they leave the university. As he described it, digital fluency is related to information literacy--students know how to sort through information and know how to discern information worthy of their attention. "What's valid information, how do I use that information? So that's what I mean by information literacy. And digital literacy goes further than that," he explained. He believes mobile learning and mobile devices are part of digital fluency:

Part of digital fluency encompasses the ability to recognize, oh this is kind of like that and I can extrapolate from the experience I've already had with one digital tool to perhaps learn how to use or solve a problem with another digital tool. This

looks familiar to me; translate that experience.... Other parts are obviously a basic understanding of intellectual property and the ability to recognize appropriate use of other people's work.

Part of mobile learning's framework I guess, is to say how can the use of mobile technologies help students develop skills in digital fluency that they can use not only in mobile technologies but in any sort of digital instructional interaction.

Challenges to Mobile Learning

Faculty work hard to prepare their courses and related activities, and they are often hesitant to rework their courses once a course has become established. Sam perceived the introduction of mobile learning and mobile devices as a disruption, something that “completely flips [their] teaching on its head.” To accommodate mobile learning, faculty members must spend significant time redesigning their courses to integrate and accommodate mobile devices:

A faculty member who's redesigned their entire curriculum to use new strategies that they weren't using before, which are dependent on the mobile device, [they] expect to have a long term commitment to their ability to continue to use that redesigned curriculum and use those strategies. ... I want to know that I'm going to be able to do that for years, not say well I did it for two semesters as an m-learning scholar and now it's time to pass the baton to somebody else.

Sam continued by saying faculty members worry that they might have to go back to their former ways of doing things due to lack of continuing support for the rotating m-learning scholars program; thus, they would lose the time invested in integrating and adopting mobile learning into their courses. By his account, “They [faculty] want to continue to teach this same course over and over again with mobile devices.” Later, Sam clarified this tension by saying it is not about faculty fearing the loss of institutional support for m-learning but rather the loss of “individual support in the form of being able to continue to

count on every student in their class being loaned a mobile device” because those faculty members have rotated out of the m-learning scholars program.

Another obstacle Sam described involved network connectivity and requiring students to buy a data plan for their mobile device. As he explained, asking students to make a onetime purchase of a mobile device is one thing but expecting them to pay for a data plan, which has monthly reoccurring charges, is another matter. While network connectivity has improved on campus, Sam found coverage still spotty in some areas and even less predictable when students were off campus.

As Sam’s work with mobile learning progressed, he also discovered difficulties “getting faculty to ask for help with considering pedagogical approaches. They tend to focus on technical skills--how to use apps [applications], set up email on the devices, etc.” Consequently, Sam spent significant time helping faculty members learn how to upload videos and photos to Web sharing sites, to use Internet document sharing and collaboration sites, to transfer files from the mobile device to a computer, and to build an e-book using a mobile device application. Pointedly he said, “[There is an] instructor tendency to focus more on the operation of the technology than its effective pedagogical use.”

Visual Representation of Mobile Learning

Sam’s model (see Figure 12) for mobile learning depicted three central areas of concern: faculty and student needs, institutional priorities, and how best practices might inform both. Undergirding all of this was the university’s infrastructure. Sam clarified:

Decisions about infrastructure (networking, learning environment) are informed by the perceived needs of faculty and students and the strategic priorities of the

institution. To the degree that these things are in line with best practice, the infrastructure and environment will support best practices.

In addition, Sam placed the role of faculty development as a small hub surrounded by faculty and student needs, institutional priorities, and best practices, reflecting his view that faculty members need to be guided by best practices while acquiring the requisite skills to meet the needs of students and the institution.

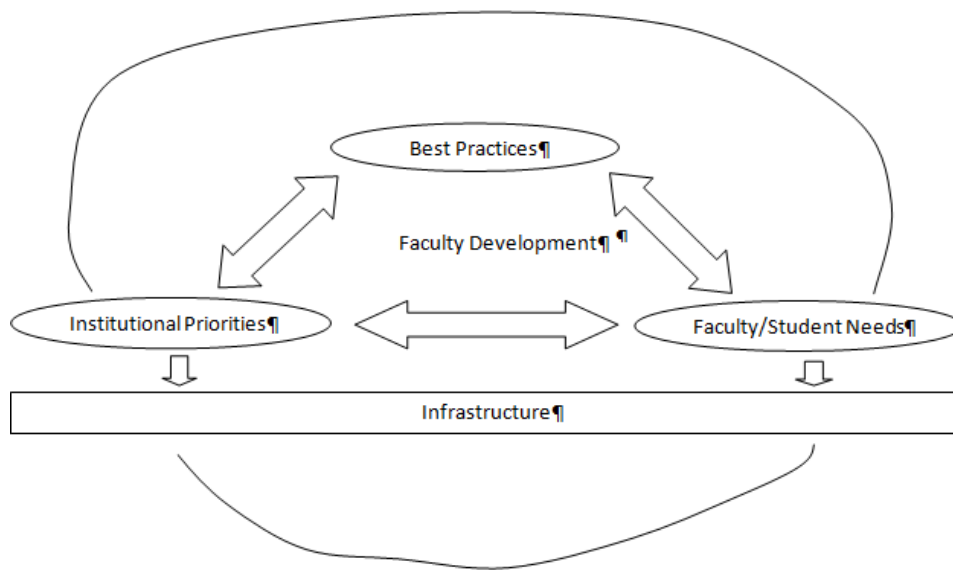


Figure 12. Sam's visual interpretation of mobile learning.

Offering a macro view that included the university's priorities and infrastructure, his model is inclusive of both the needs of the learner and the faculty member. Best practices subsume effective pedagogies grounded in learning theory and successful instructional strategies using mobile devices.

Summary

My intent with the preceding chapter was to illuminate the distinctive voices and experiences of the faculty developers and instructional designers who shared their stories with me in representation of mobile learning at their universities. Each of the individuals offered a distinctive viewpoint and set of experiences in their observations and perceptions about how mobile learning was unfolding on their campuses. Collectively, the participants' lived experiences were both disparate and congruent in many ways. Their back-stories provided the reader context from which to begin understanding and interpreting the study's findings.

Most participants revealed that mobile learning at their university was in its infancy and that their own experience supporting and guiding faculty with mobile learning endeavors was limited. However, this paucity of exposure and general lack of a specific framework or model to guide them did not deter participants from offering ideas, potential frameworks, or concept maps as vehicles for informing mobile learning endeavors. Nor did it dissuade them from discussing obstacles and challenges they encountered with technology innovation in higher education. Only one participant, Sam, presented a divergent set of experiences and exposure to mobile learning through his center for teaching and learning. His observations and encounters offered contrast to the narratives and experiences of the other participants.

In the next chapter, I illuminate the finding and themes identified through the interview process and mobile learning framework diagrams relative to my research questions and the mobile learning literature. Chapter VI presents the discussion and integrative interpretation of what I learned from this study.

CHAPTER V

THEMES AND FINDINGS

The purpose of this multi-case case study was to explore the activities, work, challenges, and perspectives of faculty developers and instructional designers as they strove to address requests for mobile learning implementation and support from university faculty and instructors. Each participant shared diverse and similar experiences and perceptions regarding mobile learning, providing a situational understanding of their encounters within a contemporary context and a snapshot of the goings-on at their universities and colleges relative to mobile learning. The perspectives and experiences with mobile learning as expressed through participant interviews and mobile learning model diagrams offered collective insights into how mobile learning was unfolding on their campuses and their way of thinking about mobile learning.

This chapter surveys the central themes that emerged from the data using the participant's own voices to address each of the research questions. Key findings for each of the research questions obtained from 18 interviews (two per participant) and nine visual representations of mobile learning are presented. An integrative interpretation of these findings is discussed in the next chapter.

The following research questions guided this study:

- Q1 How are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?

- Q1a What, if any, pedagogical approaches, conceptual frameworks, or models are they using when guiding faculty and addressing requests for mobile learning implementation and pedagogical support?
- Q1b What are the barriers and challenges instructional designers and faculty developers face when supporting and guiding faculty in their mobile learning endeavors?

Before presenting the salient themes in relation to my specific research questions, it is necessary to provide additional summative context for these themes. Summative context provides important descriptions and background knowledge necessary to fully appreciate the findings. It offers a way to understand two key variables embedded in the study: the definition of mobile learning and participant experiences with mobile learning. By providing summative context of these two variables, I hope to illuminate context specific forces that influenced participants' insights overall.

Establishing the thematic context of my findings includes a presentation of the central tenets emerging from the participants' perceptions, definitions of mobile learning, and their accounts detailing what was occurring on their campuses regarding the use of mobile devices to facilitate learning.

Participant Definitions of Mobile Learning

As expressed in the literature, pinning down a single definition and description of mobile learning is challenging and fraught with a variety of interpretations (Traxler, 2007; El-Hussein & Cronje, 2010). Is mobile learning about the device that accompanies learning? Is it about the learner constructing his or her own personal learning environments while on the move? Is m-learning about rich contextual experiences anchored in authenticity? Should mobile learning be defined by how learners consume, construct, contribute, collaborate, and communicate using handheld devices? These

questions, along with participant explanations and perceptions of mobile learning, emerged from the data in similar patterns as well as divergent views. What follows is a distillation of participant expressed views and definitions of mobile learning.

The most pervasive words, common across many of the participants' definitions of mobile learning, were *anytime and anywhere access to information*. As Alaina explained, "They [students] don't have to have their laptop, they don't have to be in a lab, they don't have to be in a classroom, but can pretty much access learning from anywhere and access learning in a variety of ways." Hannah and Anna echoed this view, but it was best summarized by Anna as "anywhere, anytime learning on a device that is mobile." Steve defined mobile learning as "it's really learning on the go or accessing resources on the go," while Mike noted, "Since mobile devices can remove many of the constraints of traditional educational settings, learning can happen wherever and whenever."

Mike also discussed how implementing mobile learning fostered the ability for students to interact in multiple ways and offered another tool to use in the classroom that supported learning. He explained, "We are at a place where using mobile technology can provide dynamic learning experiences that are truly learner-centered." Similarly Dominic said, "Mobile Learning is not device dependent or 'technology', it is how it is used" in reference to how the technology acts as a facilitator but is not an end unto itself. Like Mike, he believed the learner needed to be at the center of these activities, not the device used to conduct the activities.

Also emerging from the assorted explanations of mobile learning were three elements that explicated what the participants felt to be essential components of mobile learning: the ability to consume information or content, create content, and contribute to a

community (connect and share) or the 3Cs. Emily, when describing mobile learning, spoke about the ability of the learner to guide his or her own learning with the device while networking and making connections. Alaina talked about students “being able to use mobile learning to create connections, [and] create learning communities, either small or large.” Brent summed up the 3Cs (consume/create/contribute) best in his explanation:

My definition would involve the ability to consume and contribute information to a community without being tied to a physical location. We want them not only to consume information that the instructors are pushing out to them, but also be able to contribute back to a broader community, whether it’s the class as a whole, something specific to the institution, or even contributing to you know, the world wide community, the academic community.

Interestingly enough, several initial responses from participants defining mobile learning included mention of a device before any comment was made about the learner, instructor, or learning environment. This “device first” line of thinking supported Traxler’s (2007) observation that mobile learning definitions can have a technical focus, describing the technologies involved in mobile learning as opposed to definitions of mobile learning that offer a conceptualization of the terms *mobility of learning* from the “learner’s experience of learning with mobile devices” (p. 1). For example, several participants’ first words after being asked how they defined mobile learning were “Having a smartphone,” “learning that occurs using tablet or smartphone devices,” and, “mobile learning as any technology that I use or have access to that is portable, handheld.”

Without exception, the participants discussed smartphones and tablet computers as mobile devices, with some participants reporting a prevalence of smartphones over tablet computers on their campuses. Steve mentioned, “The devices that we tend to have more of on our campus would be phones,” while Brent explained,

I think that mobile learning at [ABC University] is mostly involving smartphones at this point. I think that the percentage of students on our campus that have smartphones is astronomical. You know, 80, 85, 90 percent of students have some type of smartphone. Whereas tablets really still haven't picked up yet as much on campus as smartphones have.

Mike and Anna included laptops in their definitions of mobile learning. Mike explained how he was seeing less of the heavier models of laptops, while Aisha believed devices like a cell phone, tablet computer, and laptop should be part of mobile learning because they “allow the learner to access learning opportunities at any time in any place that they would like to.” The blurring of what devices should be included in a definition of mobile learning reflects the rapid evolution of portable handheld devices that support the mobility of the learner. As laptops become smaller and lighter, they are perceived to be as portable and convenient as tablet computers or smartphones, albeit missing a camera, location-based services, and a virtual “on-demand” keyboard.

Sam said his university was trying to remain platform agnostic when discussing mobile learning, similar to Emily's statement that “we really do try hard to use the current technology agnostic. ...We really don't want to push anybody into one particular technology.” Dominic believed that at his university, due its large size, it would be difficult to standardize on one type of mobile device. According to Johnson et al. (2012), globally, individuals are “growing accustomed to a model of browser-based software that is device independent” (p. 4).

These definitions and descriptions of mobile learning in some manner reflected the original definition of mobile learning used in this study. Mobile learning was defined as the mobility of the learner in tandem with the handheld mobile device (smartphones, iPhones, iPad, Personal Digital Assistants, MP3 players/iPod, tablet computers), a

wireless Internet connection, and the learner's ability to move fluidly across time and place with access to content, information, and discourse anytime and anywhere.

However as El-Hussein and Cronje (2010) discovered, ascribing one fixed definition to the term is difficult.

Antecedent Question: What Is Happening on Campus?

Another measure of the summative context for this study encompassed participant knowledge and experience with mobile learning. Therefore, before the primary research question was answered, an antecedent question emerged requiring attention: what is happening on your campus regarding mobile learning? The findings from this question provided a logical segue into the emergent themes surrounding the primary research question: how are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?

Eight of the nine participants in this study indicated "not much is happening" on campus regarding mobile learning. This "not much," according the majority of participants, represented how they were in the "beginning conversation stages" of mobile learning--not far along the path towards implementation or more frequent use of mobile learning. Mike stated, "It [mobile learning] is in the background. . . . It is not a priority."

More specifically, the majority of participants observed ad hoc, small informal group efforts for those interested in mobile learning. Brent clarified:

[We have] a mobile learning center on campus. It's technically what they're called, but it's more of an ad hoc group of people with common interests. Not a department. It's not an academic program. They do have a university website, but they're all faculty members in different departments and student employees they've hired who have an interest in mobile learning.

Mike also talked about mobile learning efforts at his university as being informal and lacking a specific endorsement or support from the administration: “We don’t have a guiding light for that yet. We support it to a degree, but we don’t have a mobile learning center. We don’t have anything of that nature yet. It’s sort of just piecemeal. The Colleges kind of do their own thing.”

Hannah believed her university to be in an early stage of development when it came to mobile learning. She claimed they were beginning to consider mobile learning and “getting a good understanding of how mobile learning, how it actually works, what we need to provide to faculty.” Emily posited, “It probably would be good if we had more of an organized initiative around it [mobile learning].” Contrary to the experiences of Emily, Anna, Brent, and Mike, early efforts at Hannah’s university had the support of the university’s administration, although she acknowledged these early efforts were about accessing LMS content via a mobile device.

The Divergent Case

According to Mays and Pope (1995), a deviant or divergent case is a case “in which the researcher’s explanatory scheme appears weak or is contradicted by the evidence” (p. 111). Seawright and Gerring (2008) defined a divergent case as a case that presents a “surprising value” and is “closely linked to the investigation of theoretical anomalies” (p. 302). Among the cases in this study, one such contradictory and surprise case emerged--a case that presented a departure from the other eight cases.

Sam’s experiences with mobile learning at his university were leading edge, innovative, and strongly supported by university leaders and administrators. His university had been encouraging the use of mobile learning through various initiatives for

the past several years and was continuing those efforts. Various groups meet on a regular basis to discuss mobile learning ideas, successes, and failures; they are supported by Sam, his team, and other departments on campus.

According to Sam, the formal initiative for mobile learning ranged from grants for faculty to procure tablet computers and applications, to help them decide on the most pedagogically sound way to use mobile learning in their courses, to a mobile learning Website. He depicted the mobile learning on campus as an effort to span the curriculum in support of one of the university's foundational student outcomes--digital fluency. Sam explained that faculty members and instructors participating in the mobile learning initiative were using tablet computers in a variety of ways: from capturing and blogging about pre-service teaching experiences, to identifying key building elements from the field as part of a construction management project, to analyzing applications created to disseminate interpretive historical findings to the public.

By providing a summative contextual look at participants' descriptions of mobile learning and their experiences with mobile learning, I have attempted to provide important background information relevant to the study's findings. It is now beneficial to address the themes and outcomes attending the primary research question: how instructional designers and faculty developers plan for and support faculty and instructor requests for mobile learning. Following this section, I present findings and themes relative to my remaining research questions addressing models and frameworks for mobile learning, challenges to mobile learning implementation, and unanticipated findings.

Faculty Not Requesting Mobile Learning Support

Because mobile learning is in its formative stages and not much is transpiring regarding mobile learning according to the study participants, the primary research question represented forethought and a harbinger of things to come, but not yet realized. Little was experienced by these participants regarding planning for, guiding, and supporting faculty members or instructors who desired to implement mobile learning in their courses. I found a meaningful lack of evidence to corroborate mobile learning initiatives at these universities, which would necessitate faculty developers and instructional designers supporting instructors with their mobile learning endeavors.

When purposely asked about instructor inquiries regarding mobile learning, participant responses clustered around the idea that no one is seeking help to implement mobile learning because faculty members and instructors are not using mobile learning. As Anna noted, “Not much. . . . Nothing formal has been happening.” Brent echoed this sentiment stating, “The short answer is very little,” while Hannah explained her university was in very early stages of talking about how mobile learning works and what was needed to support faculty implementing it. Mike offered, “We’re just not there yet.” Alaina said, “Mobile learning in and of itself isn’t really a distinct conversation that’s happening right now.” Anna and Mike both talked about the need to have a formal university effort for mobile learning. Mike summed up, “We don’t have a guiding light for that yet.”

Sam, representing the mobiley-engaged campus, discussed how faculty sought him out for assistance with “how to” questions, more so than pedagogically oriented

questions. When asked about how he supported faculty members seeking assistance with mobile learning, he clarified,

More questions come in along the “how do I use it type of approach,” but there are some, who are kind of familiar with at least what they think they ought to be doing or who have some ideas, they are coming in and saying, can you help me implement my idea. So they rarely, when they have an idea, ask, is my idea the right idea? Or a better idea? It’s usually I have an idea, can you help me do it?

Faculty and Instructor Mobile Device Use

Although faculty members and instructors were not directly seeking mobile learning support from the study participants, the evidence suggested they were using mobile devices. At Mike’s institution, faculty members could check out a tablet computer cart (wheeled carts containing multiple tablet computers for use in a specific class on a specific day) that was circulated within the college as an ad hoc computer lab. He explained that instructors used the tablet computers from the cart in their classrooms when a computer lab was not available. Sam spoke about using a check-out kit containing tablet computers (iPads) to support faculty who wanted to experiment with mobile learning in one or two classes or over a few weeks rather than an entire semester. He elaborated,

[Instructors] want to send their students around campus to record videos of something, to go interview people, or do something to try to take advantage of mobile technology. But where they don’t need the students to have [the tablet] for the entire semester in their possession.

Steve’s community college also recently implemented a tablet computer cart so instructors and students could begin exploring and using mobile devices. Johnson et al. (2012) found that educational institutions around the world were “sponsoring programs that provide devices to students who do not already have them” (p. 12).

Three participants mentioned how faculty were beginning to use smartphones and tablet computers as replacements for clickers, which students previously needed to purchase for use in classroom response systems. Use of a student-owned mobile device with the appropriate application replaced the need for students to buy a clicker to participate in course polls and question/answer sessions.

Non-Academic Use of Mobile Devices

In the various discussions about mobile learning, it was apparent that most universities were taking important steps to provide mobile access to student services and student and campus information. While this did not involve study participants supporting faculty members using mobile learning for teaching and learning, six individuals talked about how the university was attempting to reach and assist students through their mobile devices. For example, Anna and Emily talked about recent strides made at their university with providing students access to their class schedule and location, book lists, grades, and more via smartphone or other mobile devices. Mike briefly mentioned his university's new mobile app that provided an interactive campus map, grades and class schedules, a library connection, and campus news. Brent pointed out his university had recently enabled several Websites to be accessible through mobile browsers--sites that provided campus news, events, and general information, while noting the alumni association had created a mobiley-accessible Web site.

Pedagogical Approaches and Models--Interview Data

To address the secondary research question--what, if any, pedagogical approaches, conceptual frameworks, or models participants were using to guide faculty requests for mobile learning implementation and pedagogical support, it was necessary to

extend the question to the models or frameworks that inform the general support and advice participants offered their constituents. Common sense dictated if study participants were not sought out to support and guide faculty members with their mobile learning efforts, then no pedagogical approaches or mobile learning frameworks were being used specifically to inform said guidance.

Indeed, several participants said it was too early to consider a specific model to guide them. Brent, who earlier spoke about the principles of universal design being a primary concern, when queried later about a mobile learning framework responded, “The lack of movement on mobile learning in general here at the university hasn’t really prompted me to look at any other frameworks for designing mobile learning.” Similarly, Emily said, “Maybe I should be looking at a specific framework,” while Hannah responded, “No, we’re not at that point yet that we’ve started doing that research.” Sam--characterizing the anomalous case, whose university has embraced and encouraged mobile learning--was unable to describe a model or framework that informed his support of mobile learning. He said, “If you’re talking about a framework pulled out of the literature or something like that, we probably should but haven’t done a lot of reviews of formal frameworks and literature for mobile learning.”

However, when probed further, most participants discussed some type of model or reference to inform their counsel with faculty members, mobile learning context aside. Although the models and references varied, two participants mentioned a similar topic: the use of Fink’s (2003) book, *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*. Others mentioned resources and models

ranging from experiential learning, to andragogy, to Bloom's taxonomy, to universal design, and the community of inquiry framework (Garrison et al., 2000).

Because eight out of nine participants had no specific experience assisting faculty with mobile learning implementation, the majority of participants spoke about the models and resources they used when queried by instructors about technology integration and how to improve their face-to-face courses. The participants consistently harkened back to their instructional design backgrounds and education. Interestingly, when participants were asked to draw a model or framework depicting mobile learning for their campus, the visual representations suggested a contrast to the descriptive data participants provided. The following sections present the emergent findings and patterns from both the interview and visual data regarding participant responses to what, if any, pedagogical approaches, conceptual frameworks, or models they used to guide faculty.

Eighty-eight percent of the participants had an instructional design background with a master's degree or higher in instructional technology, curriculum and instruction, or digital technologies. This education background infused their descriptive ideas about mobile learning pedagogy and models to support and guide mobile learning endeavors. Campbell et al. (2007) found that

instructional designers work directly with faculty and other clients to help them think more critically about the needs of all learners, about issues of access, about the social and cultural implications of the use of information technologies, [and] about alternative learning environments. (p. 646)

This instructional design ascendancy and line of questioning informed how most participants addressed inquiries from faculty about technology integration.

The primary referents to models or frameworks in this study were grounded in instructional design practices and a standard instructional design line of questioning.

This standard line of questioning was derived from a genSam process model described as analyze, design, develop, implement and evaluate (ADDIE). Questions included but were not limited to understanding the learner and her needs including knowledge gaps, optimal sequencing and presentation of instructional content (based on the learner), and supporting desired learning outcomes with relevant assignments and assessments.

Participants offered guiding questions they would ask if faculty came to them for mobile learning assistance. For example, Brent said, “I would ask them ‘what are your learning objectives?’” and “If you’re teaching a fully online class, why do you need mobile learning? . . . Why is accessing content from a mobile device necessary when students are already coming to your class three days a week?” He also considered the demographic of the class (learner analysis) because “if you’re teaching a class of non-traditional students, none of them may have smartphones and so mobile learning wouldn’t really be relevant in that situation.” Also consistent with an instructional design line of questioning, Dominic explained, “It’s not a question of technology or not technology, it’s what technology? . . . What is the learning that needs to happen? And then, can technology support that? I always try to put the learning first.” He explained how he “starts back at, what are the learning outcomes you need to accomplish and then we work from there.”

Mike explained that when he received inquiries about technology use in the classroom, he asked the faculty member what he or she hoped to accomplish with the technology. “I’m always saying ‘well, you can use a clicker, anybody can use a clicker. But what do you want to do with a clicker? Do you want to give a test? Do you want to

prompt for information?” His questions reflected a consideration of course objectives and whether or not the technology enhanced the achievement of those objectives.

In a comparable perspective, Steve talked about how instructors were not fully trained in best pedagogical practices for classroom instruction, let alone transferring that to mobile learning. Steve found himself supporting faculty regarding the basics of good instructional design and teaching practices such as writing learning objectives and aligning objectives with assignments and assessments. He chided, “People want to add bells and whistles when their course isn’t even congruent between the lesson objectives and the activities.” He added, “You get sucked into answering questions like how to use the [LMS] drop box, but you ask, why are you using the drop box? Show me how that aligns with your course objectives?” Steve expressed frustration with the gap he perceived between college faculty understanding pedagogy and wanting to add more “bells and whistles.” He clarified,

To add mobile learning on top of a not so good course, [means] we have fundamental gaps in assessment and understanding. . . . We have huge knowledge and practice gaps in pedagogy and applying pedagogy to the college classroom. So to talk about mobile learning, it’s a very premature conversation in most of the instances on our campus.

Brent voiced an analogous sentiment when he said, “[It] goes back to making sure that the use of mobile learning and mobile technology are aligned with the learning objectives of that course.” He continued, “I was at least trained in not implementing a new piece of technology just because it’s cool and it’s fun to use, but making sure that it fits within what you are trying to accomplish.”

Pedagogical Approaches and Models— Visual Representations

According to Pauwels (2010), respondent-generated imagery or materials “differ from preexisting or societal imagery or artifacts in that they are clearly produced within a research context, although not by the researchers or their collaborators, but on their request and following their basic instructions” (p. 552). In attempting to further understand participants’ perceptions and understanding of mobile learning, I requested that each participant create a model, flowchart, or diagram that depicted how they saw mobile learning as it could apply (or did apply) to their university. These models and diagrams allowed me to peek into the heads of my participants regarding their ideas about mobile learning in a non-verbal and reflective manner. Pauwels continued, “Respondent-generated material, while offering a unique (insider) perspective, is never an end product, but just an intermediate step in the research” (p. 553). He pointed out that researchers must still “analyze and make sense of the visual output generated by the respondents,” framing their vision within the research output (p. 553).

I asked participants to draw models for mobile learning as a way to supplement and to better understand the text/verbal data gleaned from their interviews. According to Radnofsky (1996), “Qualitative models interpret a culture or event that has been studied, but that cannot be understood in its complexity through textual interpretation alone” (p. 386). As Radnofsky noted, I found that an “attachment to linguistic rendition should not preclude the diversification both in our ways of knowing and in our ways of representing and reporting what we know in two-dimensional or even three-dimensional models” (p. 389).

My decision to include several observations from the salient models in the findings chapter proposed a way of triangulating linguistic descriptive information with visual representations. Additionally, it offered participants the opportunity to reflect on their perception of mobile learning without the time constraints imposed by the interviews. This next section presents emergent findings from the participant visuals: the consideration of the learner, his or her learning environment, and the mobile device. Interpretation and further discussion of the participant visual models is presented in chapter VI accompanied by a discussion of how the models compared and contrasted to the frameworks and pedagogical models discussed in the literature review.

Discerning findings from the participants' models and visual perceptions of mobile learning was no straightforward task. Each individual's visual model or framework appeared to be as unique as its author. However, when looking for a pattern, it was important to ask not only what was visually apparent, but also what was absent. In this case, the pattern or more consistent findings subsidized what the models did not reveal.

Missing from four depictions of mobile learning was the learner, especially the learner as the primary focus within a mobile learning environment. As El-Hussein and Cronje (2010) exhorted, mobile learning by its very name implies the mobility of the learner, whereas Laouris and Eteokleous (2005) lobbied for "a broader view that accounts for a learner freely moving in his physical (and virtual) environment" (p. 7). Hannah, Anna, Alaina, and Steve's models made no specific reference to the centrality of the learner or the learner's role in his/her vision of mobile learning. As previously discussed,

the ubiquity of mobile devices and the mobile learning environments they support beckoned for a more learner-centered approach.

Hannah's model illustrated faculty members at the hub of mobile learning considerations with the student or learner presented as part of the faculty member's workload. Anna's model offered a sequence of events that needed to be aligned before consideration of mobile learning--a sequence that did not include the learner or faculty. The learning management system--provisioning content, activities, and assessment for mobile learning--was portrayed in Alaina's model; it had no specific reference to the learner or faculty member. Steve's framework illustrated a foundational focus on the art of teaching, building into a capstone of mobile learning tools, with no specific reference to the learner's place within mobile learning.

Another consistent finding in the participant models was a noticeable lack of the learner's environment or the situated context within which mobile learning might take place. The anywhere aspect of mobile learning was not readily apparent. Only Dominic's and Mike's models offered a loosely considered representation of context. Dominic's model, which placed "self" at the center of concentric circles, depicted a learning environment situated in the community and the world, one that included experiences and reflection. Mike illustrated the learning environment positioned among the learner, the teacher, and information--all grounded upon pedagogy.

Lastly, in the spirit of exploring what was not revealed, I noted little reference to specific mobile devices in participants' models or frameworks for mobile learning. This is important because it represented a broader interpretation of mobile learning--one that was not device constrained or device specific. In addition, because specific mention of

the mobile device was not apparent in many of the models, its role in mobile learning might be seen as supportive or secondary as the participants considered other elements more important to their vision of mobile learning. For example, Anna's, Dominic's, Sam's, and Alaina's models did not include any reference to mobile devices, while Steve's, Hannah's and Mike's models portrayed the mobile device in a non-specific, ancillary role.

Potential Challenges to Mobile Learning

Everett Rogers (1995) posited that new ideas, practices, or objects (innovations) and their perceived newness determined how an individual reacted to the innovation. He claimed, "Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability and less complexity will be adopted more rapidly than other innovations" (p. 16). Ertmer (1999) discussed the challenges of technology innovations as first order barriers (external) and second order barriers (internal) for instructors attempting to integrate technology into their curricula. She said, "First order changes adjust current practice in an incremental fashion," leaving the individual's foundational beliefs intact (p. 48), while second order barriers "confront fundamental beliefs about current practice, thus leading to new goals, structures or roles" (p. 48). This study provided evidence of first order or external barriers as well as second order (internal) barriers. The three main barriers were time, lack of knowledge, and accessibility.

Mobile learning and its potential to be a disruptive technology represents an innovation with inherent barriers that challenge how faculty members perceive it in terms of a valuable augmentation to learning. The third research question asked participants to

disclose the challenges they faced when supporting and guiding faculty in their mobile learning endeavors. While the literal answers to this question provided no discussion of barriers and challenges to assisting faculty with mobile learning, the participants were at the ready to explain challenges supporting faculty members' implementation of technology in general. These observations transferred readily to potential challenges and barriers faculty developers could encounter when supporting mobile learning.

Time

Lefoe et al. (2009) wrote that it was not surprising that new technologies had not had “a large impact on pedagogy when faculty find it challenging to engage in new ways of thinking about their teaching within current workload structures” (p. 16). As evidenced by the narratives within this study, faculty members were expected to do more with less and often struggled to meet the daily demands of their teaching workloads in addition to their research and service agendas. It was not surprising that *time* was the most frequently cited barrier to implementing technology that the study participants had encountered.

Dominic, Alaina, Steve, and Anna all referenced time as an inhibitor to the use of technology in teaching. As Dominic expressed, faculty members at his institution were pressed to allocate sufficient time to what they must do, let alone taking on new technology. He explained that faculty members were fine with learning how to implement a new technology but wondered what they could relinquish to make the time for learning it. He clarified,

Change is not something we want to do because we have so many other things to do. You know if it was to learn the technology and become really proficient in technology, that means I have to drop a couple of my office hours or does that

mean I can't take the extra time to follow up with those couple of students. Or you know, is this going to take away from my research time?

Steve spoke about when new faculty members are hired, they can be overwhelmed with the tasks, responsibilities, and new information they need to master. They struggle with managing the time necessary to meet their day-to-day obligations. He referred to this as survival mode and added, "People are not able to take on more beyond the basic survival stage, so I don't see teachers in the survival stage, faculty members, whether adjuncts or full time taking on technology or mobile learning."

Alaina observed that questions regarding technology integration were beginning to become part of the "larger conversation" on her campus. An example of the type of questions she heard was "How do I incorporate all this technology into my face-to-face teaching so that it's effective and it doesn't have me spending all my time using it?"

Hannah described how faculty sounded frustrated from the start when the topic of technology integration arose. They immediately began to list how they did not have time to learn a new technology. She elaborated, "You know, faculty talk about work load, time issues, I won't be able to attend any sessions to learn about this, this is now something else that I have to do." She added, "The issues that faculty already have with technology adoption through the process of online learning, I think that's going to transfer across to mobile learning." Anna expressed a similar sentiment when she said, "You know, the classic [phrase] 'I don't have enough time,' or 'it's just another thing.'"

Sam, reporting results of an internal study done on mobile learning at his university, found that faculty who implemented mobile learning were also concerned about the time needed to integrate mobile strategies into their courses. He reported that

faculty members were challenged because they did not have more opportunity to plan their courses further in advance, which resulted in their learning along with their students.

These participants expressed concern for the time-intensive nature of technology integration and how it affected faculty members' ability to learn about new technology. Mishra, Koehler, and Zhao (2007) believed, "They [faculty members] have little time or interest in learning about technology unless it is directly applicable to what they do" (p.4). Likewise, Polly, Grant, and Gikas (2011) found that tenured and pre-tenured faculty were not encouraged to integrate technology into their classes because of additional time devoted to research and service activities. They believed "opportunities to learn new technologies and work on integrating them effectively in their courses could be seen as extraneous" (p. 60).

As Rogers (1995) posited, it does not matter if the innovation "has a great deal of objective advantage"; what matters is whether or not the instructor or faculty member believes that the innovation is expedient (p. 15). According to the study participants, the relevance of mobile learning was not apparent to most faculty members.

Lack of Knowledge and Understanding Technology's Role

A second pattern emerging from participant interviews regarding challenges to mobile learning implementation was faculty members' lack of knowledge about technology and how it could support learning. Ertmer (1999) suggested, "Teachers with a limited amount of training may begin using technology with current levels of knowledge and skill or wait until sufficient levels have been obtained, depending on how significantly they weight their own lack of training" (p. 52). Emily believed faculty were not prepared to use technology; that included mobile devices for learning. Additionally,

she reported faculty comments such as “Oh I’m old, I don’t know about this stuff, or you know I’m not good at technology it’s too hard to learn that or whatever. So I think that may be an inhibitor; this un-comfortableness with new technology.” Later she spoke about faculty members who were still circumspect about laptops in the classroom and how this might carry over to handheld devices. This evidence of doubt spoke to a lack of understanding regarding how technology integration could support learning:

We sometimes still have trouble with faculty even wanting students to be able to have their computers in their classroom. I think it’s even harder for them to embrace what they could do with a mobile device. They still have this idea that students are going to be doing other things than what they should be doing while in class with some other device, whether it be a laptop, a cell phone, an iPad.

Alaina spoke about students coming to campus with knowledge of mobile applications they used to suit their own needs. This gave them an advantage over instructors who were not as familiar with mobile technology and applications. She believed the “next biggest challenge is educating instructors because they don’t know that these tools are out there.”

Brent noted that faculty members often did not appreciate what technology could bring to learning. He explained, “Specific to academics, the biggest challenge of mobile learning is getting instructors to understand why mobile learning is important.” He continued, “You know, why is tablet technology and mobile technology important in the classroom or for the sake of education?” In a corresponding manner, Mike mentioned, “The faculty don’t see the need for it.” He added, “We’re not telling them [faculty] they have to use it. We’re just offering it as an option. So, I wonder if, you know, there’s always a resistance to change and technology.”

Accessibility

A majority of participants expressed concern for and discussed faculty awareness of the digital divide--those who could afford small handheld portable devices with a data plan and those who could not. Block (2010) defined the digital divide “as the gap in access to technology by socioeconomic status, race, and/or gender” (para. Introduction).

Emily offered an example:

If you’re going to do an iPad initiative, then find a way to supply them. You know, for everyone. I spoke with one faculty member, she wanted her students to do videos, create videos in the classroom, but she really worried about 2 or 3 students in her class who she knew wouldn’t have access to any kind of video recording equipment. So she didn’t do that. . . . That was definitely a big consideration for her to think about, so I feel that’s going to affect the mobile learning initiative too.

Steve echoed this observation when he talked about how many faculty and students did not have the financial means to buy sophisticated mobile devices. Brent deliberated the challenge for instructors to implement technology that did not impose additional costs on students:

[Perhaps] instructors are leery of the fact that possibly not every student has a mobile device, and so if that happens to be the case in your class, the instructor’s required to provide them with an alternate assignment or an alternate method of completing the assignment. So that you’re not forcing the student to incur additional costs. . . . [Mobile learning] does have its drawbacks when you have students who don’t have what most instructors consider to be the norm of mobile technology and mobile data plans.

Dominic shared their concerns about accessibility noting, “There’s always a cost issue from the university side, as well as the student side.”

Unanticipated Findings

The conversations and dialogue involved in the exploration of how faculty developers and instructional designers were guiding and supporting mobile learning

requests produced two unanticipated themes or findings. The first unexpected finding was the perception by almost half of the participants that mobile learning was an extension of the learning management system or paired with the learning management system. The second finding was that half of the participants believed mobile learning was being driven by students on their campuses.

The Role of the Learning Management System

A key component of distance education today is the delivery platform or learning management system that provides a repository for course content, instructional strategies, activities, and course discussions. Most distance education courses and online learning take place through the support of a learning management system. Four study participants regarded the LMS as a potential gateway to increased mobile learning. They believed that by enabling mobile access (the LMS's mobile platform) to the university's learning management system, students and faculty members would acclimate to the use of a mobile device for learning in a seamless, unobtrusive manner. Therefore, the use of mobile devices in support of content access and traditionally LMS bounded activities (discussions, readings, quizzes) would evolve. By appreciating mobile learning as an extension of the LMS, these individuals did not discuss mobile learning as an independent, contextually rich activity.

Brent expressed, "My hope would be that we would use our learning management system as a starting point when developing for mobile learning so that students have more or less a seamless experience." Similarly, Hannah surmised that once students had access to the mobile version of the university's LMS, learning how to access it and use it successfully on the go would come easy. She said,

I'm hoping that because [students] already have a basic fundamental level of understanding of how to use their smartphones, that it won't take long, or they should be able to go pretty quickly from just opening something up there, to accessing a discussion board while walking from one building on campus to another or while . . . sitting on a bus.

Emily explained that she did not see mobile devices as necessarily being tied to the LMS, “but I think that might be an entryway maybe, you know. . . . If [faculty] start seeing they can use [the mobile device] on the LMS, they'll think about other things they can do with it.”

Students and Faculty Driving Mobile Learning

A second emergent and unanticipated theme concerned students' use of mobile devices and how that carried over into an expectation of mobile device usage with the university's learning management system. Several participants noted more mobile devices “showing up” on campus, indicating the ubiquity of the device and its habituated nature in the hands of students. Alaina summed this up:

I think [it] is going to be driven by the fact that we're already seeing not only students, but faculty and administrators showing up with iPads and then really wondering well is there more we can do with this besides taking notes and checking email and making appointments? So it's the technology already showing up on campus.

Four study participants indicated a student expectation of anytime and anywhere access to information.

Anna detailed how her university's switch to a new learning management system resulted in students temporarily losing mobile access to content (PDFs) in the new LMS. She clarified, “Students have contacted us not too happy with some of the functionality of the mobile technology and that lets me know that despite the fact that we haven't rolled it out in a formal way, they are expecting it.” She added, “The interest, most recently has

been by students.” Hannah noted that after her university announced the launch of the mobile platform for their LMS, students got excited and began asking questions about the rollout. She explained, “Student services have received a lot of questions. So, when is it going to be available? That’s the main question, when is it going to be available? Because they want it. They want access to it.”

Alaina recognized that while there were no distinct conversations yet about mobile learning for undergraduates at her university, she offered that those conversations would begin soon “because students will ask.” In a comparable manner, Emily commented that faculty, seeking to meet the needs of students, would be driven by their students to begin using mobile devices in their teaching. She ruminated, “I think faculty are looking for ways to engage [students] and adapt to them, so they know if [students are] carrying these things around in their hands, maybe we should try [mobile learning].”

Mike argued that mobile learning on his campus could be either faculty or student driven. He elaborated:

I think that the student can drive it, but the problem is that the way education is set up now, at least at my institution, there’s a lot of talk that we’re a learner-centered institution, but we’re not really. We’re very much instructor-centered. It’s on the instructor’s terms. You come in and the instructor does their thing.

Summary

The themes and findings in this multi-case case study provided insight into how faculty developers and instructional designers across seven institutions were supporting faculty members and instructors considering mobile learning implementation.

Participants readily offered definitions about mobile learning that included the concept of anytime, anywhere learning, with experiences and examples of mobile learning ranging from simply consuming content from the LMS via their mobile devices to field-based

experiences using a smartphone with location-based services to learn about battles fought in the fields of Gettysburg.

Eight out of nine participants expressed no support needs or specific plans for mobile learning in this scan of mobile learning endeavors across these institutions. Only one participant, representing the “surprise” or anomalous case, cited strong administration support as well as implementation of a mobile learning initiative--a multi-year project designed to identify and support key uses of mobile technology that impact teaching and learning.

Student and faculty use of mobile devices across these campuses was on the rise. Several participants noted more handheld devices in the possession of students and faculty than in previous semesters. Faculty members were beginning to become more aware of mobile device potential by using these devices as alternatives to clickers and as a way to implement student polling services. Students in turn have the potential to drive mobile learning initiatives because of their expectations that access to course content and information would be available on their mobile devices.

Many participants drew from their instructional design backgrounds when asked about models and pedagogy informing potential mobile learning efforts. This instructional design bias permeated their responses to my interview questions and informed the types of questions they asked faculty who sought support for technology integration.

Based on five of the participants’ visual representations of mobile learning, it appeared the learner was not at the center of mobile learning considerations or the learner was depicted in an ancillary role. Also missing from the majority of models was a

calling-out of the learning environment or situation where anytime and anywhere learning could occur. Most participants regarded the role of the mobile device as subordinate; as such, mobile devices were not represented in the visual models in a dominant or techno-centric manner.

The challenges or barriers to implementing technology reported by the participants included time, a lack of knowledge or understanding about how technology can support learning, and accessibility. Ertmer (1999) claimed, “Lack of adequate resources (first-order barriers) can constrain any integration effort. If teachers do not have sufficient equipment, time, training, or support, meaningful integration will be difficult, if not impossible, to achieve” (p. 56). Additionally, participants expressed their own and faculty’s sensitivity to the accessibility of mobile devices from a cost perspective.

This chapter presented faculty developer voices and experiences in conveyance of the perceptions, pedagogy, and practices of mobile learning at their respective universities. In the concluding discussion and implications chapter, I examine what meaning can be made of their experiences in light of the literature and mobile learning frameworks presented by Park (2011) and Koole (2009). This examination could provide insight and direction for faculty developers who support faculty members’ mobile learning endeavors.

CHAPTER VI

INTERPRETATION AND DISCUSSION

There is no one way of qualitative thinking, but a grand collection of ways: It is interpretive, experience based, situational, and personalistic. Each researcher will do it differently, but almost all of them will work hard at interpretation. (Stake, 2010, chapter 1, section 1.9)

The purpose of this study was to explore the perceptions, pedagogy, and practices of faculty developers and instructional designers as they worked to support mobile learning inquiries and mobile learning efforts initiated by faculty and instructors desiring to implement mobile learning. The primary research question was how were instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses. A second research question was what, if any, pedagogical approaches, conceptual frameworks, or models were faculty developers using when guiding faculty and addressing requests for mobile learning implementation and pedagogical support. A third research question explored the barriers and challenges instructional designers and faculty developers faced when assisting faculty in their mobile learning endeavors. These research questions structured this chapter and the interpretation of the findings; however, it is necessary first to explicate antecedent questions that emerged relative to the three research questions. These emergent questions and their explanations directly influenced participant responses to the research questions.

What I encountered during my research was a nascent perception of mobile learning's potential--a potential not yet actualized. This led to the antecedent question: what is happening at these universities regarding mobile learning? It became evident early in the data collection process that mobile learning was not being implemented in a formal, administratively supported manner across the majority of institutions represented in this study. Because I was naively influenced by the abundance of media and recent journal articles discussing and demonstrating innovative, experiential uses of mobile learning, I believed universities and colleges would be well on their way to advancing the mobile learning cause.

Since that was not the case, it became essential to listen to the optimistic, yet realistic voices of faculty developers and instructional designers explaining the actualities of mobile learning according to their observations and experiences. These participants revealed an awareness and eagerness for mobile learning, along with purposeful ideas about how to support it based on prior faculty assistance and technology integration experiences.

Following a social constructionist epistemology and a symbolic interactionism lens, I saw "meaning as arising in the process of interactions between people" (Blumer, 1969, p. 4) and learning "as social products, as creations that are formed in and through the defining activities of people as they interact" (p. 5). Therefore, the interpretations and discussions that follow were derived from the meanings and interpretations emerging from my conversations with the study participants, as well as interpretations of their mobile learning models. In the spirit of Marshall and Rossman's (2011) conviction, telling the story or interpreting one's findings "brings meaning and coherence to the

themes, patterns, and categories, developing linkages and a story line that makes sense and is engaging to read” (p. 219).

Clearly, mobile learning at the universities studied is in its infancy and is poised to spring in the near future. Therefore, direct and specific answers to my research questions were unsubstantial. However, in the following sections, I interpret the research findings guided by the literature, and the Koole (2009) and Park (2011) mobile learning models. More specifically, I discuss the findings in light of participant observations and disclosure regarding mobile learning, and how those relate to the university’s LMS and the pedagogical implications thereof. Interpretation of participant drawn models of mobile learning that provide insights into how the participants perceive mobile learning follows this discussion. Lastly, this chapter investigates the barriers and challenges participants encountered when implementing technology, challenges they believe would apply to mobile learning efforts as well

Mobile Learning, the Learning Management System, Pedagogy, and Models

As an emerging technology, mobile learning holds bright promise to extend learning opportunities beyond a tether to the learning management system and to provide unique, learner-centered, and contextually rich learning experiences. These innovative and authentic learning opportunities are buttressed by the increasing ubiquity of handheld portable devices and wireless Internet access. Mobile learning’s potential offers instructors, instructional designers, and faculty developers the prospect of creating engaging, real-time, and situated learning activities within a learner-centered paradigm.

In this study, participant stories revealed an appreciation and understanding of mobile learning, as well as insights into the potential it holds for anytime, anywhere, just-

in-time learning. However, the creation and execution of mobile learning, anchored in authentic learning environments with situated activities and rich learner experiences, currently sits on the horizon. This did not imply a lack of progress or interest on the part of the study participants regarding mobile learning. Rather, it meant that the centers for teaching and learning in this study were not leading the charge to embrace a new technology--one that requires a new way of thinking about teaching and the students' learning experiences. What unfolded instead were a paucity of theoretically informed pedagogies and a greater awareness of the relationship between learning management systems and mobile learning.

Personal Use and the Role of the Learning Management System

Most participants in the study discussed mobile learning within the context of student access to the LMS. They also discussed faculty using their personal mobile devices for administrative and non-academic related purposes. The non-academic use of a personal mobile device will eventually lead to faculty using these devices for more educational purposes. Likewise, faculty members' access to the university's LMS through a mobile device will help prepare them for student mobile access to the LMS as well as help them gain confidence in using a mobile device to support learning. Corbeil and Valdes-Corbeil (2007) believed "students and faculty who already use mobile computing and communication devices will find ways to integrate them into all aspects of their lives—including the tasks of teaching and learning" (p. 57).

This extension of the personal use of mobile devices scaffolded through the university's learning management system provides an early opportunity for instructional designers and faculty developers to inform faculty members about usability issues.

Equally important, enabling the LMS's mobile feature may lead to further mobile learning exploration and innovation on the part of faculty members, e.g., investigating more situated and contextual learning experiences that take advantage of the mobile device's affordances.

At several institutions, faculty exploring mobile devices for learning led to the formation of ad hoc, informal mobile learning groups or communities where interested faculty members exchanged ideas and practices for incorporating mobile learning into their courses. Faculty developers and instructional designers might seek out these communities as these faculty members represent a contingent of curious, early adopters (Rogers, 1995) who are ready to move forward with mobile learning. At the intersection of the instructors' personal use and curiosity to extend teaching beyond LMS content access, faculty developers and instructional designers need to be poised to offer theoretically informed, pedagogical guidance.

Pedagogical Considerations

Pedagogy in general terms is the art and science of teaching or the methods and practice of teaching. The construct of pedagogy is complex and subject to a wide array of interpretations, making it difficult to singularly define. Watkins and Mortimore (1999) broadly defined it "as any conscious activity by one person designed to enhance learning in another (p. 3). Beetham and Sharpe (2007) defined pedagogy as a "sense of guidance to learn: learning in the context of teaching, and teaching that has learning as its goal" (p. 2). They believed that pedagogy "[involved] ways of knowing as well as ways of doing. Like other applied disciplines, it is centrally concerned with how we understand practice (the 'evidence base' for theory), and how we apply that theoretical understanding *in*

practice” (p. 3). Stewart and Hedberg (2011) talked about the pedagogy of mobile learning as embracing “the idea of thoughtful teaching practice that engages students in meaningful learning environments beyond the classroom . . . where both teacher and student can access a wide range of activities and resources” (p. 260).

Ryu and Parsons (2009) found that much of the literature concerning mobile learning design “tends to simply link available technologies with the learning activities” (p. 11), which discounts theoretical and pedagogical considerations as well as the learner’s experience. A learning activity arranged by the instructor helps establish conditions for learning and involves the learner in doing something. The activity can be as straightforward as having students photo journal their experiences while at a park or museum using the mobile device’s camera and note taking functions. However, the learning *experience* is what the student lives and encounters. A learning experience goes beyond activities because it deeply engages the student’s senses, motivations, emotions, prior knowledge, and is more impactful and memorable than a learning activity. Ryu and Parsons suggested that a greater understanding of mobile learning design may be achieved “by setting mobile learning designs against a background of pedagogical requirements” (p. 11) that focuses the design of mobile learning toward learning experiences. Stewart and Hedberg (2011) offered that “the way in which mobile technologies are used has to be appropriate to the pedagogical approach” (p. 262). Offering pedagogical guidance that creates learning experiences, which moves beyond linking a technology to an activity, is something instructional designers and faculty developers should be equipped to do.

Participants revealed they were confident using instructional design skills to inform potential mobile learning inquiries. For example, Steve said, “The majority of our faculty needs are NOT with any extravagant or highly technical tools. It is basic education 101--how to write objectives and align course objectives with content.” While several participants spoke of pedagogy, its place in mobile learning and faculty support appeared tenuous. Sam explained:

We want to present mobile learning material in the context of thinking about course design and the pedagogical effective use of the tools. The faculty appreciate that and value that, but I get the sense that at times they kind of go, yeah yeah, I’ve heard that in other contexts, let’s get down to brass tacks and show me where, what buttons to push and what to do to. I think that what they feel we ought to be offering them are more tool skills.

Beetham and Sharpe (2007) advocated “pedagogy before technology,” further stating, “We should be in the business of locating the new technologies within proven practices and models of teaching” (p. 3). For instance, participants offered examples about different instructional design (ID) considerations and lines of questioning they employed when assisting faculty. These ID considerations included the needs of the learner, identifying desired learning outcomes or objectives, and how the technology would be used in support of student learning. Missing were theoretically informed pedagogical considerations such as constructivist, situated learning or learner-centered pedagogies. Herrington, Herrington, Mantei, Olney, and Ferry (2009) explained, “Few universities have adopted widespread m-learning technologies, and in those that have, it is not clear that they are being used in pedagogically appropriate ways” (p. 1).

While several participants drew from familiar frameworks, such as the ADDIE process model, the Community of Inquiry framework (Garrison et al., 2000) and Bloom’s (Bloom et al., 1956) taxonomy, they were not discussed against a backdrop of learning

theory and pedagogical considerations. Instead, participants discussed instructional design strategies without the underpinnings of how practice was understood and guided from a theoretical and pedagogic perspective. In several instances, pedagogy was mentioned but with no further elaboration of what instantiating pedagogy meant. For example, Mike stated,

I always inject a pedagogical piece because that's my background; I'm always saying 'well, you can use a clicker, anybody can use a clicker. But what do you want to do with a clicker? Do you want to give a test? Do you want to prompt information?

In this example, Mike presented an ID line of questioning he considered a pedagogical element. In another case, Alaina talked about needing to interject learning theory and pedagogy into mobile learning considerations when supporting faculty; however, her interview data and model did not provide evidence of what this meant or how it could be implemented.

Instructional design considerations and instructional strategies are a key part of the art and science of teaching and learning; they are necessary to insure a well-structured, organized, quality course. However, without theory-infused pedagogy informing the ID practice in a perspicuous manner, an important piece of the teaching and learning puzzle is missing. Beetham and Sharpe (2007) noted that “new technologies make visible aspects of [teachers'] pedagogic practice that were previously taken for granted” (p.7). The data in this study testified to the reality of this statement: the emergence and use of mobile devices for learning makes visible the need to identify and purposefully incorporate appropriate pedagogy. Infusing pedagogic support that moves beyond linking mobile technology to an activity is required.

In contrast, several other participants mentioned they had not considered using a framework or model to inform ideas and pedagogy for mobile learning because it was too soon; they were not at that point with mobile learning at their universities. Even Sam, representing the divergent case, claimed no formal model or framework informed how he supported mobile learning initiatives; rather, his university's approach appeared more collaborative, exploratory, and experiential. However, Liu et al. (2002) believed, "A good designer should be well-versed in several instructional design models and strategies from which to choose a case-specific process" (p. 211).

Overall, participant responses were mixed whether or not they used or would consider using a framework or model to inform how they supported and guided faculty seeking assistance with mobile learning. Regardless of the models and frameworks discussed, the theoretical and pedagogical implications of the models and frameworks were absent. The following section is my interpretation of the visual representations of mobile learning as drawn by the study participants, juxtaposed to their interview data, as well as the more theoretically-based mobile learning models espoused by Park (2011) and Koole (2009).

Mobile Learning Models

Richey, Klein, and Tracey (2011) wrote that the term model "implies a representation of reality presented with a degree of structure and order, and models are typically idealized and simplified views of reality" (p. 8). The models or frameworks for mobile learning as represented by Park (2011) and Koole (2009) offered views of the reality of mobile learning, which were more complete and learner-centered than the visual representations of the participants. Their models offered pedagogical

considerations as foundations for mobile learning, foundations missing from participant models.

Park (2011) believed that “the most serious issue faced by mobile learning is the lack of a solid theoretical framework which can guide effective instructional design” (p. 83). Her model was adapted from Moore’s (1997) theory of transactional distance; it advocated four types of mobile learning that addressed not only the psychological or communication gap between the instructor and learner but also interaction among learners that she labeled as the “new dimension” (p. 88). Park’s adaptation considered the activities one might encounter in mobile learning, which she categorized as individual and collective activities, mediated by mobile devices.

According to Park (2011), in a high transactional distance and socialized mobile learning activity (HS), the learner experiences a greater communication gap with the instructor but he or she is involved in group learning or socialized learning activities. Park advocated with HS activities, “instructors and instructional designers may need to give special attention and effort to 1) the design of the mobile application and 2) the setup of social interaction, such as defining the rules of the game and the roles of players” (p. 91).

With a high transactional distance and individual mobile learning activity (HI), once again there is a greater communication gap between learners and the instructor but “the individual learners receive tightly structured and well organized content and resources” (Park, 2011, p. 91). In this scenario, Park (2011) believed instructional designers “should pay attention to the creation and management of a knowledge database, including well-organized learning materials” (p. 93).

If the learning environment offers low transactional distance and socialized mobile learning activities (LS), this means there is less communication space between the instructor and student. Therefore, loosely structured instruction and socialized group-work where learners are “engage[d] in social interaction, negotiation, and frequent communication naturally” (Park, 2011, p. 93) should be employed. According to Park (2011), a low transactional distance and socialized mobile learning environment means instructional designers should promote active participation and students’ social experiences.

In a low transactional distance and individualized mobile learning activity (LI), there is less communication space between the learner and the instructor but individual learners interact directly with the instructor in a more controlled environment that meets the needs of individual learners. Park (2011) advised that instructional designers and faculty provide the necessary support for student questions and assignment completion in a LI environment.

What Park’s (2011) model offered was “comprehensive design guidelines for [mobile learning] future use...[which] categorize educational applications with mobile technologies and position them in a logical framework” (p. 83). However, her four-element framework offered minimal and inexplicit recommendations to instructional designers and instructors regarding key considerations relative to creating and supporting mobile learning efforts. This limited its practical applicability because the model is more theoretical and focuses on the communication gap or psychological distance found in mobile learning, considerations not expressed by study participants. The strength of her model resides in the categorization schemes she proposed based on the theory and

pedagogical considerations of transactional distance, not in guidelines offered regarding how mobile technologies could be implemented in teaching and learning.

Although Park's (2011) model was supported by examples of the types of learning that might occur under any of the four conditions (HS, HI, LS, LI), it did not offer actionable strategies for using the model to inform ID practice. The theory of transactional distance is an important pedagogical consideration for mobile learning activities; however, Park's depiction of individual and social engagement fell short of presenting a simplified view of reality (Richey et al., 2011), especially one that faculty developers could easily and efficiently use to inform mobile learning practice.

Contrasting with Park's (2011) abstract and theoretically based consideration of mobile learning, Koole (2009) offered a more concrete, pragmatic model in her Framework for the Rational Analysis of Mobile Education (FRAME). Her model examined "the convergence of mobile technologies, human learning capacities, and social interaction. [Addressing] contemporary pedagogical issues of information overload, knowledge navigation, and collaboration in learning" (p. 25). By Koole's own admission, this model comprehensively considered not only the mobile device but also social and personal aspects of learning. She wrote, "The FRAME model describes a mode of learning in which learners may move within different physical and virtual locations and thereby participate and interact with other people, information, or systems – anywhere, anytime" (p. 26). The mobile learning process as described by Koole results from the union of the device, the learner, and social aspects, and "provides enhanced collaboration among learners, access to information, and a deeper contextualization of

learning” (p. 38). The elements of collaboration and contextualization speak to learner-centered pedagogies that offer ways of knowing and doing.

Koole (2009) further explicated that mobile learning (within her framework) respected the context of information where the learner collectively or individually consumes and creates information mediated through the device. Contrary to the Park (2011) model, Koole’s FRAME offered actionable considerations and insights for mobile learning that touched on various ideas presented by the study participants, e.g., the mobile device and its capabilities, the individual learner, and personal aspects of learning.

Gaps Between Theoretical Models and Participant Experiences

The results from this study offered no evidence, either in the interview dialogs or the participants’ visual representations, of theory based, pedagogical considerations as illustrated by Park (2011) and Koole (2009) or as discussed in the literature. The gaps between the participant experiences and their models, and the two theoretical models, remind us that theory and pedagogy should inform practice. As Beetham and Sharpe (2007) stated, “In using the term ‘pedagogy’ we are therefore initiating a dialogue between theory and practice, as well as between learning and teaching” (p. 3).

Only one participant’s visual representation came close to Koole’s (2009) comprehensive model. Mike’s model depicted interaction among the learner, the teacher, and information, while at the same time illustrating the space among the three as where mobile learning materializes. In his view, the learner, the instructor, and information were bounded by mobile devices, pedagogy, and cloud computing. Mike’s model offered parallel considerations to Koole’s (2009) FRAME model in terms of the “device aspect,” “social aspect,” and “learner aspect” (p. 27).

Conversely, a lack of similarity with the models proposed by Park (2011) and Koole (2009) did not suggest the participant models fell short. Each model represented how the participant viewed mobile learning biased by his or her place within a center for teaching and learning (CTL). Two participants' visual representations of mobile learning appeared to be informed by the larger university environment. This broader perception of mobile learning and its place in higher education was framed within the context of their university. For example, Anna's model represented a "systematic planning" view with three elements: "vision, policies and resources." Likewise, Sam's model was underpinned by "infrastructure" and an element labeled "institutional priorities." These models displayed an awareness of vision and policies relative to mobile learning efforts and how a mobile learning initiative needs to consider infrastructure (hardware) issues as well as institutional priorities. However, as with several other models, a theory-based pedagogical foundation was absent and the role of the learner was not readily apparent.

Participants' visual representations offered insights into their ideas and conceptions of mobile learning, providing a complementary, non-linguistic perspective. The Park (2011) and Koole (2009) models offered a starting point for charting important theoretical and pedagogical considerations necessary for a mobile learning effort. However, as depicted by the participants in this study, the views and conceptions of mobile learning varied and reflected sensitivities for institutional policies and infrastructure in a broad sense, funneling down to specific mobile learning activities and exercises. In many cases, the role of the learner appeared as a secondary consideration. The following section more closely examines how participants viewed the role of the learner.

Role of the Learner

The secondary role of the learner in many of the visuals and participant descriptions of mobile learning contrasted with the Park (2011) and Koole (2009) models where the position of the learner was fundamental. Park expressed the learner as the primary component of transactional distance theory and in her mobile learning activity considerations (individual and social). Koole presented the learner as the primary factor when discussing the mobile device and social aspects of mobile learning. Specifically, the learner aspect of her model “[took] into account an individual’s cognitive abilities, memory, prior knowledge, emotions, and possible motivations” (Koole, 2009, p. 29), while the interaction learning intersection of the model accounted for “needs of distance learners as individuals who are situated within unique cultures and environments” (p. 36). Likewise, Koole included a discovery learning pedagogy among the elements of the learner aspect that involved “actively selecting or designing learning activities rooted in authentic situations as well as encouraging learners to discover laws within physical and cultural environments” (p. 31).

Because mobile learning is emergent and only beginning to gather momentum in universities and because mobile devices had a highly commercial genesis, several responses from participants regarding how they defined or explained mobile learning included mention of a device before any mention was made of the learner or learning environment. While the literature suggested defining mobile learning as being about the learner and her experiences with learning in a just in time, just for me, just enough format (Peters, 2007; Traxler, 2007), the data in this study did not suggest that CTL personnel began with learner considerations.

At this nascent stage of mobile learning, is it premature to place the learner center, surrounded by myriad other mobile learning considerations, such as the device, system connectivity, accessibility, and appropriate applications? Is it too difficult to execute mobile learning from a learner-centered pedagogy within a center for teaching and learning where other concerns for faculty development prevail? As Sorcinelli et al. (2006) found, faculty developers were concerned about helping faculty teach from a learner-centered perspective; conversely, the data supported that faculty developers themselves might struggle with a learner-centered pedagogy as well.

Polly et al. (2011) said, “It is essential to keep remembering that *student learning* [emphasis mine] needs to be the focus of technology integration and faculty professional development” (p. 67). However, lack of a learner focus might be understood in light of the participants’ tacit assumptions about the centrality of learners in the learning environment and assumptions vis-à-vis the centrality of the learner in the eyes of the instructor.

In summary, faculty members’ interest in and personal use of mobile devices will lead to further exploration of how those devices might be used to support learning. Students and faculty members who use mobile devices to access content from the university’s learning management system are poised to become early adopters of mobile learning. This is due in part to students and faculty using their mobile devices with the LMS in a familiar manner, thereby fostering confidence with mobile devices in a learning context.

Theory and pedagogy need to inform instructional design practice; this is critical in mobile learning where the instructor might have limited influence over the learner and

his/her learning environment. While participants were proficient in using instructional design principles to guide their practice, there was a lack of clear pedagogy and theory as a foundation for their practice. In contrast, the Koole (2009) and Park (2011) mobile learning models reflected established theoretical and pedagogical foundations. Herrington et al. (2009) argued that “the current use of mobile devices in higher education (essentially content delivery) is pedagogically conservative” (p. 2). Perhaps this conservatism, along with inexperience supporting mobile learning efforts, explains the lack of reference to theory and ambiguous references to pedagogy.

Participant models also reflected a lack of learner-centeredness in their views toward mobile learning. This might be indicative of participants’ positions in centers for teaching and learning (CTL) where the needs and concerns of faculty are considered before those of the learner and where faculty developers and instructional designers are removed from the learner. The lack of learner centeredness might also be attributed to assumptions that the instructor or faculty member would be focused on the learners’ needs.

In addition to examining the perceptions of instructional designers and faculty developers regarding mobile learning, it is also important to acknowledge obstacles and barriers that can inhibit mobile learning implementation. The following section discusses challenges encountered by participants when they attempted to implement new technologies--challenges they believed would carry over to mobile learning endeavors.

Barriers and Challenges

Time, lack of knowledge, and accessibility to technology (student and instructor) emerged as three central barriers to the potential implementation of mobile learning.

These obstacles reflected both first- and second-order barriers as espoused by Ertmer (1999) with first-order barriers representing external inhibitors such as lack of time, training, and institutional support and second-order barriers representing an individual's fundamental beliefs about pedagogy, technology, and their unwillingness to change.

Research agendas, publication pressure, securing grants and other outside monies, in addition to teaching responsibilities, vie for the time and attention of faculty, often with research and publication efforts taking precedence. Johnson et al. (2012) reported that “in promotion and tenure reviews, experimentation with or adoptions of clearly innovative applications of technologies is often seen as outside the role of researcher or scientist” (p. 6). More importantly, universities still recognize and reward research and publication efforts over teaching and technology integration efforts.

Polly et al. (2011) noted, “Professional development for faculty is voluntary with little extrinsic motivation for faculty to attend” (p. 60). Inadequate and disposable time poses a significant challenge and limits the ability of instructional designers and faculty developers to make inroads with introducing mobile learning. Time is a constrictor in two ways: faculty lack time to learn about the new technology, which drives the lack of knowledge necessary to implement technology, and time to experiment and practice with the technology before integrating it into their courses.

Lack of accessibility to mobile devices, wireless Internet, and communication data plans can dissuade the best intentions of faculty developers as they pursue equal learning experiences for students. As higher education seeks to diversify its student populations and become more sensitive to the learning needs of its constituents, accessibility not only of mobile devices but also of content moves to the forefront.

Therefore, any mobile initiative needs to consider the student population and their access to mobile devices, data plans, and mobiley-delivered content.

The barriers revealed in this study--lack of time, lack of knowledge, and accessibility--reflect a high-level perspective about inhibitors to implementing mobile learning. Al-Bataineh and Brooks (2003) posited that the issues plaguing early computer adoption in the classroom remain relevant: training, adequate equipment, and effective technology integration. Groff and Mouza (2008) found that the main hurdles for teachers using technology in the classroom were their lack of knowledge and experience with technology and the time it would take to become proficient with the technology tools. They found that learning new skills required “significant amounts of time and, therefore, the importance of professional development should not be underestimated. Effective professional development needs to provide time for training, experimentation, as well as follow-up support” (Groff & Mouza, 2008, p. 29). Ensminger, Surry, Porter and Wright (2004) believed, “To facilitate implementation, designers, as well as others responsible for change or adoption of innovations, must acquire information about the factors that affect implementation” (p. 65). Consequently, barriers affecting implementation must be considered by faculty developers and instructional designers if they are to move forward with mobile learning ideas and initiatives.

Time, lack of knowledge, and accessibility to technology (student and instructor) were major challenges facing technology adoption efforts by faculty. As the faculty developers and instructional designers reported, these factors would carry over as inhibitors to mobile learning efforts as well. Overcoming these barriers is not impossible; however, it involves careful planning and sensitivity to the time constraints faculty face

in general and an awareness that technology integration efforts are not recognized nor rewarded outwardly in most higher education institutions.

In the remainder of this chapter, I address implications for practice and recommendations for further research. These sections represent my way of connecting this research and the knowledge I have gained from it to practice. I hope this study contributes to the understanding of others employed in CTLs who may soon encounter faculty seeking support for their mobile learning efforts and how they might prepare to address those inquiries. Furthermore, I offer suggestions for future research, expectant that others exploring the experiences of faculty developers and instructional designers regarding mobile learning are inspired to move this topic forward--especially as mobile learning rapidly permeates the higher education landscape.

Recommendations for Practice

When faculty developers and instructional designers encounter requests for mobile learning support and guidance, it will be necessary for them to be prepared and diligent about their responsibility to support faculty, not only from a technological perspective but also from a strong, theory-based, pedagogical one. This includes a learner-centered focus--where content and instructional strategies are focused on the learner's needs, his/her learning experiences, and mobility. It also means, as several participants mentioned, asking how the technology will be used to support learning rather than offering another way to deliver or push out static content.

To the extent possible, faculty developers and instructional designers should consider theoretical foundations and pedagogical models to inform their mobile learning practices. Additionally, developers and designers could encourage faculty members to

reflect more about their own theoretical perspectives by discussing models, learning theory, and pedagogy considerations when they work with faculty. They could ask faculty members to consider how their learners learn best from their content.

Theory and pedagogical foundations work together to provide a relevant starting point when addressing mobile learning. Scott and Scott (2012) believed

professional development should be focused on enhancing university teachers' understanding of effective pedagogies (the why), include the what (curriculum), the how (designing optimal learning experiences and assessment), and particularly how these translate into their discipline. (p. 423)

Polly et al. (2011) discovered “technology integration was more effective when faculty members’ learning were focused on pedagogy along with technology, rather than learning about the technology in isolation” (p. 66). Similarly, Lefoe et al. (2009) called for a need to move beyond technology training and into “examining new pedagogies for enabling their use to support learning more effectively” (p. 15). But as LeFoe et al. pointed out, “... new technologies have not had a large impact on pedagogy when faculty find it challenging to engage in new ways of thinking about their teaching within current workload structures” (p. 16).

As a point of departure, several participants commented they were beginning to read about mobile learning in journals and technology bulletins, which in turn were informing them about mobile learning, in addition to providing cases of mobile learning in higher education. Literature of this nature could pedagogically inform practice and might offer exemplars for designers and developers in addition to providing foundational theory and models.

Through personal use of their mobile devices, faculty developers and instructional designers are becoming proficient with hand-held devices and are learning on the fly via

their own explorations. Once designers and developers become confident with the tools and affordances available through a mobile device, they can reach out proactively to support faculty members with mobile learning interests.

The staple of faculty development has been workshops where faculty members learn how to use a tool in a hands-on manner and where they have the *potential* to be exposed to pedagogical uses of the tool. Ideally, this means designers and developers should explain pedagogical uses of mobile learning devices and work in tandem with faculty to create exemplars of mobile learning using research-based foundations. Nevertheless, with time being of the essence, faculty members might resist pedagogical and theory-based approaches, jumping instead to learning how to use the mobile device and applications without thought of how the mobile activity might or might not support learning. This invites the question--should faculty developers and instructional designers take the time to inform faculty members about the pedagogical uses of a technology tool? Should they present “how to use it” skills first and then see if time remains to discuss pedagogical implications? As Alaina explained, “If we’re talking about faculty, I think we need to approach the pedagogy first and then recommend a technology. If we’re talking about faculty developers, they need to play with the technology first to see what it’s going to support.” She added,

I don’t think you should introduce the technology first to faculty. Sometimes they either get turned off because it’s a new technology and they don’t want to learn a new technology, a new product or a new software or whatever. Or, they are so enamored with a technology that they totally forget about any pedagogical implications.

How technology is implemented can vary across disciplines and individual courses. This means faculty developers and instructional designers should work with a

variety of faculty members (subject matter experts) to create exemplars anchored in a domain or content specific area. One possibility is to follow-up with individual consultations after a more general workshop. The consultation would extend the workshop, allowing faculty developers to provide personalized assistance and underwrite a specific content area.

Personal ownership and professional use of a mobile device by faculty members could lead to considerations about using the device to enhance student learning. LeFoe et al. (2009) found that faculty and staff need “to own and use mobile technology in their professional and personal contexts in order to think differently about engaging their students in pedagogically sound ways” (p. 16). They espoused that pedagogy should “drive the changes required to improve learning outcomes” and faculty development efforts should move beyond workshops to “integrated long term programs that focus on developing relationships and reflection as well as skill and knowledge development” (p. 16). This type of approach was modeled in the mobile learning programs Sam discussed.

Addressing Challenges

As synthesized from the data, having an awareness of mobile learning barriers is the first step in overcoming said barriers. Time has been and will continue to be a significant barrier for faculty to successfully use and integrate mobile learning into their courses. Instructional designers and faculty developers, sensitized to time constraints, need to work to find creative and bite-size methods to present mobile learning ideas and pedagogically sound practices to faculty members. Time also needs to be available for

faculty to practice and experiment with the technology before introducing it in their courses.

Since faculty are time-strapped and focus on what matters to their careers, consideration should also be given to incorporating a technology integration component into promotion and tenure prerequisites. While this does not directly provide faculty with more time, it would recognize their efforts to learn and implement new technologies in their courses. Currently, faculty are rewarded based on research, publications, grants received, and teaching with no specific technology component advocated. While some may argue faculty should not be obliged to incorporate technology into their teaching as the role of technology in higher education surges, in particular mobile learning, such obligations may be warranted.

Device accessibility, assuring that students and instructors alike have the use of mobile devices, could be resourcefully addressed using loaner devices. As several study participants explained, mobile device carts and loaner mobile devices were being procured for faculty and students. This minimized the need for individuals to purchase their own device; however it did have drawbacks regarding personalization and sense of ownership. As mobile device purchase and usage rise, accessibility to mobile devices might become less of an issue.

Content accessibility is an ongoing initiative in all facets of education. Based on federal regulations that require virtual content be available in several formats for those with disabilities, colleges and universities must be vigilant in making sure course content, including that obtained through mobile devices, is useable by everyone. Adopting strategies such as universal design (making all things more accessible by using a variety

of formats for those with disabilities) and helping faculty create courses that exploit universal design principles are ways to address this barrier.

The preceding offers general recommendations for individuals working in centers for teaching and learning who desire to prepare for mobile learning, while acknowledging that each university will have unique circumstances, policies, infrastructure, and initiatives regarding mobile learning. Although the majority of participants in this study did not have formal experience supporting, and preparing faculty for mobile learning, they were aware of the need to “begin the conversation” about ML as well as consider how they will support faculty.

Summary

The ideas of Lefoe et al. (2009) along with others are woven into a high-level summary of recommendations directed to faculty developers who are preparing for mobile learning inquiries:

- Acquire use-skills regarding mobile devices and knowledge of relevant and appropriate mobile applications and web sites.
- Become familiar with various mobile learning models, frameworks, and pedagogy that inform the basis or theoretical underpinning of mobile learning. For example, Koole’s (2009) FRAME model, learner-centered pedagogical practices, collaborative and social constructivist strategies, or situated learning and contextual learning principles are a few pedagogies aligned with mobile learning. Use this information to underpin and guide mobile learning workshops.

- Ensure faculty have their own personal mobile device or at least a loaner device they can use for an extended period of time.
- Encourage the formation of or organize mobile learning cohorts or small groups of mobile learning advocates who want to experiment with informed uses of mobile devices in support of learning. Encourage them to share ideas, successes, and failures.
- Create active, hands-on, collaborative workshops where faculty bring your own device (BYOD) and engage in authentic mobile learning activities. Allow time for faculty to practice as well as time for follow up consultations specific to the faculty member's subject matter and individual needs.
- Encourage faculty to reflect on their own pedagogy--what it is and how it fits within a mobile learning environment.

Implications for Future Research

As typical of qualitative studies, primary research questions beget additional questions and this study was no exception. Several questions emerging from this study encompassed the role of centers for teaching and learning and why they were not proactive in preparing for mobile learning. According to Ewing and Sorcinelli (2007), teaching centers have a mandate “to address the needs and interests of the entire academic community in support of the education of students. . . . [They provide] . . .and disseminate instructional innovations and prioritize areas where more support is needed” (para. 4). That being said, are there implicit understandings that a CTL does not lead innovation and change but instead acts in a support capacity based on the explicit needs of instructors and faculty? What is the mission of CTLs in light of rapidly changing

higher education learning environments? Further exploration is needed to determine whether it is feasible or reasonable to expect a CTL not only to provide support for the scholarship of teaching and learning, training in skills such as course development, online teaching and learning, leadership, and communication but also to support faculty technology innovation and integration.

When I began this study, I sought to explore mobile learning from the perspective of faculty developers and instructional designers. What I found was a variety of positions and responsibilities within various CTLs, which made it challenging to discern whether I was talking to the appropriate person relative to my study and primary research questions. Additionally, after the study was underway, I began to wonder whether the person I needed to talk to even worked in a faculty development center. This confusion pointed to the ill-defined nature of faculty development centers as well as the need for clearer depiction of those who work within the center. Future research is needed to illuminate the function of these centers because as technology advances and its use in higher education becomes more predominate, centers are at risk of not meeting the needs of their constituents or worse yet, falling behind or becoming obsolete.

Conversely, based on the myriad responsibilities found in various centers, is it reasonable to expect faculty development centers to be on the frontline of change, especially something that is evolving and changing as rapidly as mobile learning? Regardless, it might be time for centers to re-identify who they are and what services they provide to their institutions.

Additionally, the initial research questions presented in this study bear future consideration because they were prevenient. Although mobile devices and their use are

highly visible commercially and appear on college campuses more frequently, mobile device use for teaching and learning is not yet a conventional occurrence in higher education. Therefore, qualitative researchers should investigate how faculty developers and instructional designers could support and guide faculty members' implementation of mobile learning 12 and 24 months hence. This would afford a longitudinal study that could reveal a developmental progression of depth, breadth, understanding, and sophistication regarding how designers and developers in centers for teaching and learning are addressing mobile learning inquiries as well as insights into how faculty members are progressing in their adoption of mobile learning. Continued exploration of mobile learning through the experiences of instructional designers and faculty developers could also provide another opportunity to see what role the learner plays in future considerations and instantiations of mobile learning.

Supplementary perspectives about mobile learning from faculty members are also warranted. Research questions to faculty such as how they prepared for using mobile devices in their courses, what support and guidance was offered by the university's CTL, and if it was adequate could then be used to inform CTL practices, drive improvement efforts, and meet the specific needs of faculty.

Future research could also expand on the models, pedagogies, and frameworks used to inform and guide mobile learning efforts. For example, does mobile learning require a new pedagogical model or are current models sufficient for guiding mobile learning efforts? Prospective research should also explore the implementation of specific models or frameworks as they inform or guide faculty members' integration of mobile learning into a particular course or curriculum. Building on this idea, future research

could also explore effective pedagogies used to underpin mobile learning efforts. For example, because the student is untethered from a more formal learning environment, is a more direct instructional approach warranted or does an experiential and constructivist approach work to support a mobile learner? Because the student has the potential to become lost in the context or the situated-ness of a mobile learning activity, he/she might experience high transactional distance. Therefore, the instructor needs to be more specific in his/her activity instructions, providing structure, and explicit guidance (high transactional distance means as structure increases, dialogue decreases; Shearer, 2010).

Further research areas might be gleaned from this study that inform faculty developer and instructional designer practice regarding mobile learning support and initiatives. Hopefully, future researchers can keep pace with technological innovations, e.g., mobile devices, that offer profound new ways of creating, consuming, and contributing knowledge in a global and diverse community--ways that impact current pedagogical practices and faculty development.

Conclusion

This research sought to address one primary research question and two subordinate research questions, which are restated below followed by a summary of the conclusions. Before addressing the research questions, an antecedent question emerged from initial interviews that required consideration: What is happening on your campus regarding mobile learning?

To answer this question, participants began to relate their observations about mobile learning that included how it was paired with the learning management system, how students were driving the interest in mobile learning, and how interested faculty

were forming small ad hoc groups to share their ML experiences. As more students and faculty use mobile devices for their personal productivity, thereby habituating the devices' use as well as becoming familiar with the devices' affordances, the study participants anticipated seeing more hand-held devices on campus and greater student expectations about using the device in their courses. This idea is supported by the fact that many students can now access a university's LMS with their mobile devices and have content available to them anytime, anywhere. Mobile access to the LMS might lead to greater interest in other uses of the mobile device by students and supported by faculty who also are bringing their personal mobile devices to campus. LeFoe et al. (2009) found similar results: "Of significance was the ability for faculty to be able to use the devices in their everyday work and to become familiar with them to such an extent that they were then able to incorporate their use in the curriculum" (p. 25). As more faculty carry devices and use them personally, they might begin to explore other uses for the mobile device besides taking attendance and recording grades.

Q1 How are instructional designers and faculty developers planning for, guiding, and supporting faculty who desire to implement mobile learning in their courses?

Instructional designers and faculty developers, with the exception of one divergent case, were becoming aware of mobile learning and the potential needs of faculty but they were currently not involved in discernible efforts to guide faculty who wanted to engage with mobile learning. According to the majority of participants, faculty were not seeking out CTL staff for assistance with mobile learning because they were not using mobile devices in their courses. One explanation for this might be that faculty members did not have the time or incentive to integrate mobile learning into their

courses. Another explanation might be that faculty who were attempting to engage with mobile learning were doing so independently of the university's CTL or perhaps they were working with other individuals on campus.

Q1a What, if any, pedagogical approaches, conceptual frameworks, or models are they using when guiding faculty and addressing requests for mobile learning implementation and pedagogical support?

Although no specific pedagogies or theoretical models were cited for use in mobile learning, participants offered a variety of frameworks that informed their faculty support efforts. Participants, especially those with an instructional design background, relied on an instructional design line of questioning and referenced a process model to inform their faculty support. Others discussed frameworks they had used in past technology integration efforts, e.g., the Community of Inquiry model and Bloom's taxonomy. However, absent from several discussions about mobile learning was specific mention of the role and situation of the learner. Instead, participants concentrated on ensuring faculty had thought through their courses and prepared clear learning objectives aligned with assignments and assessments. While well-written objectives were learner-centered, learner considerations such as the environment and context for learning, discovery learning, and the social aspect of learning were not evident in the data surrounding mobile learning. These elements, when restated as pedagogies or ways of teaching and learning (contextualized, social constructivist, situated and authentic, experiential), offer essential theory-based foundations for mobile learning implementation. However, these pedagogies, which underpin a learner-centered perspective of mobile learning, were absent from the data.

Undoubtedly, the instructional design line of questioning will carry over to mobile learning support and considerations when that time comes. As Polly et al. (2011) found, professional developers, as well as faculty, had more success impacting student learning when their first question was “how can technology support students’ learning?” (p. 11).

Q1b What are the barriers and challenges instructional designers and faculty developers face when supporting and guiding faculty in their mobile learning endeavors?

Time, lack of knowledge, and accessibility (to a mobile device and content) proved to be the most described barriers to potential mobile learning efforts. These barriers have been consistently identified in the literature as some of the more significant challenges to technology integration in higher education.

Mobile learning shows bright promise, not only as a convenient way for students and faculty to consume, construct, and contribute knowledge but as an important learner-centered paradigm that has the ability to exploit anytime, anywhere learning in context-rich, authentic environments. As Johnson et al. (2012) forewarned, “[Mobile apps and tablets] have become pervasive in everyday life, at least in the developed world, and students at universities and colleges have ever-increasing expectations of being able to learn on these devices whenever and wherever they may be” (p. 6). Developers and designers within centers for teaching and learning have the opportunity to not only observe what is happening on campus regarding mobile learning but also influence what faculty members are doing regarding it. From their central stance as faculty support, they are expected to stay abreast of the latest research regarding effective technology integration and theoretical and pedagogically informed best practices. Therefore, instructional designers and faculty developers can position themselves as mobile learning

knowledge repositories and purveyors of what is working and not working regarding mobile learning. This might allow them to work with faculty members to address the most efficient, engaging, and authentic ways to realize mobile learning.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY of
NORTHERN COLORADO



Institutional Review Board

April 20, 2012


TO: Gary Heise
School of Sport and Exercise Science

FROM: The Office of Sponsored Programs

RE: Exempt Review of *Pedagogies, Perspectives, and Practices: Mobile Learning Through the Experiences of Faculty Developers and Instructional Designers*, submitted Kim A. Hosler (Research Advisor: Linda Lohr)

The above proposal is being submitted to you for exemption review. When approved, return the proposal to Sherry May in the Office of Sponsored Programs.

I recommend approval.

 11 May 2012
Signature of Co-Chair Date

The above referenced prospectus has been reviewed for compliance with HHS guidelines for ethical principles in human subjects research. The decision of the Institutional Review Board is that the project is exempt from further review.

IT IS THE ADVISOR'S RESPONSIBILITY TO NOTIFY THE STUDENT OF THIS STATUS.

Comments: *emmed - 9 May 2012*

25 Kepner Hall ~ Campus Box #143
Greeley, Colorado 80639
Ph: 970.351.1907 ~ Fax: 970.351.1934

APPENDIX B

PARTICIPANT SOLICITATION EMAIL

Email Subject line: Opportunity to participate in Faculty Development dissertation research

May 13, 2012

Hello fellow POD members,

My name is Kim Hosler and I am a doctoral candidate in Educational Technology at the University of Northern Colorado. I am seeking participants for my dissertation research; research exploring the experiences and challenges of faculty developers and instructional designers who are guiding and supporting faculty seeking help with mobile learning (broadly defined).

I am looking for individuals who work with faculty directly (either part-time or full-time) and have experience or educational background in instructional design, educational technology, or curriculum and instruction and/or prior experience supporting faculty members inquiring about or implementing mobile learning.

You will be asked to participate in two individual interviews (about 60 minutes each); one interview to occur in May (approximately) and the second interview in late August/early September. Additionally, you will be asked to submit a journal entry and a model or diagram of how you see mobile learning, in mid to late July.

Your identity will be completely confidential and no one but me will be able to connect your responses with your name and institution.

Should you decide to participate in this study, I can offer you a \$30.00 Amazon.com gift card as a token of my appreciation for your time.

If you are interested in participating or have any questions about the study or time commitment, please contact me at hosl4885@unco.edu

Also, please consider forwarding this to others who may be interested in participating in research investigating faculty developers' and instructional designers' experiences with mobile learning.

Thank you!

Kim A. Hosler, Educational Technology doctoral candidate
University of Northern Colorado
Email: hosl4885@unco.edu
OR kahosler@gmail.com

APPENDIX C

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH



**Consent Form for Human Participants in Research
University of Northern Colorado**

Researcher: Kim A. Hosler, Doctoral student of Educational Technology, College of Education and Behavioral Sciences. Phone: 303-918-2946. email: hosl4885@unco.edu

Research Advisor: Dr. Linda L. Lohr, Professor of Educational Technology, College of Education and Behavioral Sciences. Phone: 970-351-2513. email: linda.lohr@unco.edu

The primary purpose of this study is to explore how faculty developers and instructional designers working in faculty development centers and educational technology centers are handling inquiries from faculty regarding mobile learning. I am interested in understanding the types of mobile learning inquiries you receive from faculty and how you guide and support faculty when addressing their inquiries.

In order to conduct this study, I am seeking your permission to interview you on two occasions, with each interview not to exceed 60 minutes. Additionally, I am asking you to create one short reflective essay along with a model or diagram of your concept of mobile learning. The first interview will take place in May 2012, the reflective essays will occur in July and the final interview will occur in late August or early September.

When you consent to participate in this research, you agree to be interviewed by me (Kim) about your experiences and activities regarding mobile learning and your work with faculty members inquiring about mobile learning.

In the course of this research, your identity will not be attached to the answers provided or the data collected. You will choose a pseudonym to be used in place of your name and will work with me to change other potentially identifying characteristics and experiences in the research if you so choose.

The interviews may be digitally recorded (with your consent) and any audio recordings will be disposed of upon transcription to my password protected computer. Likewise, paper-based notes will be shredded once entered into my password-protected computer. Only I, my research advisor, and a transcriptionist will have access to the digital audio files.

Potential risks to you in this study are minimal and do not extend beyond the risks you encounter in your normal day-to-day work activities.

Upon completion of the two interviews, the short reflective essay, and the mobile learning diagram, I can offer you a \$30 gift card to a local dining establishment or an Amazon.com gift card (your choice). You are also welcome to a copy of the final report. I will use the findings from this study for my dissertation and for a manuscript to be submitted for publication, thereby helping other faculty developers and instructional designers who support and guide faculty regarding mobile learning.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Sponsored Programs, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-2161.

Participant's Signature

Date

Researcher's Signature

Date

APPENDIX D

FIRST SESSION INTERVIEW QUESTIONS

FIRST SESSION INTERVIEW QUESTIONS

1. What pseudonym would you like for this study? _____
2. How would you categorize your age range?
 - a. 26-35
 - b. 36-45
 - c. 46-55
 - d. 56 or older
3. What is your current position title? _____
4. Please tell me about your educational background.
5. Please describe your current role and responsibilities.
6. How many years of experience do you have in faculty development or as an instructional designer?
7. How do faculty/instructors come to you with their requests for support or questions?
8. How do you define mobile learning?
9. Describe your background knowledge of and/or experience with mobile learning.
10. What is happening on your campus related to mobile learning?
11. Describe current requests from faculty regarding mobile learning. What do you think is driving these requests? What types of questions are you seeing? How are you addressing these requests or questions? Do any models or frameworks come to mind that you would considering using or have used to support faculty interested in implementing ML?

12. How would you describe the faculty members who are seeking assistance with mobile learning? (adjunct, tenured, experienced technology users, novice technology users, young faculty members or more mature faculty members etc.)
13. Do you think faculty are prepared to use mobile learning? (how or how not)
14. Describe any preparations or plans you or your department are making to meet the needs or requests for mobile learning from faculty. *If participant has limited exposure to faculty requests for guidance /support with ML, then ask them: Imagine helping faculty implement ML at some future point. Describe how you see yourself helping them. Do any models or frameworks come to mind that you would consider using to support faculty interested in implementing ML?*
15. Can you share with me materials (artifacts) you use with faculty (e.g. brochures, emails, web page information, articles, job-aids etc.) related to mobile learning or mobile learning initiatives?
16. Describe any obstacles you have encountered or obstacles you foresee regarding mobile learning.
17. What are your most significant challenges (frustrations) in dealing with mobile learning? How do you anticipate overcoming them?
18. What additional support do you need as a faculty developer/instructional designer in order to support mobile learning at your university? (information, training, experience, models etc.)

APPENDIX E

SECOND ROUND OF SEMI-STRUCTURED INTERVIEW QUESTIONS

Second Round of Semi-Structured Interview Questions

- 1) Since our first interview on _____, please describe any *new* ideas, perceptions, or concepts you have about mobile learning. In other words, has anything changed for you regarding ML since we last spoke?
- 2) Are there any other models or frameworks you are using or considering using for any m-learning implementation? In our previous interview, you mentioned _____.
- 3) What do you see as the future of ML on college campuses?
- 4) Are there any preparations or plans you or your department is making to meet the needs or requests for mobile learning from faculty? What's happening now?
- 5) Any other concluding or final thoughts or comments about mobile learning?

APPENDIX F

**JOURNAL AND VISUAL MODEL CREATION
INSTRUCTIONS**

Journal and Visual Model Creation Instructions

1) Create a one-page journal entry (roughly) addressing the following:

- a. Have you helped anyone with his or her request for mobile learning in the past several weeks? If so, for what types of questions or issues did they seek your help?
- b. How did you help or guide them? (i.e. what did you say and do).
- c. What, if any, obstacles did you encounter?

2) A Visual Model:

- a. Create a digital model, flowchart, concept map, or drawing that visually represents how you see mobile learning as it may apply (or does apply) to your college or university.

Feel free to use MS Word's drawing tools, concept mapping software, PowerPoint or any tool that gives you the ability to create a digital representation of your model/vision.

Things to consider:

What factors interact, or what variables are necessary for mobile learning effectiveness? A few elements (not an exhaustive list) for consideration are the instructor, the learner, resources, theories, the learning environment, pedagogy for mobility etc.

- b. Write a brief summary or explanation of your model so I may better understand how to interpret it.

Please email this back to me on or before _____.