



UNF Digital Commons

UNF Graduate Theses and Dissertations

Student Scholarship

2011

A Collective Case Study of Mobile E-Book Learning Experiences

Jeffrey Scott Kissinger
University of North Florida

Suggested Citation

Kissinger, Jeffrey Scott, "A Collective Case Study of Mobile E-Book Learning Experiences" (2011). *UNF Graduate Theses and Dissertations*. 127.

<https://digitalcommons.unf.edu/etd/127>

This Doctoral Dissertation is brought to you for free and open access by the Student Scholarship at UNF Digital Commons. It has been accepted for inclusion in UNF Graduate Theses and Dissertations by an authorized administrator of UNF Digital Commons. For more information, please contact [Digital Projects](#).

© 2011 All Rights Reserved



A COLLECTIVE CASE STUDY
OF MOBILE E-BOOK LEARNING EXPERIENCES

by

Jeffrey Scott Kissinger

A dissertation submitted to the College of Education and Human Services
in partial fulfillment of the requirements for the degree of

Doctor of Education in Educational Leadership

UNIVERSITY OF NORTH FLORIDA

COLLEGE OF EDUCATION

January 2011

Unpublished work © Jeffrey Scott Kissinger

The dissertation of Jeffrey Kissinger is approved:

Signature deleted

Katherine L. Kasten, Ph.D. Major Professor
Signature deleted

2/28/2011
Date

Terence W. Cavanaugh, Ph.D.
Signature deleted

2/26/2011
Date

Paul D. Eggen, Ph.D. JJ
Signature deleted

2/28/2011
Date

David D. Jaffee, Ph.D.

2/28/2011
Date

Accepting for the Department:

Signature deleted

E. Newton Jackson, Jr., Ph.D., Chair
Department of Leadership, School Counseling, and Sport Management

5-3-11
Date

Accepting for the College:

Signature deleted

Larry G. Daniel, Ph.D., Dean
College of Education & Human Services

05/04/2011
Date

Accepting for the University:

Signature deleted

Len Roberson, Ph.D., Dean
The Graduate School

5/9/11
Date

ACKNOWLEDGMENTS

I would like to acknowledge and thank the committee members for my study: Terrance W. Cavanaugh, Ph.D.; Paul D. Eggen, Ph.D.; and David D. Jaffee, Ph.D., for their time and helpful wisdom during this learning experience. I would especially like to recognize Katherine K. Kasten, Ph.D., my committee chairperson, for her dedication, patience, and availability for my seemingly constant questions. I would also like to thank my family and friends for their constant support and interest in my research and work. Ultimately, I would like to dedicate this to all who seek access to knowledge and learning, and then strive to use these valuable tools for positive ends.

TABLE OF CONTENTS

	page
ACKNOWLEDGMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
ABSTRACT.....	ix
CHAPTER 1: INTRODUCTION.....	1
Introduction.....	1
Background of the Problem.....	1
Statement of the Problem.....	4
Conceptual Framework.....	5
Research Questions.....	6
Methodology.....	7
Research Context.....	8
Significance of the Study.....	9
Summary of Chapter 1.....	11
CHAPTER 2: LITERATURE REVIEW.....	12
Introduction.....	12
Mobile Technology.....	13
Definition of Mobile Learning.....	14
Educational Uses of Mobile Technologies.....	15
Mobile Learning Theory.....	18
History of E-books.....	20
Defining E-books.....	21
Types of E-books.....	23
Potential of E-books.....	25
E-book Challenges.....	27
Summary of E-book History.....	28
Conceptual Framework of the Study.....	29
Constructivism.....	30
Information Processing Theory.....	32
Working Memory.....	33

Automaticity	33
Metacognition.....	34
Information Processing Theory Summary	34
Social Cognitive Theory.....	35
Self-efficacy	37
Expectancy X Value Theory	38
Self-determination Theory	39
Activity Theory	40
Situated Cognition.....	42
Summary of Chapter 2	43
CHAPTER 3: METHODOLOGY	45
Introduction	45
Research Epistemology	46
Case Study Inquiry	48
Generalization and Purpose.....	49
Epistemology Summary	52
Setting and Participants	52
Mobile E-books Used in Study	55
Data Sources.....	57
Archival Data	57
Data Collection.....	58
Data Sources Summary	60
Data Analysis	60
General Data Analysis Strategy	61
Data Analysis Summary	63
Ethical Considerations.....	64
Research Timeline.....	65
Summary of Chapter 3	65
CHAPTER 4: DATA ANALYSIS.....	67
Introduction	67
Level 1 Data Analysis: Student Case Descriptions	67
Introduction	67
Student Familiarity with E-books	69
Allen.....	69
Claire	69
Denise.....	69
Ken	69
Melody	70
Roger	70
Thelma	70
Student Interview Transcript Coding	70
Summary of Level 1 Data Analysis	72
Level 2 Data Analysis: Interview Excerpt Topical Categories	72
Introduction	72

Acceptable Social Use.....	74
Ad Hoc Personal Learning Environments (PLEs)	76
Student E-book Activities	79
Student Motivations	84
Self-efficacy	89
Social Constructivism	93
Situated Learning	104
Summary of Level 2 Data Analysis	115
Level 3 Data Analysis: Thematic Cross-Case Syntheses.....	115
Introduction	115
Research Subquestion A: What Factors Contributed to Students’ Successful Use of Mobile E-books to Support Their Learning?	116
Research Subquestion B: What Factors Inhibited Students’ Successful Use of Mobile E-books to Support Their Learning?.....	120
Research Subquestion C: What Changes to Mobile E-books do Students Want That Would Best Support Use of These Devices for Learning?	123
Summary of Level 3 Data Analysis	128
Summary of Chapter 4	129
 CHAPTER 5: SUMMARY AND DISCUSSION.....	131
Introduction	131
Summary of the Study.....	131
Conclusions Drawn from the Study	135
Students Expressed Feelings of Competence	135
Students Expressed Feelings of High Self-Efficacy.....	135
Students Valued Using the E-book for Their Learning.....	138
Student Perceived E-book Use as Metacognitive and Individualized.....	140
Student Use Demonstrated that E-book Mobility Can Enhance Learning.....	144
Student and Instructor Views of Social Texts Diverged	148
Summary of the Major Conclusions.....	151
Limitations of the Study	152
Recommendations for Educational Leadership Action.....	153
Recommendations for Future Research	156
Conclusion of the Study	159
 APPENDICES.....	162
A FSCJ Student Volunteer Letter.....	162
B UNF Informed Consent Letter and Form: Student.....	163
C UNF Informed Consent Letter and Form: Instructor.....	165
D UNF IRB Approval Letter.....	167
E Semistructured Student Interview Questions.....	168
F Semistructured Instructor Interview Questions.....	169
 REFERENCES.....	170
 VITA	181

LIST OF TABLES

Table	page
1. Student Demographic, Device, and Course Information	68
2. Student Interview Information	68
3. Bases for Student Interview Transcript Coding Categories	71
4. Coding Categories Identified in Level 2 Data Analysis.....	71
5. Interview Excerpt Topical Categories and Subcategories.....	73

LIST OF FIGURES

Figure	page
1. Mobile e-book case study conceptual framework.....	30
2. Information processing model.....	32
3. Bandura's model of triadic reciprocity.....	36
4. Activity system triangle	41
5. Thematic categories.....	72

ABSTRACT

This research was designed to explore the learning experiences of state college students using mobile e-book readers. The purpose of the study was to build a rich description of how students used electronic textbooks delivered on mobile computing devices for college-level, introductory sociology courses. This research employed a multiple case study design that thoroughly investigated and documented student experiences with this instructional technology.

The bounding frame was comprised of the literature on mobile technology, mobile learning theories, and e-books. Situated within the mobile learning framework was a theoretical lens of learning theories commonly found in the literature on mobile learning (constructivism, social cognitive theory, self-efficacy theory, expectancy x value theory, self-determination theory, and situated cognition). This lens was used to provide insight into the student's learning experiences.

This study was comprised of data from a variety of sources that were chosen for their ability to produce insight into the learning experiences of mobile e-book students taking introduction to sociology courses at a Southeastern public state college. The data analysis was comprised of three levels of increasing stages of granular examination. These included level one: descriptive summaries of student cases, level two: student and instructor interview data and excerpts from audio recording transcriptions organized by topical categories, and level three: cross-case synthesis relating to the theoretical framework and research questions.

Students were found to be competent with the e-books, confident, metacognitive, and desirous of more social learning opportunities within their e-books. By addressing the primary research question and the subquestions, six major conclusions were reached. These were: (a) students expressed competence in their use of the mobile e-books, (b) students expressed feelings of high self-efficacy when using the mobile e-books, (c) students overall valued the use of the e-book for their learning, (d) students were individualized and metacognitive in their learning with the mobile e-books, (e) students enhanced their learning socially and within situated learning opportunities, and (f) the students and the instructor had divergent views on the value and utility of social, interactive textbooks.

Increasing understanding of the use of electronic and mobile instructional technologies such as e-books may better assist educational leaders with preparing students for today's global knowledge economy. Based on the conclusions of this study, recommendations for future research and educational leadership were addressed.

CHAPTER 1 INTRODUCTION

Introduction

Higher education institutions are currently in a climate of increasing government calls for accountability, while funds diminish. Adding to this climate, textbook publishers are producing more frequent editions to already costly course texts and materials that are increasing the overall cost of college attendance for students (U.S. Government Accountability Office, 2005). New technological innovations in the consumer market, such as increased availability of electronic texts—for example, hardware e-book readers and large text collections on the Internet—have gained momentum as well. Within this overall climate some higher education institutions are considering a move to using all electronic textbooks and materials, as an option to cut costs and ensure student access to affordable college educations. While this move could prove to reduce textbook costs, exactly how this transition to mobile e-books will impact student learning is yet unclear and is an area that must be researched to ensure students are positively served through these transitions.

Background of the Problem

Community college distance learning leaders have historically (Mullins, 2007) and still currently serve large populations of nontraditional students through various forms of distance learning, including TV-based instruction, online courses, and correspondence models. Innovation with instructional delivery systems has been a long

tradition within community colleges, as they seek to meet the unique needs of their nontraditional students and to increase access.

In Florida alone, the number of online degree programs has ballooned from 20 to 430 over the past decade (Florida Distance Learning Taskforce, 2009). At the same time, government allocations to colleges and universities have decreased, tuition has increased, and publishers have increased textbook costs to students through price hikes and frequent edition changes (U.S. Government Accountability Office, 2005).

Higher education institutions are beginning to explore the application of electronic textbooks, known as e-books and mobile e-book readers, in learning environments (Brown, 2009; Princeton University, 2009; Sannier, 2009; Shieh, 2009). The current Princeton University study employs the Amazon Kindle DX e-book reader. Likewise, the four goals of the Princeton pilot are that (a) there would be no sacrifice in the classroom experience due to technological intervention, (b) the use of an e-reader would offer convenience to the course participants, (c) the desire to print or photocopy would be reduced, and (d) the unique strengths of current e-readers be explored. At Arizona State University (ASU) and Northwest Missouri State University there have already been challenges, such as accessibility for students with visual disabilities, and overall challenges with student dissatisfaction with various functionalities, such as highlighting.

Increasingly flexible, mobile distance learning methodologies are emerging that can be utilized for these type of technology access-challenged student populations; however, significant data on issues related to teaching and learning in this fashion is lacking (Sharples, 2007; Sharples, Taylor, & Vavoula, 2005). Community college

distance learning leaders need to better understand the emerging delivery trends, such as mobile learning related technologies and pedagogy. By becoming more knowledgeable, leaders will be better equipped to support and serve their students, while furthering their historical mission of access and learner-centered education (Gleazer, 1980; Parnell, 1985).

Mobile learning, or “mLearning,” is distance learning delivered on portable, handheld computers, where learners can be disconnected from the Internet, dispersed geographically, and situated in their own environments (Kukulka-Hulme & Traxler, 2005). Example instructional uses include mobile devices loaded with collections of instructional media, learning objects, electronic readings, and guided learning exercises. Mobile students may complete all or a portion of their coursework in this fashion on the actual device, or the mobile computer may simply be a supplemental repository for the course materials, documentation, and media, depending on the design and learning scenario. Unlike more widely adopted and traditional online distance learning course scenarios, mobile learners are unique because they are not necessarily tethered to a desk, computer terminal, or even a particular stationary geographic location. With the advent and continuous enhancement of portable computing technologies, such as personal digital assistants (PDAs), iPods, iPhones, and handheld-sized laptops, distance learning has increasingly become more flexible and more embedded in the learner’s own environment.

One of the most widely-adopted uses of mobile technologies has been as a multimedia access tool (Cheung & Hew, 2009), including use as portable electronic textbook readers or information books (Dieterle & Dede, 2006). Recent popular examples include using PDAs, Sony eBook Readers, and the Amazon Kindle, which are

all small, handheld mobile computing devices that can be used for electronic readings and texts.

In one of the largest pilot studies to date, Northwest Missouri State University loaned Sony eBook Readers to 240 students. McGraw-Hill provided digital course content for the fall 2008 study. In a January 2009 *Chronicle of Higher Education* article, University President Dean Hubbard said the devices were ““a tremendous attention getter,”” but ““not as good an attention holder”” (Shieh, para. 4). He noted that students became frustrated with the devices’ inability to allow highlighting text, cut-and-paste functions, and interactivity. Based on the students’ initial reactions, Hubbard postulated that the devices would be “extremely popular in the long run,” after features improve (Shieh, 2009, para. 4). There have been similar small-scale studies and pilots, such as the studies currently in progress at Princeton and at ASU; however, educational institutions and their leaders have not yet determined what mobile e-books may mean for students and their learning success.

If educational leaders, and especially innovators within community colleges (Mullins, 2007), strive to provide access and quality educational opportunities to their students—in the information age where there is a movement to handheld electronic media (Johnson, Levine, & Smith, 2009)—then research must focus on integrating this technology within teaching and learning frameworks.

Statement of the Problem

In the fall of 2010, Florida State College at Jacksonville (FSCJ), formerly Florida Community College at Jacksonville, transitioned from paper-based course textbook materials to electronic textbooks for many of its 100- and 200-level courses. As part of

the college's SIRIUS initiative, a course and textbook design college-publishing consortium, FSCJ will no longer print and sell paper-based versions of SIRIUS course textbooks. SIRIUS Academics (formerly SIRIUS Learning Solutions) started as a strategic business initiative in 2003 to provide materials designed by faculty teams to create high-quality learning experiences and reduced textbook costs for students (FSCJ, 2009, "About SIRIUS"). As a measure based partly on reducing textbook costs to students and making college education more affordable and accessible, students receive course textbooks in an entirely electronic format that can be used online and on mobile e-book reading devices. Making this transition requires leaders to have more information and understanding of how student learning may or may not be affected by solely using electronic, mobile textbooks. Due to the public and well-known status of SIRIUS, no attempt was made to keep the college affiliated with the initiative anonymous; also, no harm was foreseen in revealing the institution's name.

This study investigated the experiences of college students using dedicated mobile computing devices, such as digital e-book readers, in undergraduate Introduction to Sociology courses. How the students used these devices and digital course textbooks was the focus of the research, in an effort to gain better understanding of the students' learning behaviors in a college course that employed these emerging educational technologies.

Conceptual Framework

The literature framing this study pertained to mobile learning, e-books and e-readers, and mobile learning theories. The theoretical lens informing this study, its methods and strategies for analysis, was comprised of constructivism, social cognitive

theory, self-efficacy theory, expectancy x value theory, self-determination theory, and situated cognition.

Of these theoretical lens components, situation cognition was a main factor (Brown, Collins, & Duguid, 1989). In this theory of learning, the authenticity of the learner's context and environment, along with the application of knowledge, take precedence regarding knowledge acquisition. Due to the context-agnostic nature of mobile learners and portable technology, such as e-book readers, situated cognition was an ideal constructive theoretical stance to ground this inquiry in, because it focused the inquiry on learners within their authentic, individual environments. Much research on mobile learning has focused on the technology itself (Kukulka-Hume & Traxler, 2005), rather than its use for learning, and researchers in mobile learning have called for a shift in the research agenda to the learning (Sharples et al., 2005). To this purpose, this study focused on several research questions about learning.

Research Questions

This study was designed to examine the following primary question research:

- Primary Question: What were the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses?

The following subquestions were addressed in the study:

- Subquestion A: What factors contributed to students' successful use of mobile e-books to support their learning?
- Subquestion B: What factors inhibited students' successful use of mobile e-books to support their learning?
- Subquestion C: What changes to mobile e-books did students want that would best support use of these devices for learning?

Methodology

The research conducted thoroughly investigated students' experiences using mobile e-books for their Introduction to Sociology course at FSCJ. This case study was an inductive, open-ended, exploratory inquiry that sought to begin building an understanding of the students' use of electronic textbooks on mobile e-book readers. The focus of the study was each individual student, which, for the purposes of this case study, was considered a single case and a "bound system" (Merriam, 1998; Stake, 1995). All of the students formed the collective or multiple case study, which yielded greater insight into mobile e-book learning experiences (Merriam, 1998; Stake, 1995; Yin, 2009). This study did not seek positivistic generalization, as in more traditional quantitative inquiries (Yin, 2003), but rather intended to build a thoroughly descriptive account of the phenomenon to enhance educational leaders' understanding of student mobile e-book learning experiences. By better understanding these experiences, some analytical generalization can be established as a basis for understanding and informing e-book applications in higher education (Yin, 2009, p. 43). In turn, this may provide further enlightenment regarding mobile e-book learner experiences and inform future strands of inquiry into mobile electronic textbooks and student learning in higher education.

The epistemological stance of this study was fundamentally qualitative in nature. The qualitative research paradigm was chosen for its ability to enhance understandings of real experiences and events, which in this case was of students using electronic mobile textbooks. Due to the still-emerging landscape of issues and research in mobile learning, this naturalistic approach, employing qualitative case study methods and techniques, was

considered most aligned with the purpose of documenting in-depth student learning experiences. Although there have been some specific, traditional quantitative studies on mobile learning (Doolittle & Mariano, 2008; Wang, 2007; Wang & Wang, 2008; Wang, Wu, & Wang, 2009), their focus on either working memory capacity (Doolittle & Mariano, 2008) or anxiety and self-efficacy (Wang & Wang, 2008) alone was thought too narrow and limiting in terms of insight and scope for this study. For FSCJ educational leaders to gain authentic, comprehensive knowledge on what student learning experiences were with this technology initiative, despite an inability to directly generalize, an in-depth collective case study design was devised for use in two fall 2009 FSCJ classes.

Research Context

The site chosen for this study was a large state college in North Florida, which, until the fall of 2009, was a two-year community college. At the time of the study, Florida Community College at Jacksonville, now Florida State College at Jacksonville (FSCJ), had approximately 80,000 enrolled students, with a large portion, approximately 40,000 students, taking online courses. Known for innovations in education programs and delivery methodologies, FSCJ has offered fully-online courses since 2000, and now offers the associate of arts and several other degrees completely online. These increased online programs of study and flexible delivery methods align with the institution's mission of open access and meeting diverse student needs.

In 2004, as part of a quality improvement initiative at the college, the SIRIUS course development projects started publishing online, traditional classroom-based, and hybrid course materials and textbooks. This program was started to involve faculty-

authoring teams at the college in scholarship and enhanced pedagogy in order to deliver high-quality learning experiences to students, regardless of context and modality. The design logic was that a student who took an online English Composition I course and another who took it as a classroom-based course would have comparable experiences, resulting in similar outcomes.

In addition to enhancing quality and ensuring academic rigor across learning environments, as part of the SIRIUS project, the faculty development teams collaboratively authored original textbooks for each of the courses. Faculty received stipends and royalties for their work, and the SIRIUS textbooks were owned by the college. One of the primary motivations of this project was to address rising textbook costs that were thought to be an impediment to educational access for many students. Since the inception of the SIRIUS program, 20 courses have been developed, and the textbook for each course is \$60.00, which includes a \$10.00 bookstore handling fee.

Continuing in the college's commitment to open education access and providing quality and affordable educational opportunities for all students, FSCJ will transition all of the SIRIUS textbooks to e-books by fall 2011. As the textbook and SIRIUS course materials are owned by the college, FSCJ retains the right to modify, package, and deliver these texts and materials in any format. It is thought that this move will increase students' access and affordability, since there will be a decrease in the cost per textbook for each student. Currently, the textbooks are priced at \$48.00; however, these are expected to drop with further negotiations with the partnered bookstore, Follett, Inc.

Significance of the Study

A 2005 U.S. Government Accountability Office (USGAO) report on textbook

costs revealed that textbook costs rose 186% from the period of 1986 to 2004, a rate double of that of inflation (p. 8). Additionally, the report showed that this cost equaled 72% of the total tuition costs for a full year of enrollment in a two-year college in 2004. The publishers explained this rise as directly associated with the enhanced technology authoring and instructional media, such as CDs, videos, and interactive DVDs, that reflect the most current pedagogy and market expectations (USGAO Report, 2005, p. 14). In this climate, textbook costs for students continue to increase rapidly, and as this continues, it may further hamper educational access for students, in particular nontraditional students attending community and state colleges.

With the pending move to electronic textbooks, students will no doubt be affected; however, it is unclear how and to what extent. By studying initial experiences of students using mobile electronic textbooks at FSCJ, educational leaders may better inform their actions and decisions. What is of particular interest and importance for responsible public stewards and the student constituents they serve is how student learning will be influenced or affected by this shift. Supported by the literature (Kukulska-Hume & Traxler, 2005; Sharples et al., 2005), what is needed now in terms of research is a focus on the learning students experience with mobile technology, not the technology itself or its usability. By employing a case study methodology where multiple cases of student learning experiences are analyzed, increased insight may be gained into how student learning may be affected by the move to electronic mobile course textbooks. Based on these case data and analytical generalization (Yin, 2009), researchers may uncover patterns and unforeseen issues that will serve to better inform educational leaders as they employ these instructional technologies.

Summary of Chapter 1

This chapter introduced the research topic, provided a background for the present study, the statement of the problem, theoretical framework, research questions, methodology, setting and context, and the study's overall significance and research contributions. Chapter 2 presents the literature on mobile learning, e-books, and learning theory that constituted the conceptual framework for this research. Chapter 3 contains the epistemological research stance, along with the selected methodologies, techniques, and protocol. Chapter 4 contains the data analysis strategies carried out, along with the results and major topics uncovered through this process. Finally, in Chapter 5 the six major conclusions, which resulted from addressing the research questions of this study, are discussed.

CHAPTER 2 LITERATURE REVIEW

Introduction

This chapter will provide an overview of the most important bodies of literature in mobile learning and pedagogy, establishing a foundation on which to explore mobile technologies used in higher education. Specifically, this study investigated the experiences of college students using dedicated mobile computing devices, such as digital e-book readers. How the students used these devices and digital course textbooks was the focus of the research, in an effort to gain better understanding of students' learning behaviors in a college course that employed these educational technologies.

The two bodies of literature that provided the bounding frame in which this study took place were the literature addressing mobile learning and the literature specifically addressing e-books. Within this frame an assembly of relevant pedagogical and learning theories was employed to create a collective lens from which to guide the design, data collection, and analyses. Constructivism, information processing theory, and social cognitive theory formed the study's fundamental foundation. On this foundation, constructs of self-efficacy, expectancy x value theory, and self-determination theory, and situated cognition collectively formed the lens for this study. The overall purpose of the lens was to help inform and understand the students' mobile e-book experiences from the perspective of student learning. Before defining the collective lens, the bounding frame of the literature on mobile learning and e-books is defined and established.

Mobile Technology

It is important to provide an overview of mobile, handheld computing technologies and devices in order to effectively situate the study into the use and influence of mobile devices on student learning behavior. Dieterle and Dede (2006) discussed ubiquitous computing in society, from the 1980s to the present, as powerful, pervasive change that has been driven by the evolutionary adoption of mobile devices. They began their discussion with early technologies, such as Apple's Newton organizer, now about the size of a mini laptop, through various handheld gaming devices, such as the Nintendo Game Boy, to society's current proliferation of cell phones, smart phones, and personal digital assistants PDAs (p. 3). This evolutionary account serves as a backdrop to investigate the current use of mobile technologies in education. In general, there are five main categories of portable computing technologies:

- **Netbooks:** Smaller and more portable than traditional, full-sized laptops, these devices are similar in size to a hardcover book, have extended battery life, and are lightweight. These mobile devices are beginning to span the gap between mobile phones and laptops. Service providers such as AT&T, Sprint, and Verizon are pairing these devices with third generation (3G) wireless access to offer mobile, portable wireless computing and access. Examples of netbooks include the ASUS Eee PC, the Everex CloudBook, Intel's Classmate PC, and the XO Laptop, developed by One Laptop Per Child.
- **E-readers:** These dedicated mobile devices serve as the hardware for e-books and reading materials (Cavanaugh, 2003). Some examples of e-readers are the Franklin Rocket eBook EB500 Electronic Reader, and, more recently, the Amazon Kindle 3G, Amazon Kindle DX, and Sony PRS-700 Reader. These mobile devices are unique because they primarily serve as a dedicated reading device for electronic material; however, they have now been expanded to include media, Wi-Fi, dictionaries, annotation capabilities, and limited Internet browsing.
- **Mobile Phones:** These encompass standard cellular phones and multifunction smart phones that include PDA tools, such as calendars and organizers.

- **Personal Digital Assistants (PDAs):** These handheld, computer-based devices include organizational tools such as calendars, Wi-Fi, and communication tools (Trinder, 2005).
- **Media Players:** These devices are primarily single-use mobile devices, such as an iPod or portable video player. However, recent devices have expanded functionality, such as the iPod touch's Wi-Fi, e-mail, and messaging tools.

The Horizon Report (Johnson et al., 2009; Johnson, Levine, Smith, & Stone, 2010) on technology in higher education has specifically addressed the adoption and learning influence of these devices. As the reports indicated, since 2007, leaders in technology in higher education have identified mobile devices as a top priority. Mobile technology has steadily and increasingly permeated many aspects of modern living, including learning contexts.

Definition of Mobile Learning

Mobile learning, also called mLearning, is the use of mobile, portable, and handheld computing devices in learning applications and environments (Harris, 2001; Kossen, 2001; Laouris & Eteokleous, 2005; Quinn, 2000). Traxler (2005) defined mobile learning from the perspective of the technology: “any educational provision where the sole or dominant technologies are handheld or palmtop devices,” but further added that the learner may also need to be centered in a definition (p. 175). This learner-centered move in the research has been most widely pushed by Sharples et al. (2005), who considered the contexts and experiences of the actual learners paramount. In a 2009 review of research methodologies used in studies on mobile handheld devices in K-12 and higher education, Cheung and Hew (2009) adopted definitions that led their research to the narrowed perspective that mobile learning only encompassed devices that were small enough to fit in one's hand, such as a smart phone, cell phone, PDA, or palmtop

(Mifsud, 2004; Perry, 2003). However, the focus of my present study was not the technology itself, but rather what occurred when students used portable computing devices for their learning; in this case the devices were portable e-book readers. This might have been in the form of a portable media player, such as an iPod, portable netbook, or dedicated e-book reader, like the Amazon Kindle, that was employed for the purpose of learning. The key point of interest and defining characteristic of the present study's definition of mobile learning was the focus on portability, context, and flexibility (O'Malley & Fraser, 2004) that may have influenced students' learning experiences and behaviors.

Sharples et al. (2005) explained this research stance as:

placing the mobility of learning as the object of analysis we may understand better how knowledge and skills can be transferred across contexts such as home and school, how learning can be managed across life transitions, and how new technologies can be designed to support a society in which people on the move increasingly try to cram learning into the interstices of daily life. (p. 2)

Because the present study had a learning-centered view of mobile learning adopted from the work of Sharples et al. (2005), the study was not limited to or directed by the technology itself. As such, the study allowed the research to focus on the questions and inquires related to actual learning experiences with diverse emerging mobile devices. Specifically, the study investigated college students' learning when using e-books on two types of mobile technologies, the Sony PRS-505 Reader and the ASUS Eee PC 1005HA Netbook.

Educational Uses of Mobile Technologies

Churchill and Churchill (2008) devised five categories of educational affordances of PDAs:

- **Multimedia-access tool:** A variety of multimedia resources can be delivered using this technology, such as e-books, Web pages, presentations, interactive resources, audio files, and video segments. These resources can be accessed anytime, anywhere, by connecting to the Internet using a global positioning system (GPS) or wireless network connection, from the memory of the device or storage card, if the resources were previously downloaded, or through synchronization of the device with a computer.
- **Connectivity tool:** PDA technology empowers students to connect to each other, facilitators, and experts in the field; exchange ideas and files; collaboratively build understanding; manage activities; negotiate roles in their projects; and so forth. Connections might be established synchronously and asynchronously over mobile telephones and wireless networks that support voice and multimedia data transmission.
- **Capture tool:** PDA technology is equipped with capabilities that include capture of video and still photographs. Students might, for example, photograph and videotape machines and people during their industry visits, or photograph diagrams from a book or catalog. The capture affordance also includes audio capture. For example, students might interview experts and capture audio notes, or record characteristic sounds of a faulty engine. There is a possibility for specially-designed extensions and consoles to be attached to a PDA and used to capture, store, and process other kinds of data, such as recording global positioning of certain air pollution sources.
- **Representational tool:** PDA technology might be used by students to create representations that demonstrate their thinking and knowledge, for example, mind maps or captured and edited images.
- **Analytical tool:** A mobile-enabled PDA might be used as an analytical tool to aid students' tasks. Examples of these might include standard, scientific, and graphic calculators or specially designed analytical tools created by teachers to allow students to process certain data. (pp. 1448-1449)

While this list of potential uses may appear exhaustive, current and authentic information about how students use various mobile devices for their learning is still largely unknown and unexplored. Leaders continue to underscore the importance of mobile technologies and their possibilities for teaching and learning (Johnson et al., 2009; 2010).

Cheung and Hew (2009) later expanded these categories in their research to include two more categories, assessment tools and task management tools. They defined assessment tools as “the employment of handhelds for students to answer examination

questions, tests, or quizzes” and task management tools as “utilising the devices as personal information managers which store and organise a user’s address book, contact information, calendar, task lists” (p. 157). Dieterle and Dede (2006) listed similar uses of mobile devices in teaching and learning: (a) communicators; (b) construction kits (e.g., learning objects); (c) information books (e.g., e-books); (d) phenomenaria, which are designed to augment learner environments with simulation materials, such as planetaria, or, as in Chen, Kao, and Sheu’s 2003 study, students using handhelds with bird-related pictures and content augmenting their individual learning contexts; (e) symbol pads, similar to Churchill and Churchill’s (2008) representational tools; and (f) task managers (p. 9).

The predominant use of mobile devices for learning has been as a communication tool and for multimedia access (Cheung & Hew, 2009). Cheung and Hew (2009) asserted that because most of these new mobile devices were designed originally for some type of communication (e.g., cell phones, smart phones, and other wireless communications), this would logically reflect their primary use in educational contexts. An example of this is the use of short messaging service (SMS) text messages being used in a mobile language study by Levy and Kennedy (2005), where students sent and received SMS text messages on their mobile phones for learning Italian words and phrases. Seppälä and Alamäki (2003) also employed the use of SMS text messaging in their study of a teacher education training program that used this mobile communication to facilitate the exchange of teaching techniques and questions. This makes sense, especially if one considers mobile learning communication at a distance or in a setting

outside a formal classroom, where traditional face-to-face communication among students and teachers is unavailable or impractical.

Multimedia access is the other dominant application of mobile technologies in education. Examples of this include audio visual content, such as recorded lectures, PowerPoint presentations, and interactive learning objects, or e-books, journal articles, and course readings loaded onto various mobile devices. Hughes (2005) considered technology used in education as either taking on a replacement function or transformation function. In the case of an e-book loaded onto a dedicated reader, smart phone, or netbook, this would be an example of mobile technologies acting as a replacement for traditional media, such as textbooks or stationary desktop personal computers. A study by Hernon (2007) focused on the replacement of texts and reading materials by electronic versions and e-books delivered via PDAs, whereas Waycott (2005), also researching e-books on PDAs, framed the investigation around a more transformational focus. Waycott used activity theory, fundamentally grounded in Vygotsky's theory of constructivism (1978), which underscored the context and specific situations where learning occurs as the lens through which to study potential changes in learners through the use of mobile technologies. Similar to Sharples et al. (2005), this was a move away from the study of the technology—its functions or usability—and shifting focus toward the authentic learning context afforded by mobilized content.

Mobile Learning Theory

The dominant focus of most mobile learning research has been on the technology and its usability and features (Cheung & Hew, 2009), rather than within a broader pedagogical framework. By studying mobile learning applications and use within

learning theory frameworks, such as Waycott's (2005) use of activity theory, researchers can better understand possible transformational influences (Hughes, 2005) and the actual *learning* of mobile learning. In Sharples et al.'s (2005) formative theories on mobile learning, they moved the research agenda away from the dominant "technocentric" (Traxler, 2005) focus on the mobile technology and back to the learners, their contexts, and the unique potential affordances of emerging mobile practices in education.

As Cheung and Hew pointed out (2009), the majority of the research has been limited in its scope. They, along with other researchers, including Sharples et al. (2005), advocated research theoretically grounded in topics related to pedagogy. Specifically, Cheung and Hew stated, "The use of theoretical foundations will help inform the pedagogy of using them—a key success factor to the successful use of mobile devices to enhance learning" (p. 166). While there are some research examples of this move to more pedagogically-framed inquiries (Danaher, Gururajan, & Hafeez-Baig, 2009; Motiwalla, 2007; Ryu & Parsons, 2009; Waycott, 2005), more research in this vein is needed, to explore possible positive and challenging aspects facing the learner in mobile learning scenarios.

While many researchers have touted the potential of mobile learning to promote new learning opportunities and expanded lifelong learning (Sharples, 2000; Waycott, 2005), and specifically championed the mobility aspect of mobile learning (Sharples, Corlett, & Westmancott, 2002; Sharples et al., 2005), in terms of the potential of authentic, more learner-centric contexts, researchers must be diligent and careful to not let the mobile learning potential influence their research or agenda in overly optimistic terms. In an experiment involving working memory capacity and multimedia lessons on

an iPod, conducted with university students as subjects, Doolittle and Mariano (2008) found that students using the multimedia lessons in a stationary context, i.e., in a classroom setting, performed better on post-lesson assessments than students that viewed the lessons on the iPod while walking around the university campus. This study was unique in that it highlighted one identified potential weakness in mobile learning scenarios, but, more importantly, the study underscored the need for additional research, grounded in pedagogical frameworks, to explore all facets of students learning with mobile technologies. While mobile learning may provide emerging positive opportunities for lifelong, situated learning outside of formal classrooms and traditional learning environments, understanding students' learning and the unforeseen factors, both positive and negative, will better inform researchers, designers, and educational leaders working in the field.

History of E-books

Much of the research that has been conducted about mobile learning applications has focused on one of its most obvious uses, as a carrier for electronic readings and books (Chang, Sheu, & Chan, 2003; Corbeil, 2007; Gil-Rodriguez & Planella-Ribera, 2008; Lam, Lam, Lam, & McNaught, 2009; Rao, 2003; Waycott, 2005). The focus of the present study was also on this intersection of e-books and mobile learning. The history of the e-book can be traced back to the middle of the 20th century, with reading systems like the Memex (Bush, 1945), which was the size of a large desk and filing cabinet. Recently, educators and technologists (Cavanaugh, 2003) have started to consider the possibility of e-books as a realistic, potentially effective medium for learning.

One of the earliest efforts that centered on collecting e-books and making them available was Project Gutenberg. Founded by Michael Hart from the University of Illinois, Project Gutenberg was based on the idea of making full-text collections, which were free of copyright holds and in the public domain, accessible via the Internet. Currently, these works are available in plain text and Hyper Text Markup Language (HTML), as well as popular e-book formats such as Mobipocket file format (MOBI). Additionally, Project Gutenberg provides access to over 33,000 free e-books (Cavanaugh, 2003).

Defining E-books

One can find various definitions of e-books. Some definitions focus on the actual technology of delivering and using the written material, and others on words themselves, while most combine all of these elements under an overarching concept. Some of these definitions limit an e-book to an item available only on a computer screen, focusing on its digital form and being confined to a particular “desk-bound” use scenario (Cox & Mohammed, 2001). A more expanded view of e-books by Lynch (2001) includes not only the hardware and digital text components, but also software and a means or network for distribution. Rao’s (2003) definition is perhaps the most encompassing and technically thorough, and also tends to be most widely cited throughout the literature:

Text in digital form or books converted into digital form or digital reading material or book in a computer file format or electronic file of words and images to be displayed on a computer screen or read on a computer through a network or viewed on a desktop/notebook/dedicated portable device or read on all types of computers or formatted for display on eBook readers. (pp. 86-87)

However, a more contemporary definition by Cavanaugh (2005) succinctly covers the essential, functional elements, while simultaneously conveying the concept that an e-book is evolving and fluid:

E-books, like many other forms of computer technology, have two basic components: hardware and software. The hardware for an e-book is any type of technology that displays the “book” on a screen or presents it audibly with a speaker. The software being run on the hardware makes it possible to view or listen to all of the “book” material: text, pictures, sound, and whatever else the author includes. Under this definition, even a DVD displaying closed-captioning qualifies as an e-book. (p. 13)

This definition simplifies the concept of an e-book, making it more widely understandable and accessible; however, Cavanaugh alluded to the unique complexities of this new, evolving medium. He introduced the elements of media, along with the digitized characters and texts, which could lead to a completely new understanding and use.

In summary, there are three basic elements that define e-books (Lynch, 2001). The first consists of some type of stationary or mobile hardware, such as a desktop computer, laptop, or specialized mobile device like an Amazon Kindle or PDA. The second element is the software through which the e-book content is loaded and operated; for example, something as simple as a text file application, such as Notepad on a PDA, to a more closed and proprietary software system, such as on the Amazon Kindle. The third basic e-book element is the actual content, such as the words and diagrams of a science textbook or the Microsoft Reader format of George Orwell’s *1984*. Collectively, these elements form the ability to consume written materials digitally, and, for the purposes of this study, was how the concept of e-books was framed and understood.

Types of E-books

Because my study focused on the use of such tools as e-books for actual college courses and subsequent learning applications, rather than listing more expansive technical categories of e-books types (Barker, 1992), I adopted a more limited and activity-based categorical system. Hawkins (2000) provided one useful attempt at e-book categorization, containing four types of e-books, placed according to their uses. These included (a) downloadable e-books primarily meant for use on a PC or laptop with a software or digitally-encrypted client application, such as CaféScribe; (b) dedicated e-book readers, which are portable, handheld hardware devices such as a PDA, netbook, or Amazon Kindle; (c) on-demand, print-based e-books that may be accessed and printed from a kiosk or terminal; and (d) Web-based, or limited access, e-book materials that require a user to be online, or that have limited or restricted print capabilities, such as CourseSmart.

A primary hardware platform could be a traditional desktop-based personal computer (Cavanaugh, 2005; Rao, 2003) or one that was part of a university or school computing lab; however, these could also be a part of individual classrooms. The challenge of this e-book scenario is that it requires access to these technologies, usually a specific setting to use them, which, when contrasted to a traditional paper-based book, may preclude their wider use (Cavanaugh, 2005). While these materials are accessible online, students are bound to a desk or lab context, thus limiting where and how they can use the e-books.

On these computer-based e-book systems, software enables various e-book file format display and use. Examples of these file formats are Cavanaugh's (2005) "Big Five," which include:

- Plain Text (TXT): Typically, plain text can be read on any device that has a word processing application or capabilities. Examples include Notepad, WordPad, Apple's TextEdit, and a variety of free applications.
- Web (HTML/XML): More advanced features are available in this type of format, the standard for most Web information and content. Subsequently, e-books in HTML or XML are accessible from almost all standard browsers, such as Internet Explorer, Safari, and Firefox.
- Adobe Reader (PDF): Portable document format (PDF) is a proprietary format from Adobe that is accessible on most devices and widely used. The PDF viewer adds advanced features, such as text-to-speech, embedded media, and security levels that can restrict access and printing.
- Microsoft Reader (LIT): This format only works on Microsoft-based operating systems, but has some similar features of Adobe's PDF, including bookmarking, text-to-speech, and annotations.
- eReader (PDB): Available on virtually any platform, the eReader program database (PDB) format provides similar functionality to PDFs and LIT, such as bookmarking, annotations, and modifying font size. (pp. 26-29)

Since the publication of Cavanaugh's (2005) "Big Five," electronic publication (ePub) has emerged as the industry standard for electronic books, articles, and universal sharing and selling of text materials. The ePub format allows various mobile devices and e-readers to display books on their different screen sizes, with a format that allows optimization of text sizes and pagination.

In addition to being used on more stationary platforms and contexts, such as desktop PCs in a computing lab or classroom, there are smaller, more portable hardware devices that allow readers increased access, choices, and flexibility in how they use e-books. These devices are not necessarily new. One of the earliest commercial readers

was the Rocket eBook Reader, which, compared to current devices like the Sony PRS-700 and Amazon Kindle, was thicker, heavier and had a short battery life. This device ultimately failed in the consumer marketplace (Cavanaugh, 2005), and is no longer available. During the Consumer Electronics Show (CES) held in January 2011, over one hundred new mobile tablet devices, including e-book readers, were introduced (Collins, 2011). Coupled with the free, open-source Google Android operating system, the choices for potential mobile e-book reading devices are more abundant than ever.

Potential of E-books

In this general review on the basic types of e-book devices available, one has to consider how they will be used as an educational technology tool. How will students use e-books, and what is their potential in learning environments?

Exploring the potential of student e-book use, researchers have studied how, where, and how often they have been used. One such study was conducted at Fordham College with undergraduate biology students (Simon, 2002), who used a Rocket eBook Reader for their class materials. These e-readers were loaded with class lectures and readings in this case study ($n = 22$ students) that employed satisfaction surveys and open-ended questions to explore students' usage patterns. Researchers explored how often students used the e-books while commuting on the Manhattan public transit system and how this use compared to their paper-based text usage. The self-reported student survey data revealed that there were no differences, and that they tended to use both types of media equally. In terms of satisfaction, the majority of the students (19) stated that they would recommend using e-books in college courses to a friend, and 18 stated that they wished other courses were offered with e-book materials (p. 63). This research illustrated

a feature often cited in the literature on potential benefits of mobile learning (Roschelle, 2003; Sharples et al., 2005; Tinker & Krajcik, 2001; Waycott, 2005), the portability and the ability to take one's learning on the go; however, as this case study indicated, the same benefits applied to the students' traditional paper-based texts as well.

Perhaps more specific to students in a K-12 context, and potentially to college and university students, is the size and weight related to carrying around multiple, heavy textbooks. Cavanaugh (2005) explained that "technology now allows a student to carry many books, references, and resources in a single hardware device, which weighs as little as a pound" (p. 2). He explained the light weight as one of the significant advantages of e-books over traditional media; this weight difference could alleviate the physical burden and harm (Petracco, 2001) of students carrying around numerous and heavy textbooks.

An additional advantage of e-books is based on the nature of using texts in a digital format. According to Cavanaugh (2002), this enables accessibility, giving professionals or teachers the ability to access the materials without having to rework or modify the content into another medium. For example, an e-book on a PC or e-reader can have its text enlarged for a student with vision impairment. Another example is using text-to-speech capabilities that would allow a student to listen to the text instead of reading it. E-books can be considered an adaptive and assistive technology, which has further-reaching implications and increases potential access to wider student populations and populations with various disabilities related to reading.

One characteristic of e-books that has the most potential is the amount of available materials. There are over 240 e-book libraries (Cavanaugh & Cavanaugh, 2008) that maintain thousands of titles. This means that students have the ability to

access more titles from around the world and at anytime, without going to a physical library. With this level of availability, some educators now advocate dispensing with costly, quickly outdated traditional textbook materials in favor of free, accessible electronic materials (Cavanaugh, 2004; Weber & Cavanaugh, 2006). This move could have positive economic ramifications for students, but also impact the current conception and use of the textbook in teaching and learning.

E-book Challenges

Despite what some of the limited research, mainly in the form of self-reported student data, has indicated, the adoption and use of e-books in learning is not without its challenges. In a year-long study of The California State University E-book Pilot Project, (Langston, 2003), 62% of students in an e-book usage survey indicated that they preferred print (p. 29). Similarly, a study at the University of Denver revealed that humanities students who were more aware of e-book offerings and availability had a lower rate of usage (49.5%) compared to other students that were less aware of e-book availability (Levine-Clark, 2007, p. 9).

In a study that investigated students' e-book use in a university distance learning scenario (Gil-Rodriguez & Planella-Ribera, 2008), students were given their materials and readings on a larger (1024 x 768 pixels) Digital Ink Book (DIB), which is approximately the size of an Amazon Kindle DX and is geared toward educational settings. In this study the DIB contained all of the course materials in digital format, and researchers investigated how students used the DIB for their learning and course activities. Through the data analyzed in student journals, researchers found that students did not use or see the purpose of the device. They found it to be an unnecessary "gadget"

and had an overwhelming negative reaction to its use in their course (p. 58). Although this was a single case study with limited generalizability, it does highlight negative reactions distance learning students might have to a new and unfamiliar technology. This study, along with much of the literature on e-book usage (Abdullah, 2007; Abdullah & Gibb, 2008; Dillon, 2001; Ismail & Zainab, 2007; Langston, 2003; Levine-Clark, 2007; Weber & Cavanaugh, 2006), underscores the need for further research inquiries into the actual application of e-book technologies being used in courses by students. This research agenda parallels the agenda in mobile learning, specifically regarding the contextualization of mobile technologies in educational scenarios through an activity theory-based frame (Sharples et al., 2005; Waycott, 2005) and highlights the insight a study on the use of mobile e-books in college courses could add to the collective understanding.

Summary of E-book History

Much of the literature on mobile learning has focused on the usability of e-books on mobile devices (Chang et al., 2003; Hernon, 2007; Song & Fox, 2007, 2008; Waycott, 2005). By inquiring into the use of e-books that are delivered to students via mobile computing devices, the present study investigated students simultaneously using e-books and mobile devices for their learning. Researchers of both mobile learning and e-books have advocated a research agenda that does not focus solely on the technology, but rather on how these emerging tools and practices are employed by actual students. Through these explorations, patterns of usage, challenges, and currently unknown issues and potential benefits for educators may begin to emerge. Aside from advancing the research in both mobile learning and e-books, the practical implications for such inquiries can

benefit designers and educational leaders who make technology decisions for colleges and universities.

Conceptual Framework of the Study

Within the bounding frame of literature regarding mobile learning and e-books, a collection of relevant pedagogical and learning theories was employed to both build the study's foundation and to create a collective lens to guide the design, data collection, and data analyses (Figure 1). The foundation consisted of constructivism, information processing theory, and social cognitive theory. On this foundation, within the overarching confines of situated cognition—the most cited and used theory in mobile learning research (Roschelle, 2003; Sharples et al., 2005; Waycott, 2005)—the related and overlapping motivational theories of self-efficacy, expectancy x value, and self-determination, and situated cognition comprised the lens through which I investigated the students' learning experiences, their cognition, and any novel aspects of learning with mobile e-books.

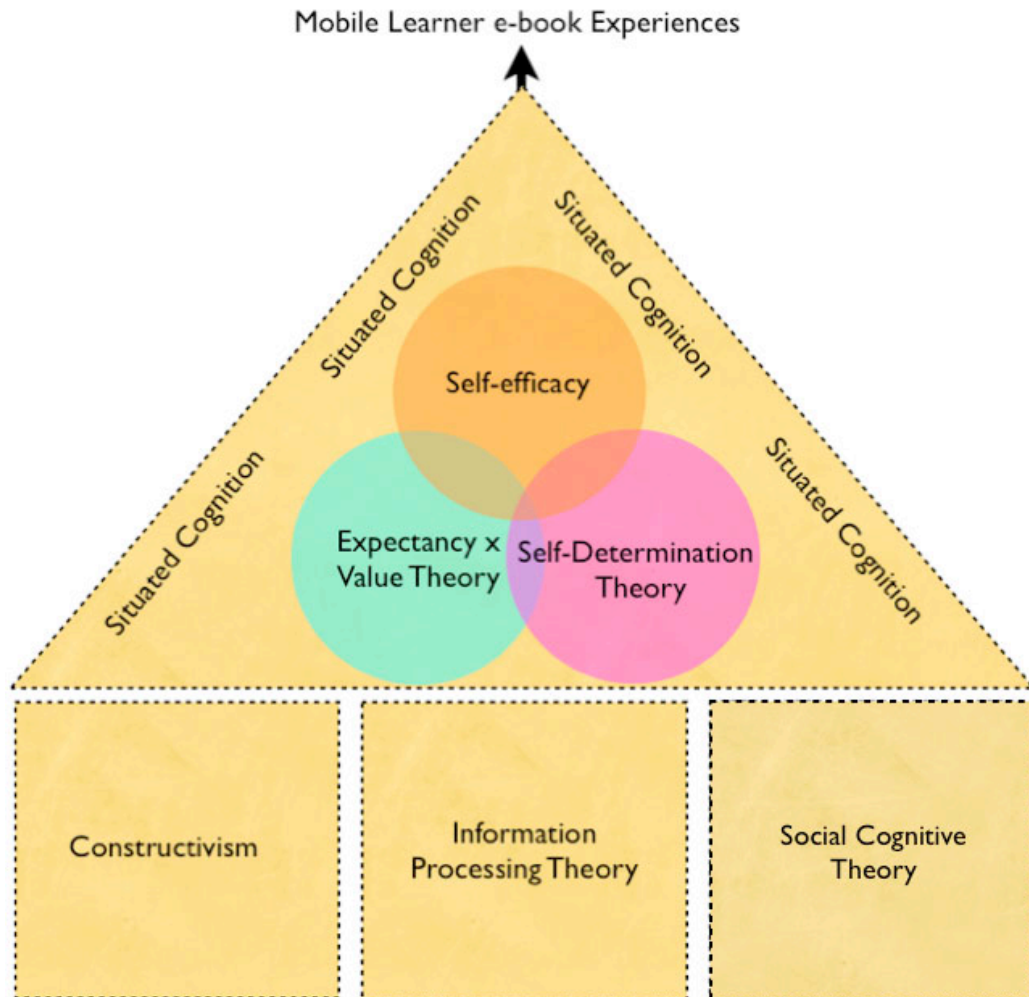


Figure 1. Mobile e-book case study conceptual framework.

Constructivism

In their emerging research, mobile learning theorists have focused on the unique affordances that mobile technology and learning applications have made possible (Sharples et al., 2005; Traxler, 2005). Additionally, researchers have focused on the experiential, contextual aspects and potential benefits of these (Roschelle, 2003), due to the learner's freedom from being tethered to particular location, unlike a traditional or online classroom.

Unlike traditional computers, users consider mobile devices more personal (Leadbeater, 2004; Plant, 2001). This individual focus parallels the individual learner-centeredness in constructivism. Dissimilar to the theories of behaviorism (Skinner, 1974), which tend to rely on observational stimuli and responses, constructivism is grounded in the individual creation of meaning (Bruning, Schraw, & Ronning, 1999; Greeno, Collins, & Resnick, 1996; Piaget, 1969). Eggen and Kauchak (2007) defined constructivism as “a view of learning suggesting that learners construct their own understanding of the topics they study rather than having that understanding transmitted to them by some other source (such as a person or something they read)” (p. 281). Combined with the individual and personal nature of portable computing devices, mobile learning is perhaps uniquely suited for more constructivist learning scenarios. An example of this may be on-demand information and knowledge access in the learner’s authentic environment, facilitated via a mobile computer or e-book that learners use to augment their daily experiences and ultimately construct their own meanings and understandings (Patten, Arnedillo-Sánchez, & Tangney, 2006; Rogers et al., 2004). Zurita, Nussbaum, and Sharples (2003) have advocated the use of mobile technologies in pedagogical designs to foster more constructivist types of teaching and learning. In their experiment with a constructivist learning environment employing wireless mobile technologies, they found that the positive learning results were greater in that situation than in a constructivist learning environment without the use of the mobile technology. For the present study, students using mobile e-book readers were situated within constructivism, and the broad theoretical notion that individuals create their own mental understandings of their experiences within the world around them.

Information Processing Theory

One of the cognitive learning theories developed in recent times is information processing theory (Eggen & Kauchak, 2007; Miller, 1956). The commonly used analogy for information processing theory compares these cognitive processes with that of a computer (Mayer, 1996). Information is taken in or perceived by senses such as sight, smell, hearing, or a combination of these. It is then processed in working memory (Baddeley, 1992), where information is rehearsed and either moves onto the next stage in the model or is lost. If information is rehearsed and eventually encoded (Bruning et al., 1999), it will then be stored in long-term memory, which, in this analogy, could be considered similar to a hard drive. In long-term memory, the information can be retrieved for later use or supplemented with the addition of new information. The model in Figure 2 illustrates this process.

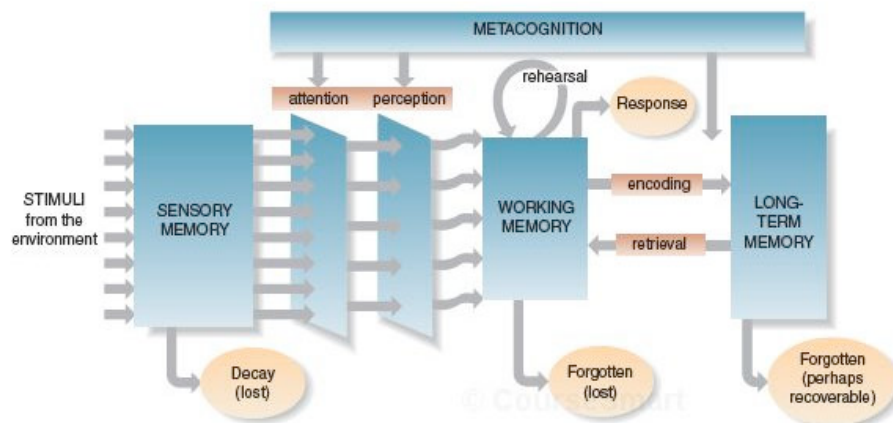


Figure 2. Information processing model. Adapted from *Educational Psychology: Windows on Classrooms* (8th ed.), by P. D. Eggen & D. Kauchak, 2010, p. 198 Copyright 2010 by Pearson. Reprinted with permission.

This model on information processing illustrates the progression of information as it travels from its perception in the environment or stimuli to long-term memory, and provides a general overview of this cognitive perspective of learning. Unlike

behaviorism, information processing theory expands on the simple notion of stimuli producing direct responses, by showing the internal cognitive processes associated with environmental stimuli. Information processing theory addresses how stimuli enter individual memory and how they are treated and stored into catalogs referred to as schema (Mayer, 1996). A frequently touted potential benefit of using mobile devices has been their portability (O'Malley & Fraser, 2004; Roschelle, 2003), which allows for more learned-centered and situational learning experiences (Brown et al., 1989). However, some researchers have found evidence that points to the limits of working memory with mobile learning scenarios (Doolittle & Mariano, 2008).

Working memory. Working memory can hold approximately seven items simultaneously (Miller, 1956); however, some research has indicated that this capacity could be less, due to the handling, use, and application of items in working memory (Sweller, 1994). In information processing theory, working memory takes information from sensory memory and encodes it into long-term memory by rehearsing the information and compartmentalizing it to larger, meaningful units, which may allow them to be stored (Miller, 1956). As some researchers have investigated (Doolittle & Mariano, 2008), one's working memory capacity may influence learning in a mobile learning scenario. The undergraduate students in Doolittle and Mariano's study recalled less when they learned a lesson on a mobile device while walking around campus. Because students' working memories were divided in this experiment, their attention on the instructional lesson was diminished.

Automaticity. Further related to working memory is the construct of automaticity, the ability to conduct tasks or mental operations with significantly less

mental effort and working memory allocation (Shiffrin & Schneider, 1977). Examples of automaticity include talking while driving a car, reading a Webpage during a lecture, or sending a text message while talking to a friend. For some, these familiar, infinitely rehearsed activities are so commonplace that they have been compartmentalized into self-contained mental processes that allow them to be conducted efficiently, without the expenditure of much mental effort or working memory. This would explain the behavior in the above examples, as well as in the Doolittle and Mariano (2008) study. Students' use of e-books on mobile learning devices will likely be impacted by the extent to which their use consumes working memory. Consequently, how students use mobile devices, and in what contexts, will further add to the understanding of mobile learning.

Metacognition. Finally, the construct of information processing theory shown in Figure 2 illustrates its iterative nature, because the attention and perception stages continually loop back. Flavell (1976) defined this as “knowledge that takes as its object or regulates cognitive behavior” (p. 231). Essentially, metacognition is a person's knowledge about his or her learning and the related processes. For example, if students feel that listening to music while reading or studying for a test distracts them, then they may avoid studying in common areas. Other students know that unless they write summaries of chapter readings, they do not remember key concepts. These are both examples of students acting on their own metacognition and beliefs about learning. Metacognitive strategies such as these result in higher individual performance (Santrock, 2009).

Information processing theory summary. The cognitive approach of information processing theory, through its analogies to computer hardware functions,

attempts to explain the individual mental processes during the perception, storage, and retrieval of information (Mayer, 1996). The key components of working memory, automaticity, and encoding may be useful for inquiries into mobile learning, due to the location-agnostic and highly-situated nature mobile learning affords students.

Additionally, uncovering the students' metacognition and strategies within mobile learning scenarios may also help explain how students experience mobile e-book use.

So far, this discussion of cognitive views on learning has focused on the individual. Another view of learning within constructivist learning paradigms, social cognitive theory, adds environmental and social variables.

Social Cognitive Theory

Social interactions in various learning processes further shaped the lens of this study on mobile learner experiences. Schunk, Pintrich, and Meece (2008) included this social variable in their definition of constructivism: "Constructivism is a psychological perspective contending that individuals form or construct much of what they learn and understand through individual and social activity" (p. 326). This interaction between the individual and the environment, along with learner behavior, comprises the essential elements of social cognitive theory (Bandura, 1986). Bandura explained this as a framework of triadic reciprocity, which he defined as follows:

In the social cognitive view people are neither driven by inner forces nor automatically shaped and controlled by external stimuli. Rather, human functioning is explained in terms of a model of triadic reciprocity in which behavior, cognitive and other personal factors, and the environmental events all operate as interacting determinants of each other. (p. 18)

This model is illustrated in Figure 3, showing the interactive relationship between the person, his or her behavior, and the environment, which Bandura referred to as reciprocal

determinism. This interplay and influence between learners and their environments, resulting in their actions and choices, is the core of Bandura's (1997) theory of self-efficacy.

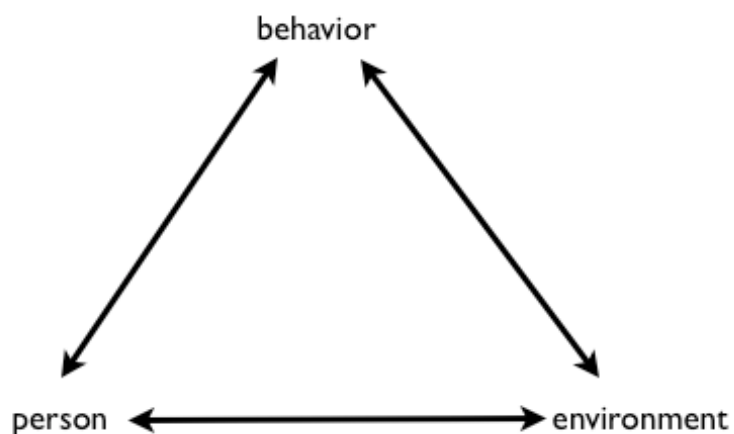


Figure 3. Bandura's model of triadic reciprocity. Adapted from *Self-Efficacy: The Exercise of Control*, by A. J. Bandura, 1997, p. 6. Copyright 1997 by Bandura. Reprinted with permission.

As some researchers in mobile learning have noted (Roschelle, 2003; Sharples et al., 2005; Waycott, 2005), this interplay of learners, their environments, and their actions make mobile learning unique and potentially powerful. Novel ways of learning afforded by the location-agnostic mobile computing device, which frees learners to learn anywhere, anytime, is at the core of mobile learning research. In their work toward developing a theory of mobile learning, Sharples et al. (2005) relied heavily on the environmental and contextual aspects of this triangular interaction, based on Bandura's model of triadic reciprocity. Specifically, Sharples et al. viewed the type of learning and behaviors afforded by portable mobile technologies as highly personal (Leadbeater, 2004) and situated within the individual's own authentic contexts (Brown et al., 1989).

These contexts are partially shaped and formed by this interplay of learner, behavior, and environment (Bandura, 1997). This present study focused on how the students used mobile learning technologies, thus investigating the interplay of the learner and the environment, as well as the situational aspects.

Self-efficacy. A subset of social cognitive theory is self-efficacy, a theory that attempts to explain learners' feelings and perceptions of their performance abilities and their choices to take actions based on these (Bandura, 1997). As defined by Schunk et al. (2008), "self-efficacy affects choice of activities, effort, and persistence. People holding low self-efficacy for accomplishing a task may avoid it; those who believe they are capable are likely to participate" (p. 139). Bandura (1997) considered self-efficacy a powerful cognitive force that is not necessarily directly tied to learners' abilities, but rather their beliefs about their individual skills and abilities, which heavily influence their behavior (p. 391). Self-efficacy is a construct that has been empirically studied and found to be a consistent factor related to learning and performance (Campbell & Hackett, 1986; Wood & Locke, 1987).

Compeau and Higgins (1995) found that individuals' computer self-efficacy relates to their abilities to use computers to accomplish certain tasks or actions. These researchers developed and validated an instrument that measures individual expectations of computer use outcomes, as well as emotional responses from using computers. Relating computer self-efficacy to this study of students using mobile e-book technologies, the level of self-efficacy students had with these technologies would influence their actions, persistence, and outcomes. Students' self-efficacy beliefs

regarding the mobile e-book technologies were one focus of my study, as well as how technology might affect students' behaviors and outcomes in the course.

Based on the self-efficacy research regarding learning (Campbell & Hackett, 1986; Murphy, Coover, & Owen, 1989; Wood & Locke, 1987) and use of computers (Compeau & Higgins, 1995), students with higher degrees of self-efficacy related to the use of the mobile e-books might be expected to experience greater course outcomes and a higher degree of satisfaction. However, Wang and Wang (2008), in their work on developing a mobile computing self-efficacy scale (MCSE), expressed that the use of mobile devices is unlike generic technology or the Internet, and therefore should be studied independently. Wang and Wang also (2008) posited that "traditional measures of computer self-efficacy and Internet-related self-efficacy are perceived as being incapable in the context of mobile computing and commerce because they are targeted primarily toward either desktop computer or wire-based technologies" (p. 407). Further arguing for the necessity of a mobile-specific self-efficacy measurement, Wang and Wang (2008) stated, "a comprehensive MCSE instrument can provide a more accurate diagnostic tool to assess an individual's mobile computing self-efficacy than can a simple adaptation of computer self-efficacy or Internet self-efficacy scale" (p. 407). Building on Wang and Wang's case for studying the specific, unique aspects of mobile computing, this collective case study also attempted to explore the self-efficacy of students using mobile e-books.

Expectancy x value theory. Expectancy x value theory is related to self-efficacy theory. Based on the early research of Atkinson (1957) regarding motivation, the current paradigm of expectancy x value theory has become more social cognitive in nature

(Schunk et al., 2008) and has strong empirical support regarding its role in learning behavior. Leading this research, Wigfield and Eccles (2000) focused on the constructs of learner ability, expectancy items, and usefulness/interest (p. 70). Ability beliefs relate to the learners' current conceptions of how successfully they are able to perform a particular skill or task—for example, in response to the question, “How good are you at math?” (p. 70). The expectancy construct is defined by how learners evaluate their potential level of performance—for example, in response to the question “How well do you expect to do in math this year?” (p. 70).

Finally, there is the construct of utility or interest, which Wigfield and Eccles (2000) considered the value and importance one places on a specific task or skill. For example, one student may highly value the skill of times tables in math because of the connection to performing well on a test and the subsequent higher grade he or she desires in the math class. However, this also works inversely; a student who does not value grades may be bored by math or less likely to perform well (Meece, Wigfield, & Eccles, 1990). Expectancy x value theory provides a theoretical construct regarding motivation and the variables comprised within an individual's choices and his or her likelihood of achievement. In regards to this present study, this theory of learner motivation further enhances the conceptual lens through which to examine student learning with e-book technology.

Self-determination theory. Related to both self-efficacy and expectancy x value theory is the theory of self-determination, which is seen by some as a theory that incorporates both models (Schunk et al., 2008), because it includes both intrinsic and extrinsic motivation. The basic components of self-determination theory are based on the

psychological needs of competency, autonomy, and relatedness (Ryan & Deci, 2000). These three needs are part of a subtheory of self-determination theory, called cognitive evaluation theory, which focuses on individuals' intrinsic motivations (Ryan & Deci, 2000, p. 70). Ryan and Deci (2000) explained that autonomy can increase individual intrinsic motivation and influence subsequent achievement (p. 70). They further explained that feelings of individual competence must be accompanied by a sense of autonomy for one to have a sense of self-determination. These senses then lead to a greater perception of control and intrinsic motivation toward achievement. Ryan and Deci's research on self-determination theory also indicated that, combined with autonomy and competence, individuals are more likely to be intrinsically motivated when tasks are need related. For example, a student in a mathematics setting feels that learning a specific mathematics formula is tied to his or her expected performance on an upcoming quiz; therefore, this skill is not something he or she finds irrelevant.

Activity Theory

One learning theory used by researchers to frame mobile learning inquiries is activity theory. It shares similarities with some of the preceding theories and learning paradigms: constructivism, information processing, social cognitivism, self-efficacy, expectancy x value theory, and self-determination theory (Engeström, 1987, 2001); however, activity theory does not perfectly align with any of the other theories and paradigms. Rooted in social cognitive and constructivist theories (Vygotsky, 1978), Engeström's model (1987) focused on the interplay of the subject, mediating artifacts or tools, rules, community, and actions leading to outcomes (Figure 4). Researchers, such as Waycott (2005), who employed activity theory to investigate mobile learning, defined

activity theory as a collection of broadly-defined concepts based partly on constructivism (Vygotsky, 1978), that helps explain the contextual application of tools by individuals for particular objectives (Waycott, 2005, p. 111).

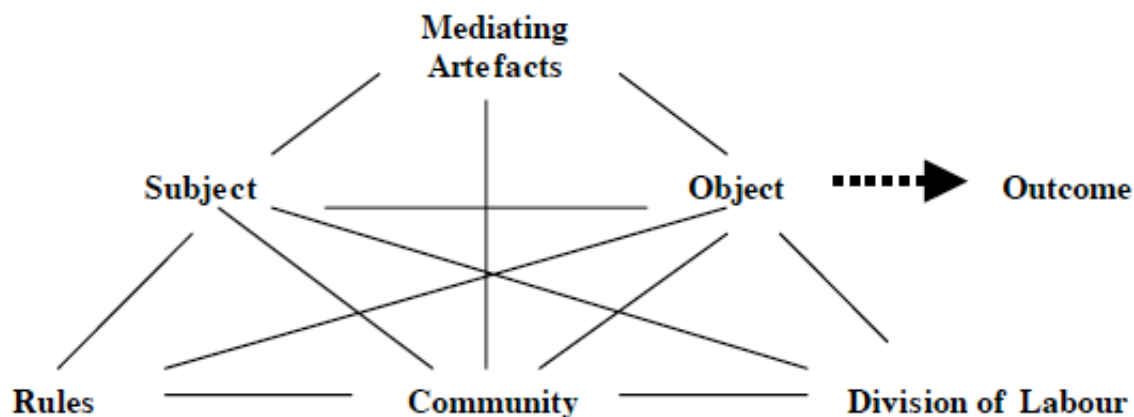


Figure 4. Activity system triangle. Adapted from *Learning by Expanding: An activity-theoretical Approach to Developmental Research*, by Y. Engeström, 1987, p. 112. Copyright 1987 by Engeström. Reprinted with permission.

Specifically referring to the use of activity theory for investigating mobile learning,

Waycott (2005) explained:

an important strength of activity theory in evaluating learners' use of mobile technologies is its notion that tool mediation is central to all human activities. This emphasis on tools, including computer artefacts, as mediators of activity focuses attention on the activity itself rather than simply the interaction between the human and the computer. In other words, the human is seen to be doing something other than using the computer: the computer is the tool through which the user achieves her objectives. Therefore, according to this perspective, evaluation of computer artefacts should focus not only on identifying usability issues, but also on examining how well the tool supports the user's activities. (pp. 111-112)

Waycott's explanation illustrates the focus on the mobile context, artifacts, objects, and purpose. Because the study focused specifically on the broader learning experiences of undergraduate students using mobile e-books, activity theory was too epistemologically narrow to serve as part of the conceptual learning theory lens. A theory that was more

focused on learning experiences and encapsulated the preceding cognitive, social, and constructivist paradigms and theories, is known as situated cognition (Brown et al., 1989).

Situated Cognition

Drawing on both constructivism and social cognitive theories, situated cognition focuses on the context in which activities occur and their application to real-world use (Brown et al., 1989). Situated cognition furthers the belief that knowledge and the acquisition of knowledge cannot be separated from the environment in which they are used. For example, learning Spanish vocabulary words from a dictionary in a traditional classroom can be contrasted to learning vocabulary from its everyday use on a vacation to Spain. Another example of situated cognition would be the apprentice that learns in the actual work environment, such as midwives and butchers (Lave & Wegner, 1991). The key components of situated cognition reside within the authentic context and purpose for which new knowledge is gained and used. Brown et al. (1989) underscored the enculturation of learners in a particular setting with specific practices, jargon, and negotiated behaviors as a key factor in knowledge acquisition (p. 34). Additionally, Brown et al. (1989) embedded the authentic activities associated with knowledge within a culture: “The activities of a domain are framed in culture. Their meaning and purpose are socially constructed through negotiations among present and past members” (p. 34). This explanation illustrates the social cognitive view of this learning theory and also challenges the relevance of the traditional school-based model of learning. The authors explained that learners are enculturated into the disconnected and inauthentic laboratory

of the school environment that is ill-suited to promote knowledge acquisition and transfer.

While situated cognition challenges the role of current learning and classroom practices, it is perhaps most closely aligned with constructivist and social learning paradigms. Examples of this relationship, related to designing instruction, are cognitive apprenticeship, anchored instruction, and problem- and case-based learning. All of these designs are fundamentally grounded in authentic learning tasks, applications, contexts, and negotiated meanings (Collins, Brown, & Newman, 1989). Some researchers have taken issue with situated cognition's reliance on environmental variables, calling into question whether learning is fundamentally bound to a particular context in time, and further arguing that abstract knowledge can be gained through both concrete and abstract examples (Anderson, Reder, & Simon, 1996). However, researchers in mobile learning have focused heavily on the environment, social negotiations, and authenticity of the uniquely-situated learner (Roschelle, 2003; Sharples et al., 2005; Waycott, 2005). The present study also investigated the situated learning contexts of students using mobile e-books.

Summary of Chapter 2

This chapter provided an overview of the literature related to the exploration of mobile technologies used in higher education. Within the bounding frame of this literature, learning theories and paradigms were selected for their abilities to focus on and enlighten understanding of mobile learning experiences. Constructivism, information processing theory, and social cognitive theory created the foundation. On this foundation, the overlapping theories of self-efficacy, expectancy x value, self-

determination theory, and situated cognition formed the collective lens used to investigate this multiple case study of mobile e-book learner experiences.

Chapter 3 will discuss this study's overall research design, including the epistemological grounding, research methodologies, setting, participants, data collection, and data analysis protocol. The study's timeline and the ethical considerations will also be discussed.

CHAPTER 3 METHODOLOGY

Introduction

This chapter discusses the methodologies chosen to conduct this research study. This will include sections on the research epistemology, participant selection, research techniques, data collection procedures, research timeline, data analysis, and ethical considerations.

The purpose of this study was to investigate the learning experiences of college students using dedicated mobile computing devices as digital e-book readers. How students used these devices and digital course textbooks was the research focus, in an effort to gain better understanding of students' learning behaviors in a college course employing these educational technologies.

The following literature was used to guide this inquiry:

- Mobile learning, including definitions of mobile learning, types of mobile devices, and emerging mobile learning theories
- E-books, including definitions of e-books, history of e-books, types of e-books, and e-books as an example of mobile learning
- Learning theories, including constructivism, information processing theory, social cognitive theory, self-efficacy, expectancy x value theory, self-determination theory, and situated cognition.

Introduced in Chapter 2 (Figure 1), within the frame created by literature pertaining to mobile learning and e-books, the collective learning theory lens guided and informed the selected methodology, including participant and site selection, data collection, and

analysis.

Research Epistemology

Because mobile learning is a relatively new model for delivering courses, little research exists on how best to design and deliver these courses. Dominated by a technocentric research agenda (Kukulska-Hume & Traxler, 2005), existing inquiries have focused on the mobile devices themselves, infrastructure, and usability, not learning. However, inquiries related to teaching and learning are also needed (Sharples, 2007; Sharples et al., 2005). In one of the most comprehensive collections of research on mobile learning, *Mobile Learning: A Handbook for Educators and Trainers* (Kukulska-Hume & Traxler, 2005), the authors compiled 12 case studies that related to mobile learning. Only one section specifically discussed teaching and learning, as these factors were not a significant focus of the book and the case studies it contains. Nevertheless, the authors did call attention to the need for inquiry regarding the best mix of teaching methods and technologies, so future researchers can promote effective mobile learning scenarios (p. 42). Furthermore, in a report on emerging research issues in mobile learning, *Big Issues in Mobile Learning*, researchers Sharples, O'Malley, and Taylor (2004) emphasized a shift of the agenda away from exploring the mobile devices and back to teaching, the learners, and the learners' perspectives. A research agenda that informs the teaching and learning aspect of mobile learning is needed, and this agenda was the guiding principle of this qualitative design.

A traditional, positivist research approach employing quantitative methods to investigate mobile learning experiences would be ill-suited to this study's research context, and such an approach would also prohibit further understanding of students'

mobile learning experiences. A qualitative approach is better aligned with this study, to fulfill the purposes of particularization versus generalization. Merriam (1998) characterized qualitative researchers as “interested in understanding the meaning people have constructed . . . how they make sense of their world and the experiences they have in their world” (p. 6). If researchers seek to better understand learning experiences from the students’ perspectives, then the data pursued should derive from the lived experiences of the actual participants. Patton (2002) explained it this way:

The phenomenon of interest unfolds naturally in that no predetermined course established by and for the researcher such as would occur in a laboratory or other controlled setting. Observations take place in real-world settings and people are interviewed with open-ended questions in places and under conditions that are comfortable for and familiar to them. (p. 39)

From authentic participant voices, artifacts, and real-life events, I constructed a detailed record of students’ mobile learning experiences. The collected data were understood through the learning theory framework established in Chapter 2, emphasizing knowledge construction, authentic contexts and learning experiences, and situated cognition. The qualitative approach produced an enhanced understanding of these mobile learning experiences, the utility of which will be valuable for practitioners and designers, as they create and administer mobile courses and programs. As more data about students’ mobile learning perspectives is gathered, more informed design and support decisions will be possible. While enhanced understanding may have the practical application of assisting practitioners in mobile learning, this understanding may also guide future research.

This study’s epistemological approach was grounded in a naturalistic and constructivist research paradigm (Lincoln & Guba, 1985), focused on the particular

contexts and experiences of individuals' cases, which served as the repository for in-depth mining of qualitative data based on real lives and events. These data helped accomplish the overarching goal namely to further educational leaders' and researchers' understanding of actual, lived experiences of students using mobile technologies for their learning. A collective case study approach was employed to accomplish this purpose (Stake, 1994).

Case Study Inquiry

This qualitative, exploratory inquiry employed techniques used in social science case study research (Merriam, 1998; Stake, 1995; Yin, 2009). Yin (2009) recommended case study inquiries for “how” and “why” types of research questions, where the researcher has little or no control, and the purpose is to investigate real-life contexts, phenomena, and situations (p. 2). Case studies, as Yin further explained, “are used to contribute to our knowledge of individual, group, organizational, social, political, and related phenomena” (p. 4), and are particularly employed and useful for the social science disciplines: psychology, political science, anthropology, social work, and education. Merriam (1998) described the case study as a record or product that documents the “intensive, holistic description and analysis of a single instance, phenomenon, or social unit” (p. 21). The object of study or unit of analysis (Yin, 1994) is what Stake (1995) referred to as the bound system, the self-contained entity being studied. The purpose of an in-depth case study is to thoroughly document and understand the particular bound system for its own uniqueness, making the case study a poor tool for generalization (Stake, 1995, p. 7). Stake (1994) explained that a case record may contain both qualitative and quantitative data, as “case study is not a methodological choice, but a

choice of object to be studied” (p. 236). The common element throughout these researchers’ beliefs regarding what constitutes case study research is the purposeful focus on a bound unit of analysis and emphasis on building a record and enhanced understanding of the particular.

Generalization and Purpose

Statistical generalization, used to make predictions and judgments about wider populations and contexts, is not employed in qualitative case study designs. Yin (1994) refers to analytical generalization, which starkly contrasts with the common and traditional concepts of quantitative inquiry relying on statistical generalization. Yin noted that in statistical generalization, “an inference is made about a population (or universe) on the basis of empirical data collected about a sample” (p. 30), and there are formulas, surveys, and representative sampling techniques that attempt to strengthen the validity and reliability of such inferences. Yin contrasted this purpose and goal of qualitative case study inquiry by explaining that, unlike quantitative studies, each case is considered an individual experiment, not a sampling unit. The value and utility of qualitative studies is not in making inferences to wider populations, such as with quantitative studies, which employ representative sampling techniques. Instead, Yin (1994) explained, the purpose is to use each of these cases, or experiments, in analytical generalization to further enlighten one’s understanding of theory. This is an inverse process that uses “the empirical results of the case study” (p. 31) to inform theory.

Some researchers have argued for a more concrete approach for utilizing qualitative case studies in regards to generalization. For instance, Erickson (1986) advanced the notion that focusing on generalization is inappropriate and ill-suited for this

type of research. He instead proposed the idea of concrete universals, which he considered common experiences that transcended the particularization of single cases. He posited that the universals can be found in the particular, using classrooms: “each instance of a classroom is seen as its own unique system, which nonetheless displays universal properties of teaching. These properties are manifested in the concrete, not in the abstract” (p. 130). A belief that Erickson (1986), Yin (1994, 2009), and other case study researchers (Merriam, 1998; Stake, 1994, 1995) appear to share, however, is that a thoroughly documented case record has utility in informing beyond its solitary self. Stake (1994) made this purpose and utility clear in his descriptions of intrinsic and instrumental case studies.

Stake (1994) established a binary distinction of the purpose of case study research, which he called intrinsic versus instrumental case studies. He defined an intrinsic case study as having a purpose of solely understanding the particular case for its own sake, and “it is not undertaken primarily because it illustrates a particular trait or problem, but because, in all its particularity and ordinariness, this case itself is of interest” (p. 237). Stake further explained that the purpose is not to enlighten or understand some abstract concept or contribute to theory building. He asserted that the purpose of the intrinsic case study is to build a thorough, in-depth record of the singular unit of analysis—for example, a “child, clinic, conference, or curriculum” (p. 237).

The purposes of instrumental case studies have an almost opposite purpose. Stake (1994) explained that the instrumental case study uses the particularization of the single case as a means to an end, and “is examined to provide insight into an issue of refinement of theory” (p. 237). Stake stated that “the case is of secondary interest; it plays a

supportive role, facilitating our understanding of something else,” (p. 77) which, for the purposes of the present mobile e-book inquiry, was how case study research techniques were employed. The theoretical foundation presented in Chapter 2, focusing on constructivism, information processing theory, and social learning theories not only guided this case study inquiry, but as both Yin (1994) and Stake (1994, 1995) have suggested, this inquiry was informed and enlightened within the frame of a mobile learning context. For this purpose, the present qualitative case study employed a multiple (Merriam, 1998; Yin, 1994, 2009) or collective case study design (Stake 1994, 1995).

Stake (1994), in his distinction between intrinsic and instrumental case studies, discussed a final category, which he considered a collective case study. In this definition he used the same logic to expand the meaning of an instrumental case study, explaining that in collective case studies, the purpose is to further enhance the understanding of a phenomenon, issue, or theory through the utilitarian use of case records. The cases are holistically used as a tool to understand a larger issue, one that transcends the individual cases themselves. An example he provided is Kozol’s (1991) *Savage Inequalities*, where multiple cases of student experiences in underserved school districts were used to inform the larger issues of school funding and, larger yet, social justice.

As was the case with my collective case study inquiring into students’ learning experiences using mobile e-books, each student case was chosen “because it is believed that understanding them will lead to better understanding, perhaps better theorizing” (Stake, 1994, p. 237). Yin (1994) and Merriam (1998), referring to this practice as multiple case study, had similar ideas about the value and utility of these designs. Merriam posited that “the more cases included in a study, and the greater variation across

the cases, the more compelling an interpretation is likely to be” (p. 41). Yin (2009), in his epistemological logic, considered each individual an actual experiment, and believed that multiple experiments could yield great enlightenment and phenomenological understandings (p. 59).

Epistemology Summary

The purpose of the present study was to investigate the learning experiences of college students using dedicated mobile computing devices as digital e-book readers. Therefore, an exploratory, constructivist approach (Lincoln & Guba, 1985), employing qualitative collective case study methods, was most closely aligned for this study. The collective case study design, where each mobile learner was considered a bound unit of analysis, was used to further enlighten understanding and identify key issues related to students’ use of mobile e-books.

Setting and Participants

The participants for this collective case study were undergraduate college students at Florida State College at Jacksonville (FSCJ), a large college in the southeast United States. It is worth noting that this particular college transitioned from a community college to a state college in the summer of 2009. The setting was appropriate because the college is transitioning to completely electronic textbooks for most of its institutionally-published course materials during the 2010–2011 academic year. The college administration supported this data collection on students’ use of mobile e-books, and in August 2009 granted its permission to collect the initial data through its internal institutional review board. This initial data constituted the archival data used in this study.

For this initial data collection, approved by FSCJ's Institutional Review Board (IRB) in August 2009, a letter was e-mailed to students, explaining the requirements for student participation and seeking volunteers to use an electronic mobile book version of the print course textbook (Appendix A). Student volunteers also signed an informed consent form and returned the form to me (Appendix B); the instructor also signed an informed consent form (Appendix C). These archival FSCJ data were later collected after approval of the full research protocol by the University of North Florida (UNF) IRB (Appendix D).

The student volunteers were enrolled in two fall 2009 sections of an instructor's Introduction to Sociology (SYG2000) courses offered at the state college. One class was a fully online course, where students had no face-to-face requirements or meetings. In this course students interacted in the Blackboard learning management system (LMS). They participated in asynchronous virtual class discussions, took quizzes, and submitted written assignments through the LMS. Additionally, students were required to participate in a cooperative learning activity, a group assignment.

The other section was a traditional, classroom-based SYG2000 course. In this course the assignments and grading scale were identical to the online equivalent, except that the majority of the student and instructor activity took place face-to-face in the physical classroom. All students, except one, took their course quizzes through Blackboard, which the instructor provided as a convenient option for his classroom-based SYG2000 courses.

The instructor for these courses was a full-time administrator at the college, who typically teaches two sections of SYG2000 each semester. At the time of the study, he

was 50 years old, with more than 20 years of teaching and training experience, and 10 of these years related to distance and online delivery. In his full-time administrator role at the college, he is required to maintain expert knowledge related to online learning technologies and pedagogies. Across the college's departments he is highly regarded for his online teaching knowledge and experience.

The textbook used in SYG 2000 is published at FSCJ by a college initiative called SIRIUS Academics. These textbooks are developed in conjunction with an entire set of course materials and, as stated on the project Web site:

Courses are developed by teams including faculty, instructional designers, multimedia specialists, editors, quality assurance staff, and outside content consultants. All content and pedagogy are developed by the team using the latest technology, including SoftChalk's LessonBuilder. Emphasis is on the development of highly creative, interactive courses making use of the latest research in learning, motivation, and technology. Faculty external to Florida State College at Jacksonville and the SIRIUS program review content of courses and the development teams teach the courses during the beta period prior to full release. The courses are published and distributed by McGraw-Hill Learning Solutions. (FSCJ, 2009, "Course Development")

SIRIUS course materials are designed to be used in traditional face-to-face, fully online, and blended online/face-to-face learning environments. The textbooks were previously printed with the McGraw-Hill partners, but beginning in the fall 2010 term, Follett took over the publication, distribution, and electronic publication of the textbooks. The electronic and print versions of the textbook are identical, with the same visual layout, page numbering, table of contents, and images.

After the instructor agreed to let me seek student volunteers from his two fall 2009 SYG2000 courses, a letter was drafted that explained the study, requirements of the students, and timeline. The letter was approved by FSCJ's IRB and then e-mailed to the instructor's students. Over a three-week period, a total of 13 students responded by e-

mail, agreeing to volunteer—eight from the face-to-face course and five from the online course. The student volunteers represented a diverse mix of ages, backgrounds, and experiences.

The purpose of this study was to investigate the learning experiences of college students using dedicated mobile computing devices as digital e-book readers. The research site was two SYG2000 courses, one online and one face-to-face, that used the same textbook. This textbook was available in an e-book format, as well as in a hard-copy version. The e-books were provided to the student volunteers for the entire 12 weeks of the course. Students chose from two types of portable mobile computing devices, the Sony PRS-505 Reader and the ASUS Eee PC 1005HA Netbook.

Mobile E-books Used in Study

The Sony PRS-505 Reader is a dedicated electronic reading device that displays text materials, such as books, textbooks, newspapers, and magazines on a 6-inch, 600 x 800 black-and-white screen. This screen displays in e-ink, a high-contrast, low-power consumption, high-visibility surface optimized for text. The 256 megabytes of random-access memory (RAM) can store a maximum of 160 average-sized e-books. This memory is expandable, with two additional memory slots, Sony and secure digital (SD) memory formats, common to digital cameras and other small electronic devices. Supported formats include Bleb, Adobe Portable Document Format (PDF), plain text (TXT), electronic publication (ePUB), and rich text format (RTF). The Sony PRS-505 Reader also has an internal, long-lasting lithium-ion battery that supports up to 8,000 page turns per charge. The SYG2000 textbook was loaded on the Sony PRS-505 Readers as a PDF document.

PDFs are a widely-used method of publishing and sharing digital reading materials and have the ability for basic security and digital rights management, such as print limitations, copy and paste restrictions, and password security. Loaded on the Sony PRS-505 Reader, the SYG2000 e-book users had the ability to bookmark passages and pages, modify the font size, and change the display orientation from portrait to landscape. The Sony PRS-505 Reader is a mobile device designed specifically around its use as a portable, handheld e-book reader. Unlike the ASUS Eee PC 1005HA Netbook, the Sony PRS-505 Reader does not have additional advanced features and functionalities.

The ASUS Eee PC 1005HA Netbook is a mobile computer. It has the capability to run several operating systems; however, in this study the eight Netbooks ran on Microsoft XP, a common operating system. The ASUS Eee PC 1005HA Netbook has an internal 160-gigabyte hard drive that can store thousands of e-books and digital materials. It also has one gigabyte of RAM, Wi-Fi, and a 10-inch, 1024 x 600 color display and supports most text formats, including TXT, RTF, HTML, XML, and PDF. The ASUS Eee PC 1005HA Netbook has an 8-hour battery capacity per charge. Because the ASUS Netbook is actually a multifunction portable device, it has more advanced e-book capabilities than the Sony PRS-505 Reader.

The ASUS Eee PC 1005HA Netbook was loaded with an electronic text-reading software called MyScribe, containing the identical SYG2000 textbook to the version used with the Sony PRS-505 Reader. This e-book was in a PDF format within the security framework of MyScribe, adding another layer of antipiracy digital rights management (DRM) security. Similar to the DRM commonly used with Apple's iTunes online store, MyScribe loads the electronic reading material to its secure DRM and permits end users

to access materials assigned to their account and user ID. MyScribe allows students to take notes, search and highlight text, bookmark pages and passages, and listen to a computer-synthesized version of the e-textbook, with a text-to-speech feature.

Additionally, if students connect to the Internet, they can share their e-book notes with other students in their class.

Data Sources

To build the case records and database that informed understandings of students' mobile e-book learning experiences in this collective case study (Yin, 1994), data were collected from multiple sources. Yin (2009) referred to a convergence of evidence in data collection efforts, as researchers draw on multiple data sources to employ in triangulation analysis techniques, which aim to corroborate facts and phenomenon (p.116). He advocated three main principles of data collection to help ensure the rigor and empiricism of case study research: (a) use multiple sources of evidence, (b) create a case study database, and (c) maintain a chain of evidence (pp. 114-122). This study was comprised of both archival data and data that were collected after approval of the full research protocol by UNF's IRB.

Archival Data

In August 2009 FSCJ's IRB gave me permission to explore the use of e-books in two course sections, to track initial student reactions to the use of e-book readers. As part of this effort, during the fall 2009 semester, SYG2000 students using the e-books in both the online and face-to-face sections maintained weekly writing journals. Two-part, open-ended writing prompts were e-mailed to the student volunteers every week, asking them to record their thoughts, feelings, and experiences using the e-books. These prompts

were submitted as secure text documents through the Blackboard LMS to an e-book community established for this purpose. The instructor and other student volunteers did not have access to other students' journals; the entries were completely private to the student authoring them and me. Each of the 13 student volunteers completed 9 journal entries. The self-reported student data were added to the collective case study database after the study was approved, and students provided informed consent for these materials to be included in the present study.

In addition to the student journal data, any available archival data were retrieved from student e-book notes. With the ASUS Netbooks, through My Scribe, students had the ability to record and save their notes directly into the e-book. These notes could be compiled and used for reviewing, studying, or sharing. For students who used this functionality, these data were collected from the ASUS devices and added to the case study database. There was no equivalent feature on the Sony PRS-505 Reader; therefore, these types of data were not collected from these devices.

Data Collection

The final pieces of data collected were artifact data, researcher's notes, and data from in-depth interviews with student volunteers and with the course instructor. These data were then added to the archival data, which collectively constituted the case study's database.

The two mobile e-textbooks, accompanying software, and hard copy of the textbook were used to gather data. Yin (2009) referred to this as artifact data, in which tangible, related objects, thought to have potential to yield greater insight or enhance triangulation efforts, are collected and used in the case study process. I used both the

Sony PRS-505 Reader and ASUS Eee PC 1005HA Netbook, recording my notes, questions, and experiences, which were then compiled into the overall case study database.

Referring to the third key principle of Yin's case study data collection (2009), maintaining a chain of evidence, I also added my ongoing and iterative note data collected throughout the planning, design, and data collection phases. These note data include research questions, design and logic decisions, modifications, and daily occurrences related to the study, and were also added to the case study database.

In the last step of the data collection process, I conducted in-depth interviews with the student volunteers. The interviews were semistructured and open-ended (Patton, 2002), designed to uncover students' actual mobile e-book course experiences related to their learning. The question prompts (Appendix E) were designed to enlighten the understandings of the use of e-books by students within a constructivist, social cognitive, and situated learning framework. Students were asked to explain how and where they used their mobile e-books, providing details of any common or novel applications during their courses. The interview lengths ranged from about 30 minutes to 1 hour; the audio was recorded with Apple's GarageBand, transcribed, and added to the case study database.

In addition to student interviews, the instructor participated in semistructured interviews (Appendix F). The purpose of these interviews was to further enhance the overall case record and to triangulate with the other data sources. The interviews with the instructor were also recorded, transcribed, and added to the case study database.

Data Sources Summary

The archival student journal data, my chain of evidence notes, artifact notes, student interview transcripts, and instructor interview transcripts were loaded into the qualitative data analysis software MAXQDA Plus (Kuckartz & Kuckartz, 2002) to form the case study database. The database was securely stored, accessible only to me, and loaded on one of FSCJ's computers. To protect their privacy, the instructor and students' names were replaced with pseudonyms they had selected during their interviews.

Data Analysis

The purpose of this study was to investigate the learning experiences of college students using dedicated mobile computing devices as digital e-book readers. These data were collected from multiple sources, to synthesize them from the case study database through such techniques as triangulation (Patton, 2002; Yin, 2009). After the data were collected, they were compiled into an electronic database using the qualitative data analysis software MAXQDA Plus (VERBI Software, 2009). The compiled data were then analyzed, as a means to understand the collective case study and search for how the information could enlighten the study's research questions.

Corbin and Strauss (2008) defined this analysis stage of inquiry as "the act of giving meaning to data" (p. 64). They further explained that analysis "involves taking data apart, conceptualizing it, and developing those concepts in terms of their properties and dimensions in order to determine what the parts tell us about the whole" (p. 64). This definition of qualitative data analysis overlaps Yin's (2009) multiple case study logic, as multiple experiments that strengthen design, as well as Stake's (1994, 1995) definition of

instrumental case studies that are used as a conduit for enhanced understanding. Known from their early work in grounded theory, Glaser and Strauss (1968) developed the data analysis technique referred to as open coding, the process of assigning passages and phrases of text to themes and subthemes. This process typically begins with a broad search for general themes and patterns, but through constant comparative and theoretical comparative processes (Corbin & Strauss, 2008), the researcher digs much deeper into the data.

General Data Analysis Strategy

Yin (2009) stressed the critical importance of case study researchers conducting qualitative data analysis by identifying a general analytic strategy (p. 127). He further explained that while software tools such as ATLAS.ti, HyperRESEARCH, and NVivo are useful in the analysis process, they do not replace choosing and employing a general analytic strategy in the data analysis process (p. 128). What Yin meant by “a general analytic strategy” is that qualitative researchers should choose an approach that “will help [them] treat the evidence fairly, produce compelling analytic conclusions, and rule out alternative interpretations” (p. 130). Yin included four analytic strategies in his discussion: relying on theoretical propositions, developing case description, using both qualitative and quantitative data, and examining rival explanations. This study employed all four strategies to some extent, but the study’s primary concentration was relying on theoretical propositions, due to its focus on learning experiences and the theoretical framework described in Chapter 2.

Yin (2009) stated that his first general analytic strategy, relying on theoretical propositions, is the most preferred (p. 130), and this was the primary strategy employed

in this collective case study. He defined this preferred analysis strategy as “an example of a theoretical orientation guiding the case study analysis” (p. 130). Applied to this present case study, with its concentration on student learning experiences with mobile e-books, the theoretical lens introduced in Chapter 2, comprised of various learning theories, provided the major theoretical propositions from which to analyze the data. Yin explained that this preferred general analytic strategy “helps to focus attention on certain data and to ignore other data” (p. 130). Further applied to this proposed study, I wanted to create an in-depth understanding of student learning experiences with mobile e-books by relying on the theoretical propositions developed in Chapter 2 to focus and enhance analysis.

Corbin and Strauss (2008) described theoretical comparative data analyses as “tools designed to assist the analyst with arriving at a definition or understanding of some phenomenon by looking at the property and dimensional level” (p. 75). Relating this technique to my collective case study, each of the student’s mobile e-book experiences helped inform the overall understanding of learning within a mobile-enabled learning situation. By drawing connections and identifying similarities between the research literature and data collected in the case study, this exploration deepened my understanding and elevated insight from the individual, raw data to a more synthesized, abstract level. At this level one may begin to make judgments within the theoretical framework for increased understandings of phenomena, what Yin (1994, 2009) referred to as the utility of analytical generalization, similar to Stake’s (1994, 1995) use of instrumental cases.

The constant comparative method of data analysis is the typical starting point for

qualitative researchers, where they look for similarities and differences in the data while continuously applying previously analyzed data (Corbin & Strauss, 2008, p. 73). Corbin and Strauss (2008) stressed the importance of this type of data analysis, as it “allows the researcher to differentiate one category/theme from another and to identify properties and dimensions specific to that category or theme” (p. 73). An example of this data analysis related to this study is identifying incidences of students’ feelings of self-efficacy in their interview transcripts. Corbin and Strauss’s (2008) data analysis method of theoretical comparisons strongly paralleled Yin’s (1994, 2009) concept of analytic generalization.

Building on my study’s theoretical propositions (Yin, 2009) and constant comparative methods (Corbin & Strauss, 2008), I specifically employed two of Yin’s data analysis techniques, namely pattern-matching and cross-case synthesis. Yin (2009) explained that pattern-matching is one of the most desirable analysis techniques, which “compares an empirically based pattern with a predicted one” (p. 136). Grounded within the learning theoretical propositions, by using Corbin and Strauss’s (2008) constant comparative methods, this pattern-matching technique was employed to increase understanding of student learning with mobile e-books. Additionally, in an effort to create a more robust research design, this study employed the technique of cross-case synthesis. Each unit of analysis, the individual student, was analyzed using the aforementioned methods and techniques to uncover patterns across each student’s learning experience. As with Yin’s (2009) research, considering each case an individual experiment and examining multiple cases through cross-case synthesis, a more thorough understanding and increased ability to learn was established.

Data Analysis Summary

Employing the general analytical strategy of relying on theoretical propositions (Yin, 2009), the data collected in this study were examined through various methods and techniques chosen for their abilities to enhance understanding. These included constant comparative analysis, open and axial coding (Corbin & Strauss, 2008), and Yin's (2009) analysis techniques, pattern-matching and cross-case synthesis. The overall purpose of the chosen data analysis strategies and techniques was to develop insight to the student learning experiences with mobile e-books.

Ethical Considerations

The purpose of this study was to investigate the use of mobile e-books by students in their undergraduate SYG2000 courses. With colleges like FSCJ moving to e-books for course textbooks, institutional decision makers and educational leaders need to be informed about the issues associated with students learning from portable e-books, in order to maintain quality, uphold academic rigor, and ensure student success. As this collective case study inquiry involved human participants and people's lives, the research design was painstakingly crafted to cause no harm.

The instructor and students who participated in this study were volunteers, and were free to withdraw from the study at any time, without any negative repercussions. Language to this effect was explicitly stated in the initial volunteer letter and in the Student Consent Form and Instructor Consent Form approved by the IRBs of both FSCJ and UNF. As previously noted, the e-book content was identical to the traditional print versions. The student volunteers were explicitly informed of the study's purposes, and there was no participant deception at any time.

For the archival data accessed from FSCJ, the students returned a signed copy of a

volunteer letter that stated the study's purposes, expectations, terms, and requirements. For the data collection that was later collected after the full approval process granted by UNF's IRB, students also signed informed consent forms for their participation in the interviews and reconfirmed their permission to use archival data.

Lastly, all data that were collected and securely stored, available only to me, on a computer owned by FSCJ. Interviewees used a pseudonym during their recorded audio interviews. After the interviews were transcribed, the audio files were destroyed. Finally, in the case study database, pseudonyms were used to file the data, not the participants' original names.

Research Timeline

The last day of both SYG2000 sections was November 20, 2009; the research for this collective case study was conducted in spring 2010, immediately after the courses ended. At this point the data were integrated into the collective case study database.

Students scheduled interview appointments with me, after the research proposal was approved by the dissertation committee, and UNF's IRB granted me permission to proceed. The instructor interviews were also conducted after the course ended.

All of the data, including archival student journal data, my chain of evidence notes, artifact notes, student interview transcripts, and instructor interview transcripts, were loaded into the qualitative data analysis software MAXQDA Plus (VERBI Software, 2009), for my immersion into data analysis.

Summary of Chapter 3

This chapter discussed the overall research design, an exploratory, qualitative collective case study. This discussion included the research epistemology, setting and

participant selection, the mobile e-books used, data sources, data analysis, ethical considerations, and research timeline.

The purpose of this study was to investigate the learning experiences of college students using dedicated mobile computing devices as digital e-book readers. The overall epistemological underpinning of this study was constructivist in its approach and nonpositivistic in nature, not intended for positivistic, statistical generalization to larger populations. Therefore, a qualitative collective case study design was used to create a narrow focus on fostering a better understanding of student learning experiences with mobile e-books.

CHAPTER 4 DATA ANALYSIS

Introduction

The purpose of this collective case study was to explore mobile technologies used in higher education—specifically, students’ learning experiences using mobile e-books in online and hybrid introduction to sociology courses at Florida State College at Jacksonville, a public state college in the southeastern United States. This chapter will report the findings of analyzing the data through the theoretical lens defined in Chapter 2 (Figure 1). The information collected in the collective case study database was analyzed on three levels:

- Level 1: student case descriptions,
- Level 2: interview excerpt topical categories, and
- Level 3: thematic cross-case syntheses.

Each of these levels will be individually explored and examined in this chapter, which concludes with a reiteration of the study’s research questions and discussing them in the context of the third and final level of data analysis.

Level 1 Data Analysis: Student Case Descriptions

Introduction

The students were enrolled in one of two sections of introductory sociology, either fully online or the online/classroom-based hybrid; both course sections had the same instructor. Student ages ranged from 21 to 59, and all of them lived in the Jacksonville, Florida, region. After agreeing to participate in the study, students could choose either the Sony PRS-505 Reader or the ASUS Eee PC 1005HA Netbook, which had the MyScribe e-book software.

In addition to the instructor, from the original 13 student volunteers, 7 agreed to

participate in the postcourse interviews about using mobile e-books. The interviews were conducted in May 2010 and recorded using Apple's GarageBand. After the audio was transcribed to text, the audio files were destroyed.

What follows is a description of each of the student cases, including general demographic information, such as gender, age, and how familiar they were with mobile e-books prior to study, as well as the themes that emerged from the student interviews.

Table 1 provides an overview of the students' general information.

Table 1

Student Demographic, Device, and Course Information

Name	Gender	Age	Device	Course Type
Allen	Male	24	ASUS Netbook	Hybrid
Clair	Female	21	Sony Reader	Online
Denise	Female	20	Sony Reader	Online
Ken	Male	24	ASUS Netbook	Hybrid
Melody	Female	42	ASUS Netbook	Hybrid
Roger	Male	23	ASUS Netbook	Online
Thelma	Female	59	ASUS Netbook	Online

In addition to the variety of student demographics and familiarity with e-books and e-book readers, the interviews themselves were diverse in length and number of words and passages, as illustrated in Table 2.

Table 2

Student Interview Information

Name	Duration	Words	Passages
Allen	1 hour, 10 minutes	8,096	86
Clair	45 minutes	4,765	67
Denise	35 minutes	2,996	52
Ken	52 minutes	7,489	85
Melody	1 hour, 4 minutes	7,811	62
Roger	31 minutes	3,238	53
Thelma	33 minutes	4,312	59

Student Familiarity with E-books

As revealed in their interviews, the students' familiarity with mobile e-books prior to participating in this study varied. Understanding these prior experiences, or lack thereof, informed the second and third level of data analysis related to these corresponding experiences.

Allen. Allen had used e-books prior to this study, and he specifically had used electronic textbooks. He shared that he was also using an electronic textbook for his college algebra course. However, the e-book for his math course was only available online, not on a mobile device or e-book reader like the introductory sociology e-book he used for this study. Allen's interview responses significantly focused on the e-book technology and his perceived limitations in using the device.

Clair. Clair stated that she had never used an e-book. Data analysis of Clair's transcript yielded numerous codes in both the standard and novel categories derived from data collected from all student interviews.

Denise. In her interview, Denise said that she had never used an e-book. Her responses often focused on learner security—that is, how using the device made her feel more secure and content as a learner. Her responses also underscored this concern as it related to her frequent mention and examples of learning in specific situations.

Ken. Ken explained that this was the first time he had used an e-book. Even without this prior experience, throughout his interview responses, Ken underscored his competence and comfort with the use of the e-book on the ASUS Netbook for his course and learning.

Melody. Melody shared that she had used electronic materials or e-books for personal use and for a college course. Unlike the other students, Melody's interview revealed that she did not use her e-book for the duration of the course. After 3 hours of use, she did not persist in using the e-book.

Roger. Roger initially stated that he had never used an e-book. However, he eventually revealed that he had used e-books prior to the study, but for a recreational purpose, his hobbies with automobiles. Roger's transcript data highlighted his elevated self-perception of competence with and confidence in using the e-book on the ASUS Netbook in his sociology course. Moreover, Roger commented on the desire to see social learning enhancements in future mobile e-books.

Thelma. In her interview, Thelma shared that she had used electronic materials, in the form of technical manuals and documents; however, she had never used an e-book in a college course. As was the case with Roger, Thelma's transcript demonstrated elevated self-perception of competence with and confidence in using the e-book on the ASUS Netbook in his sociology course.

Student Interview Transcript Coding

All of the students' interview transcripts were coded into seven primary categories. These categories were based on the study's theoretical framework, established prior to the interviews, or newly derived after review of the interview transcripts. The categories are presented in Table 3.

Table 3

Bases for Student Interview Transcript Coding Categories

Theoretical Framework	Interview Transcripts
Social Constructivism	Acceptable social use
Self-efficacy	Ad hoc personal learning environments
Situated learning	Student e-book activities
	Student motivations

In addition to the seven primary categories, through open and axial coding, a combination of categories derived from the theoretical framework in Chapter 2 and unique categories extracted from the data analysis emerged. Table 4 provides an overview of these categories, as well as which students' experiences related to these categories.

Table 4

Coding Categories Identified in Level 2 Data Analysis

Categories	Students							
	Allen	Clair	Denise	Ken	Melody	Roger	Thelma	
Theoretical Framework	Social Constructivism	X	X	X	X		X	X
	Expectancy x value		X	X	X	X		X
	Metacognition	X	X	X	X		X	X
	Self-determination		X	X	X		X	X
	Self-efficacy	X	X	X	X	X	X	X
	Situated learning	X	X	X	X	X	X	X
Interview Transcripts	Acceptable social use	X	X		X			
	Ad hoc PLEs	X	X	X	X	X	X	X
	E-book activities		X	X	X	X	X	X
	Emotional media		X	X		X	X	X
	Flexibility	X	X	X	X		X	X
	Learner security		X	X				X
	Microwave society					X		
	Stolen learning moments			X				
	Usability		X	X	X	X	X	X

Summary of Level 1 Data Analysis

The first level of data analysis for this study examined students' general demographic information, familiarity with mobile e-books prior to study, as well as initiating an exploration of themes that emerged from students' interviews. These themes were coded to reveal a variety of topical categories, some of which were identified in the theoretical framework, and some of which were novel. New, novel categories that emerged during the coding process were selected for their ability to address the overriding research questions and purpose.

In the next section, the level 2 data analysis examines the excerpts from the students' interview transcripts, arranged by topical categories. These excerpts were selected and organized for their ability to enlighten students' learning experiences using mobile e-books.

Level 2 Data Analysis: Interview Excerpt Topical Categories

Introduction

The level 2 data analysis contained student interview text excerpts that were organized within coding categories established during the level 1 data analysis. These student interview transcript texts comprised the qualitative data that was analyzed through grounded theory procedures (Strauss & Corbin, 1990). This process involved selecting text and passages and organizing them into thematic codes that related to the theoretical framework established in Chapter 2. These data are represented in Figure 5, Thematic Categories, which was generated from the qualitative data analysis software MAXQDA Plus.

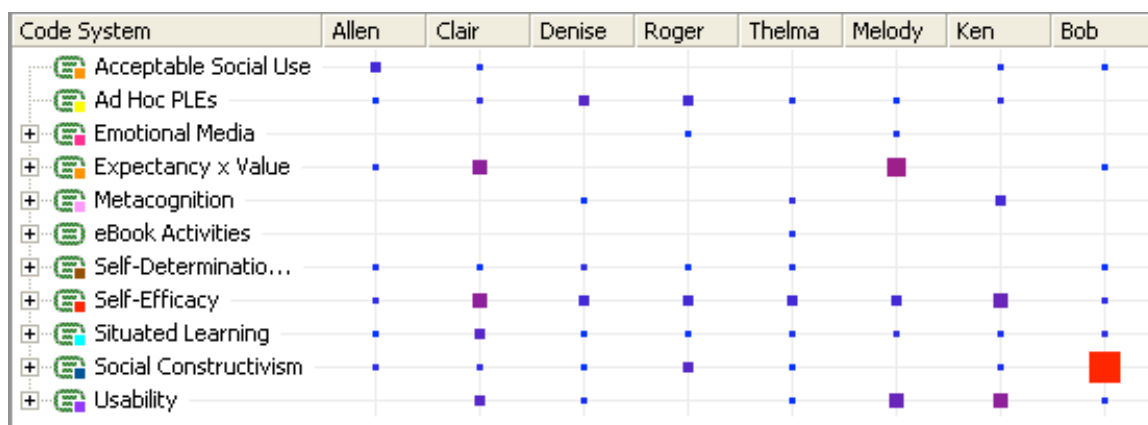


Figure 5. Thematic categories.

The coded text data were categorized under the various themes arising through the open and axial coding process (Strauss & Corbin, 1990), both those themes aligned with the constructs of the theoretical framework of this study, such as metacognition, and novel categories, such as acceptable social use. Figure 5 illustrates the varying strengths of the thematic categories; the strengths were generated from the frequency of that coded category for each student case. For example, the large square in Bob's (the instructor) column showed a frequent occurrence of social constructivism emerging from his interview data. Additionally, the large square in Melody's column showed her frequent emphasis on expectancy x value theory. While statistical totals are of limited value for a constructivist, open-ended qualitative study such as this, this figure did illustrate the strengths of the thematic coded categories for each interviewee, which was enlightening for the data analysis.

In the following sections, the seven thematic coded categories were examined through interview excerpts taken from the collective case study database, for the purpose of enlightening the learning experiences of students' using mobile e-books. These thematic categories, as well as their corresponding subcategories, are listed in Table 5.

Table 5

Interview Excerpt Topical Categories and Subcategories

Categories	Subcategories
Acceptable Social Use	–
Ad Hoc Personal Learning Environments (PLEs)	–
Student E-book Activities	Printing Highlighting Key word searches
Student Motivations	Competence Value Persistence Time urgency
Self-efficacy	Difficulty of use Confidence Sources of confidence Previous technology experiences
Constructivism	Student claims of no e-book interactions with other students E-book use to support online discussions
Situated Learning	Desire for social learning textbook Anytime, anywhere learning Disruptive locations Cognitive load GPS textbook analogy Situated learning instructional design

Acceptable Social Use

A novel topic, acceptable social use, emerged from two student interviews. This topic contained coded texts that illustrated an understanding or desire to use perceived social appropriateness of certain types of learning materials, such as traditional textbooks and e-books. Allen’s comments underscored his perceived discomfort from using a textbook in a social and situated environment—for example, in his comments about using the mobile e-book at a bookstore. In the following two interview excerpts, Allen contrasted this perception with his feelings of how the mobile e-book was not as “weird” but actually “normal”:

I think it's a lot weirder to go into a Barnes & Noble with your own textbook. First off, you'd be walking in to a bookstore with a book. If it was a used book, it probably wouldn't look as weird. . . . It's normal to take your laptop with you wherever you go. I don't really use book bags, so I would usually just load up the one book I needed and take it out when I get home. I think the reason. . . there was a possibility I could've had the same experience with the book, but in my experience, it's harder to be social when you're using a book, because it's so ingrained in to social situations when you're reading a book.

These comments were based on Allen's location while using the mobile e-book—in this case, in a coffee shop socializing with friends while working on his course. Allen also commented on how the use of the e-book on a mobile reader was more private than a traditional textbook:

J- You mentioned earlier that sometimes a book or a textbook could be a social barrier, and this sounds like it wasn't a social barrier. You happened to have your electronic version on there, and it sounds like it was pretty cool because you could actually learn and witness things and talk.

A- Yeah, there's a kind of dimensionality privacy. It's not real privacy—someone can look on your screen. But for the most part, they just see you're on a computer.

J- So it's socially acceptable to have the netbook, and not so much the textbook?

A- Yeah.

This element of privacy was supported by Clair's interview, where she also commented on how using a mobile e-book instead of a traditional textbook was less revealing in a social environment or public context:

C- Nobody knows that I'm studying because it looks like a regular book! You don't get a lot of questions. "Oh, what are you studying?" "What school do you go to?" It just makes it easier.

J- So it's anonymous.

C- Very much so.

Clair's interview revealed how she used the Sony Reader in the hospital with her

baby. She not only enjoyed her ability to use the device in that setting, since phones and laptops were forbidden, but also the ability to be more private about what she was reading and doing on the device. This concept of privacy directly related to the next topic, ad hoc personal learning environments.

Ad Hoc Personal Learning Environments (PLEs)

In this study's context, ad hoc PLEs were defined as the use of mobile e-books to create portable and personal learning spaces conducive to students' needs, regardless of location or context. One example from the student interviews was Ken's discussion of how he used his e-book on campus while in-between classes:

J- What about stuff going on visually? It might be quiet, but there are people walking around and stuff. Are you able to block that out?

K- I can tune that out pretty well. I can hear, but I just filter it out.

Ken's comments focused on his ability to block out external stimuli to focus on reading his e-book, regardless of location. His perspective aligned with Denise's. In the following excerpt she comments on how she used her e-book to concentrate in environments with distracting noise:

J- How do you think the location of where you were using the e-book, like church or with your friends, influenced your learning?

D- It depends on how quiet it was, what the environment was. If it was too loud, I could still do it, just put on my headphones. If it was quiet, I could just sit there and read it.

Early in her interview, Denise explained how she played music on an iPod while reading and studying to block out environmental distractions and create her own portable learning space. This was similar to how Clair created her ad hoc PLE, only instead of using a portable music player, such as an iPod, Clair used the music playing functionality on the

Sony Reader while simultaneously reading. She explained this in the following two excerpts:

C- Yes, I was listening to music. I was able to focus more because I knew I was gonna' be there for x amount of hours, so I would go more in-depth. I would reread things instead of just skimming them, as I did when I was on the bus—I would just skim it. I was able to read it and go over it or refer back to other chapters. Things like that, which the bookmarks came in handy with that.

J- In general, describe how your reading or studying environment helps or hinders your learning. We talked about a bunch of places you studied. How do you think these different locations help or harm how you learn in general?

C- Well if it's a location with a lot of activity, it helped to have the music going because it's consistent. It's not like I'm talking to someone while I'm trying to study. With the music it's the one song or the next song. It's not so much of a distraction as people walking in front of you, people talking to you or being on the telephone, things like that. So it actually reduced the distractions.

J- That's an interesting point. You're saying the music enabled you to forget about everything else and focus on the reading, if I'm paraphrasing you correctly.

C- Correct.

In addition to stating how music use allowed her to focus more with the e-book, Clair stated that the music she used to focus in her mobile PLE reduced her feelings of stress in different locations, such as in the doctor's office:

J- In the doctor's office, do you think that that environment had anything to do with how you learned? Better, worse, different?

C- It was a stressful situation, for one thing. Having my music helped a lot. When I was reading, I realized I was more relaxed in that environment. There's all kinds of chaos, and I'm relaxed, so I'm able to retain more information as I'm reading.

J- Because of the music.

C- Right.

While these excerpts focused on the individual learner's creations of PLEs that were conducive to his or her needs, these PLEs were created mainly through the use of

music, either on the mobile reader itself or with another portable media device used in conjunction with the e-book. Two other student interviews revealed a variation of this topic, based on using the e-book as a portable learning portal.

Thelma's and Allen's comments related to PLEs did not focus on blocking out environmental distractions but rather on how the mobile e-book, and the fact that it was an all-in-one, self-contained device, could be useful as an efficient learning portal that contained all of their necessary tools and provided access to their course content. In the following excerpt, Thelma commented on how she valued the ability to access her online course on the mobile e-book through Blackboard, the college learning management system (LMS):

But like the e-book, if that's all I had with me, I still could go through and do my entire coursework. I can get out on Blackboard, do what I need to do, come back—I could do both without the additional device. But it just made it easier to do that. I could do it without it, if I didn't have it. So you can literally do all of your work wherever you wanted. I think that's the real value of the e-book.

Allen's interview comments also revealed the value of a singular learning portal, such as in this excerpt:

My general reaction to the netbook was, hey, I can keep everything in one small package.

However, he continued by explaining the value of having all his learning-related tools within one location or portal:

The other thing I just thought of is the usefulness of having all of your tools on one screen, on one desktop at a time, because having the calculator, sometimes I run dual screens, and I'll be checking out my calculator over here, and my homework here, and it's also useful with research papers. I can have a window of my work, a window of what I'm researching.

Both Thelma's and Allen's comments related to the topic of ad hoc PLEs learning environments. However, unlike other students, they focused more on the available

functionality-related tools on the e-book, such as the Blackboard LMS, the calculator, and capabilities for researching and writing papers concurrently. Moreover, Denise and Clair were less focused on these tools for certain tasks and activities, and instead used music to block out environmental distractions. All students, however, used their e-books to augment their ad hoc PLEs in ways that they perceived to best support their individual learning.

Student E-book Activities

The topical category of student e-book activities was generated to gather the student excerpts that focused on the actual activities students performed with and on the mobile e-books. These included the subcategories of printing, highlighting, key word searches, and bookmarking.

Printing was not a functionality that students used. The one student that expressed an initial desire to print, Thelma, the 59-year-old IT professional, expressed her desire this way:

I thought, you know, that I wanted to print, and in the beginning, I think that I thought I would want to print things out. I never did. I never went through the process to even try to print it.

Later in her interview, Thelma further commented on printing—its impact on the environment and the ease of keeping electronic materials current:

T- I think that all textbooks should be online. I really do.

J- Online, electronic, or both?

T- An electronic version. Because if you just stop and think about the environmental concerns of printing all these darn things. How much easier is it to keep a book online up-to-date?

None of the other students expressed a desire to print; however, highlighting was

mentioned as a function that they either wanted to use or did use.

Of the limited studies that have been conducted on mobile e-book use in formal education settings (Shieh, 2009), the highlighting function has been noted by students as cumbersome and difficult to use. There were no excerpts from the student interviews in the present that supported this problem. On the contrary, this excerpt from Roger illustrates how he used highlighting with his e-book on the ASUS Netbook:

I didn't actually use the highlighting for the way in which I compiled the notes. I looked at that a little bit. But I mainly used it to highlight the key points I needed to cover.

Clair also explained how she thought of and used the highlighting feature with her e-book on the Sony Reader:

I was comfortable. I was comfortable, relaxed. Like I said, the e-book was easy. It was easy to go back and forth, easy to find information. They have a highlighting feature on that e-book, and that helped. That really helped 'cause it jumps out at you. It doesn't highlight like it's bright yellow, but it marks the area.

Clair mentioned the ease and comfort of using the highlighting feature, contrary to the findings reported in the Northwest Missouri State University study that used Amazon Kindles loaded with electronic textbooks (Shieh, 2009).

In another excerpt Clair stated how she was aware that bookstores do not buy back textbooks that have been highlighted:

And they don't take the books with writing and highlights, bent pages, that kind of thing. They don't really take those back.

Both Roger's and Clair's comments illustrated their use of the highlighting feature on the ASUS Netbook and Sony Reader to enhance their learning. Additionally, Clair shared her concern over bookstores and the negative resale effect on highlighting in traditional paper-based textbooks.

Within this topic on e-book activities, the subcategory of key word searches often reoccurred, with multiple examples. The interview excerpts primarily focused on how e-book activities allowed students to read in a nonlinear fashion and to access information efficiently, in addition to how these activities supported their learning in the course. These three excerpts from Roger stated how he felt about the key word functionality on the ASUS Netbook:

I used the search features excessively.

I think the best thing, the biggest thing that helped me, was the search function. It was real quick to find relevant information.

The search function made it easier to find what I was looking for, over thumbing through pages.

Roger's statements aligned with those of other students that used the key word search functionality, as illustrated in this excerpt from Allen, where he compared and contrasted his e-book search ability to manuals lacking electronic search capabilities:

I did a lot of key word searching because, just kind of physically going through books—for instance, one e-book I have that's really annoying is that when I had a Honda, someone scanned the entire repair manual. But it's a 1,200-page repair manual, and you're looking for something specific, and the index isn't written that well. You're kind of up the creek without a paddle because with a book you can get a quick visualization of each page, but you can't key word search it.

Allen clearly expressed his frustration with a digital text that did not meet his expectations.

Thelma made similar comments regarding the benefits of key word searches, although she provided more detail about the perceived impact the search abilities had on her individual learning. Thelma expressed the same desire for the activity of key word searches; however, early in her interview she shared this:

T- I'll tell you what I was doing in the beginning, the same thing you'd do with a

book. Because one of the things with a book you do is you go, “Where was that? I know it was back here.” So you’re paging through, you’re paging through. I was doing the same thing with this in the beginning. I was scrolling through and scrolling through. And I said, “I don’t know why I’m doing this—why don’t I just search for the key word?” And you know, it took me, I don’t know, a couple hours after I first got it. I’m sitting there trying to scroll back through, and I was just trying to do an exercise at the end of the first chapter. But it was just more a mindset that you think you’ve got to flip through those pages. That’s what I think I liked the best. Not having to waste time looking for something that I know was in that book somewhere. It was somewhere in the first part of the book, or the first chapter. It seemed like a waste. It’s like looking for something on your desk. You can never find it, but it’s right there in front of you.

J- But the key word. . .

T- The key word I can find.

Initially, Thelma did not use the key word searches, and it took time for her to get acclimated to the word search feature and see its potential benefits. Her interview further revealed how she used the key word searches for her course and specific learning activities. For example, in the following excerpt, she explained how she felt the process and activity of using key word searches affected her learning:

So if I’m sitting there with a book, I’m pretty much going to take it out of my head, as much as I can. I’m not going to go back and check myself, because now I’ve got to look for it in that book. But with the e-book, whether I thought I knew it, or even if I knew it or not, I would still tend to double-check myself. But while you’re checking through to find this stuff, you search and you find it, you’ll start reading it again. So it’s almost like this continuous reinforcement, as you’re going through and taking the test, of the whole module that you just finished reading. I don’t know, it’s like a re-review again, to me. Anyways, that’s how it felt to me.

She mentioned a “continuous reinforcement” here and how the activity of using key word searches with the e-book was a review. Additionally, this excerpt illustrated her inclination to constantly double-check herself with this functionality. In the following excerpt she applied her double-checking activity to working on an assessment in Blackboard:

So it just seemed like you had more ability to really evaluate what your answers were going to be, because I had the ability to look through it. On the e-book I could look through it and find something that I wasn't sure about that particular key word. Maybe change it to something else. If I had multiple choice, of five different multiple choice[s], I could look all of them up. Instead of picking the one I thought it was, I could look them all up, and evaluate it before I answer it. You would just go through and evaluate. It was like a real strong review of that module that I don't think—I know—I wouldn't have done it, had I not had the electronic search. . . .On the e-book, you're picking more information up, as you're searching for the answer to this question.

These excerpts show how Thelma positively viewed the activity of using key word searches for her use on assessments; however, they also add the element of motivation.

Roger, who explained in his interview that he viewed the use of key word searches positively, also shared some reservations. In this excerpt he explained why he would like to see some changes to this functionality:

The only downside to it is that I couldn't narrow it down. If I'm working on chapter 1 or chapter 7, I could not search the relevant terms specific to that chapter. It would give me the relevant terms for the entire text. So if I could limit that down, it would actually save me a lot of effort.

Roger's quote showed his desire for an enhanced search feature that could allow specific requests and limited results.

Bookmarking was another activity mentioned in the student interviews. For example, Clair elaborated on how she used bookmarking for her learning activities, illustrated in the following excerpts:

C- I definitely used the bookmarking, because when there [were] major points I figured would be on a test, I was able to mark that page, and not have to flip through a million pages to get back to that point.

J- Do you remember how many you had?

C- I did a lot—I remember one test I had 19. I remember that because I looked at it and said, "Wow, I have too many. Maybe I don't need some of this information." I do remember that.

Clair described how extensively she used the bookmarking feature. Again, this activity relates to and is similar to the use of key word searches and using the e-book in a nonlinear fashion.

These excerpts illustrated how some of the students supported their learning by performing certain e-book activities, such as highlighting, key word searches, and bookmarking to access information quickly and efficiently, in addition to conducting nonlinear reading.

Student Motivations

For all of the students, their motivations for using the e-book in their courses often surfaced during their interviews. Motivations for e-book use was defined as how students felt about how they were motivated to use the e-books and why they persisted. All but one of the students, Melody, persisted in using the e-book for the duration of their courses. The subcategories that comprised motivations were student e-book competence, value, persistence, and time urgency.

One aspect of the motivation topic that came up in the student interviews was competence in relation to using the e-books. All of the students expressed a self-perceived level of competence for using the e-books in their courses. This was most apparent in excerpts from Allen, Roger, and Thelma.

A- I was really confident because I've used PDF books before, I've used Windows XP before, and I've used so many different operating systems, so many different types of programs. I've even done some programming, built my own programs, so it kind of became, after a while, stop needing to learn everything before getting started and just learning its particular quirks.

J- Did you feel in control of your learning using the e-book?

R- Absolutely.

J- And why do you feel this way?

R- Again, being from an IT background, there's no real challenges there for me.

The menus were where I would expect to look for them, the general functionality was there.

J- Did you feel in control of your learning using the e-book?

T- I did. I really did. I like that, because, like I said, I could put it right back.

You know, the darn things last forever. I'd plug it in and open it up and go right back wherever I was.

Denise and Clair also shared their perceived competence levels for using the e-book. For example, Denise stated, "It made me feel confident," and Clair said, "I felt in control of my learning because I was able to control where and when I learned." The excerpts clearly illustrate all of the students' perceived levels of e-book competence.

Melody, the one student who discontinued use of her ASUS Netbook e-book after approximately 3 hours, said this about her confidence:

My confidence level was not the issue with using the e-book; it was the "user friendliness" of the book itself. When scrolling, it does not allow for you to scroll down the page which you are on—it goes to the next five or six pages. Even when I use the next page button at the bottom of the screen, it still does not allow for me to maneuver within the page I'm reading. I would not have a problem with it, if this particular feature was more navigational.

When further questioned, Melody responded in terms of the motivation subcategory of value. The following excerpts related to the low value she placed on using the e-book on the ASUS Netbook:

To be very pointed in my response, I ended up resorting to my [paper] textbook.

Again, adding to my frustration, and my strong opinion that it wasn't worth the trouble. My textbook is literally right here.

[I] hate to say that I placed a low value on it, because I'm pretty sure it has a very high value, but for me, specifically, I found that my books had more value. My paper book had more value.

I didn't give it the chance that it deserved.

Early in the course, in her week 1 journal notes, Melody stated that her aversion to using

the e-book was not related to her confidence levels. Instead, her interview conveyed her perceived low value for using the e-book for her learning.

This perception contrasted with the views expressed by Allen, Clair, and Thelma, who all placed a high value on using the e-book. Allen stated “yes” in response the question about whether he valued using the e-book for his learning. Clair said, “It exceeded my expectations,” and then elaborated:

In the beginning, I didn’t put a lot of value in to it because I didn’t want to set myself in a position where I was going to completely rely on it. I wanted to make sure it was going to be able to deliver before I put all my eggs in one basket. After a while it became the only thing I needed. I didn’t need to go off to the Internet or anything. Because the textbook—it was just like the textbook. Nothing was missing. So then it became very valuable.

Clair’s comments, along with those of the other students, show that Melody was the only student who did not value the e-book use. This leads to the next subcategory under motivation, namely persistence.

Some students, like Denise, expressed a “warming-up period” when asked about their continued use of the e-book. The following two excerpts from Denise’s interview illustrated this:

J- Did you find [the e-book] difficult to use?

D- I did, at first, when I first brought it home. I was experimenting with it because I had never used one before. But then I got used to it.

D- I probably got used to it the second day I got it. Like the night that I got it, I was kind of playing with it.

Clair also alluded to her continued e-book persistence in her previous excerpt on the value of e-book use:

After a while it became the only thing I needed. I didn’t need to go off to the Internet or anything. Because the textbook—it was just like the textbook. Nothing was missing.

This statement strongly contrasted with Melody's interview and week 1 journal, where she shared how early in the course she gave up on using the e-book in favor of the paper-based textbook. During her interview, Melody made numerous comments regarding not using the e-book, such as, "I never really gave it a fair chance," "Because I didn't give it a fair chance," and "If I had to do it all over again, I would not use the e-book."

When Bob, the instructor for the sociology courses, was interviewed, I asked if he knew of any students that did not persist in using their e-books. He responded:

One of the women who bailed early, when she told me that she was going to return it, she led me to believe that she didn't want to learn the technology. She just wasn't at a point in time where she wanted to spend the time learning how to use the technology. She just wanted to take the class and get it over with.

The instructor later indicated that the woman he referred to was Melody. In summary, Allen, Clair, Melody, Roger, and Thelma all stated that they were competent in using the e-book. All students but Melody also placed a high value on using the e-books for their course.

The final subcategory under the topic of motivation was time urgency. Time urgency was defined as how the students felt about the use of the e-books for particular activities and within the context of the 12-week course. Time urgency also related to all of the previous subcategories of motivation, competence, value, and persistence.

Time urgency was best illustrated by two students with different perspectives on this construct in relation to their e-book use. Melody explained her feelings in the following excerpts:

Because of my schedule, I work all the time, I'm a full-time wife and mom and going to school four nights a week, it doesn't allow me the time to say, "I'm going to take this one hour to familiarize myself with this electronic book." When I knew that one hour of trying to familiarize myself could be utilized for studying

an hour, studying I can do using my textbook.

I'm not afraid of anything. I'm always open to new challenges, but for me, this was more of a rough time, and right now issue. I have the time right now, and is it going to work faster for me, or is just using my textbook going to be faster for me?

But it's more about time than anything else. If I had a choice today, I would choose the handheld one.

Examined in conjunction with her previous comments, Melody did not value using the e-book for her course, particularly because of the finite amount of time she had to devote to using it. Melody's e-book experiences starkly contrasted Thelma's, which are explained in this excerpt:

T- The motivation was I had to have x done by this time. That's always my motivation. This is my drop-dead date. If I didn't keep on track of that syllabus, I was going to be behind, and that was my motivation.

J- Did the e-book influence or hinder your ability to do that in any way?

T- It didn't hinder it in any way. Did it influence me? It was efficient. I thought it was very efficient to use. Much more efficient than the textbook. But that goes back to that ability to find things quickly and I'm not wasting a lot of time and energy looking for stuff. But the actual tasks that had to be done, like I said, the discussions and the tests. Even when I got down to doing the project itself, I did that all on my laptop, not the netbook.

This contrast illustrated a noticeable difference in Melody's and Thelma's learning experiences with their e-books on the ASUS Netbooks. These differences, however, could also have been influenced by each student's individual purposes for and tasks with the e-books. For example, the use difference between reading straight through the text or searching the text for specific content to answer a question could impact motivation to use the e-book.

The main topic of student e-book motivations consisted of the subcategories of competence, value, persistence, and time urgency. Motivation for e-book use was

defined as how students felt about how they were moved to use the e-books and why they persisted. Melody was the one student who reported to not value, persist, or perceive a time-effective use for her e-book.

Theories in learner motivation, such as expectancy x value theory and self-determination theory, were related to the next topic, self-efficacy.

Self-efficacy

As noted in the theoretical framework established in Chapter 2, self-efficacy is related to the motivational theories of expectancy x value and self-determination. Self-efficacy has begun to rise in the mobile learning research (Wang & Wang, 2008) and is the first attempt at creating an empirical measure regarding the use of mobile technologies. Both theorists in self-efficacy and expectancy x value theory agree that “efficacy expectations are more predictive of performance and choice than are outcome expectations” (Wigfield & Eccles, 2000, p. 71; see also Bandura, 1997), where expectancy x value theory and self-determination theory focus on outcome. Taking this perspective, it is perhaps appropriate that self-efficacy has emerged as a useful measure to begin to understand the learning choices, persistence, and performance of mobile learners. Therefore, defined for this topical category in the study, self-efficacy was the students’ beliefs about their capabilities to use the mobile e-books to support their learning in the course. The subcategories that comprised this topic were perceived difficulty of use, confidence, sources of confidence, and generalization of previous technology experiences.

When questioned about their perceived confidence levels, some students shared information regarding the supporting materials that came with the e-books, menu

systems, and the overall navigation. Clair commented on how the manual influenced her confidence:

The manual was 30 pages. You know, small pages, not full pages. Just seeing the manual gave me a little boost of confidence because usually when you see manuals for computers or anything, they have these thick manuals, and it's like, "Oh my god, I have to figure out so much about this," and that wasn't the case.

Her perception of the manual as a short and helpful resource illustrated how this factor made her feel confident about using the e-book. Related to this was Roger's comment about how he viewed the menu system: "The menus were where I would expect to look for them, the general functionality was there." Both of these quotes illustrated students' positive confidence about using the e-books, one with the Sony Reader (Clair) and the other with the ASUS Netbook (Roger).

When questioned about his observations of students' use of the e-books and perceived levels of confidence for use in class, Bob, the instructor, stated:

Learning can't happen if they can't access the device, so I think that's the biggest hurt. If I put a big wall up that says, "I can't use this thing," learning isn't going to take place. That, I think, is related to learning. We have to get over that bump in order to get to the device. I think some people put this wall up by saying, "It's technology, I don't want to deal with it." I don't think most people are going to fall into that boat though.

Bob focused on the importance of students' learning self-efficacy progressing beyond the technology use, including manuals, menus, and basic functionality. The student comments seemed to support this focus, because students expressed positive feelings about the e-books' simplicity of use, which relates to next subcategory of confidence.

All of the students either expressed high self-confidence when questioned about their use of the e-books or simply stated that the use was not an issue or concern.

Examples of this include Thelma stating, "I thought it was easy to use;" Ken asserting, "It

made my life a whole lot easier;” and Clair saying, “Yeah, it was fairly easy.”

Interestingly, even Melody, who did not see value in using her ASUS Netbook e-book and did not persist in its use during the course, stated:

The confidence wasn't an issue. I mean, it's an electronic device, it's a computer. Computers are pretty much like a television. It's a part of your life. So the confidence wasn't an issue.

All of students, including Melody, reported a high perceived level of confidence or else noted that confidence was not a concern of theirs using the mobile e-books. Related to this subcategory of confidence within self-efficacy were the student sources of confidence.

Melody stated that she was confident because she was in control, as described in her statement, “Well, I mean, I had the power,” and also when she compared using the e-book to a television remote control: “Yes, I had the remote.” Clair stated a different reason as a source of her confidence in using the e-book:

With my regular textbooks, it doesn't even cross my mind to take it with me when I'm going to run errands, or when I'm going to pay bills, or when I go to doctor's visits, things like that. That's not a thought, about studying. With the e-book, it was already in my purse. I'm like, “Oh, I have it here, let me just go ahead and do it.” It's easier. You can go down to the Landing and sit on the water and study, and you don't have your pages flying back and forth in the wind or your notebook flipping pages, things like that. It really makes it easy to study anywhere.

For Clair, the portability and freedom to use the e-book in various environments was the focus in above excerpt, one of the bases for her perceived confidence level regarding her self-efficacy. Yet the most frequently stated source of student confidence was not portability, but previous technology-related experiences.

Denise shared her perceptions of her high technology-related abilities in this comment: “I'm always with electronics. I always help my mom with the computer, so I

didn't really have any problem with it." She also stated that she was never nervous about or afraid of using her e-book. Echoing these high feelings of confidence, based on generalizing from previous technology-related experiences, were these excerpts from Allen, Clair, and Roger:

A- Mostly I felt in control because I know enough about the computer to get around. I know if you can't right-click and copy/paste, you can control + c. Usually it takes specific hindrances to make me feel uncomfortable or out of control with something.

C- I consider myself pretty computer savvy. In the beginning, you know, it's a new piece of equipment, so I wanted to make sure I read the instruction manual that came with it so that I don't damage it in any way or do something that I have to pay for it. After I read it, did a quick skim through, I was able to work it.

R- Again, being from an IT background, there's no real challenges there for me. But once I figured it out, I was good.

These students relied on their previous successful experiences as a source of confidence and high self-efficacy in using the e-books for their learning. Even Melody, who abandoned using the e-book, felt that she was able to easily generalize from previous technology experiences to use the e-book.

The only negative or hesitant comments about generalizing the use of new technology, such as mobile e-books, came from Bob, the instructor, as illustrated by these two comments:

It's a piece of technology, as I mentioned before, and there's always going to be someone who just doesn't know how to use the technology. That's a negative. Other than it being a piece of technology, I don't think that there's anything else that I can add in about the negatives.

There's a lot of technology out there right now, and that's probably the other hindrance for this. As an instructor, if the student has the option to get an e-book, I'm not sure what that means, how it's going to be delivered. Right now there are just way too many ways and devices that it could be delivered, and each device has its own peculiar issues with it. As an instructor, am I going to have to know more about different devices, so I can help my students? Are there going to be

some devices where I'm going to say, "I just don't know; I have no idea."

While Bob shared these concerns, none of the students expressed these same concerns, and all of them shared their own perceptions of high self-efficacy for using the e-books in their courses.

Self-efficacy was defined as the students' beliefs about their capabilities to use the mobile e-books to support their learning in the course. In exploring this topic, the subcategories of perceived difficulty of use, confidence, sources of confidence, and generalizing previous technology experiences were used to identify data related to students' feelings of e-book use self-efficacy.

Social Constructivism

One of the primary parts of the theoretical framework described in Chapter 2 was constructivism, which Schunk et al. (2008) defined as "a psychological perspective contending that individuals form or construct much of what they learn and understand through individual and social activity" (p. 326). Bandura (1997) also emphasized the role that modeling social behavior plays for individuals learning through vicarious means. For the purposes of this study's topical categorization, social constructivism was defined as data that revealed how students felt, valued, and/or participated in social learning means. Three subcategories for this topic were student claims of no e-book interactions with other students, e-book use to support online discussions, and the desire for a social learning textbook.

When students were asked about how they used their e-books, and specifically if they used them individually, socially, or both, most students claimed that they only used the e-books individually. For example, when Thelma was asked how she used the e-book

on the ASUS Netbook, she explained, “I just used it myself. I didn’t interact that much with anyone else.” Roger also described using his e-book on the ASUS Netbook in isolation by explaining, “The majority of the time, I was solitary.” This perspective was shared by both Denise and Clair. When they were asked, “Did you use the e-book totally by yourself, or did you ever use it with classmates, or both?” Denise replied, “I would never use it with classmates; I would just be by myself,” and Clair said, “I used it individually.” From these interview excerpts, one can surmise that the students felt that they only used their e-book individually, and not for the class group projects or in a social learning context.

While the students declared that they had only used their e-books individually, during further questioning, three noted that they actually did use the e-book to support their social learning activities in the online discussion interactions. For example, Thelma responded as follows:

T- Now, if I had to reference back to something, that’s why I’d use the [e-book] to do the actual discussion questions. If I wanted to reference back to something in particular, it was so easy to find my spot.

J- Because you were required, in the discussion questions, to back up your assertions.

T- Well, I wanted to, so that I would make sure, if I made a statement, that something I’d written was accurate. Some of the other people should have tried that.

She shared that she would use the e-book on the ASUS Netbook to help her look up information for discussion questions, and she found she could comfortably perform this task to support her learning activities.

In a similar excerpt from Allen, he explained how he used the e-book on the ASUS Netbook to support his learning in the online discussions:

A- Yeah. If you count interacting on the discussion board, if you count replying to people's discussion boards.

J- When you're interacting in discussions with your classmates, did you use the e-book to do any of those responses?

A- Yeah, because I could kind of go back and say, "Well, no, this is why I think this, and it's in the book."

Similar to Thelma in her online course, Allen supported his hybrid course learning activities in the online discussion posts with the e-book.

Furthermore, Clair's interview revealed that she too had used the e-book on the Sony Reader to support her online discussion learning activities, as indicated in this excerpt:

No, I used it. A lot of the discussions would cause me to refer back to something in that chapter we had been studying. There may be a definition, or you may have to give your viewpoint on a topic in that chapter, so it really helped to have it right there and to be able to press the numbers on the side. I'm good with the page numbers. "Oh, I'm on page 46." And I'd press 46, and it would go to that page. The whole page shows up, everything.

Using the e-books to participate in the online discussions was an activity that these students used to support their learning; however, Clair further expounded on her experiences related to the e-book and its use in the online discussions in this insightful exchange:

J- So you've used it for the discussions, to look up information. You also used it for the test. Any other ways you used it when you were taking the online class?

C- There was a portion of our discussion where students were having issues with something. I would be able to write really fast. I wouldn't have to flip through the book, and I was able to give feedback on whatever topic they're not sure about. It was fast, as opposed to having to look through the textbook to help them. Half the time, with the regular textbook, I won't respond to the students who need help because it's tedious to look through and then have to type and explain it.

J- So because it was fast, you actually went above and beyond, and you helped

students that had questions.

C- Right.

J- And you never did that before?

C- Right. Because you have to flip through the pages or you have to sit there. In that class you have to support. Everything that you say, you have to support it with something. So if I'm helping someone with a question, you have to go through the book and find which page number that supports this. It's a headache.

J- How did you do it?

C- A lot of times it was bookmarks.

J- Oh, because you already had a bookmark.

C- Yeah. So a lot of times, it was easy. I studied more because of the fact it was not a headache category. I'm telling you, that's the truth. If it's a headache, I'll do it if I have to, but I don't want to. If it's not a headache, I'm all for it.

Clair's comments expanded beyond simply stating that the e-book was used to support online discussions. She claimed that she was more engaged and socially interactive in her learning with the use of the e-book. This social learning behavior relates to the third and final subcategory under social constructivism, the desire for a social textbook.

The e-book on the ASUS Netbook contained the e-book reader software MyScribe, which had a feature that allowed student to highlight text and create notes within the electronic textbook. These annotations could then be shared with other students using that textbook platform in their course. Essentially, these MyScribe features provided a communication channel for students to create and share their individual notes on the electronic sociology text. No student reported that they used this sharing functionality, which was only available with the e-book on the ASUS Netbook.

Despite this lack of utilizing the MyScribe shared notes feature, students did express a desire for this type of functionality. In the following two excerpts, Roger

explained how he experienced these e-book sharing abilities:

J- If you could improve upon anything about the e-books, what would it be and why?

R- From what I saw on the e-book that I purchased, it had some sort of shared note feature on it. I think that if it had some sort of portal built into it, where you could connect to your classmates and have some sort of a chat function, so if you were working on a group project, you could all watch some sort of a window and be able to have like an IM. I wouldn't say an IM, but some sort of a chat room, where all the students could be in there and collaborate.

R- The shared notes feature, I see that being very applicable to where, say, I read through the text, and I make my notes, but I can look at somebody else's shared notes, and go, "Hey, this is an important point," and go over it. It may stand out that much more to me, because somebody was coming at it from a different perspective. And then on the collaboration side of it, yes there's other programs that you can use to collaborate, but especially in the students' environment, having one program already set up where it's extremely easy—you know, a one-click connection. You say, we go to this chat room, and this is the code to get into it or whatever, so it's private within those students. You know, setting up something like that just makes it that much easier, I think, for working on group projects.

Roger described a scenario from his perspective as an online student, one that would be facilitated and enabled through an online server and portal. Clair also expressed a desire for social functionality embedded in the e-book but, as the following excerpt illustrated, within a classroom-based context:

If I was in a classroom, if I was in a face-to-face class, maybe another student found something that I overlooked, so they would be able to say, "Hey, put my book name in, and you can get this information from me." That kind of thing. I don't know what it would do for cheating and things like that. That's a potential downside.

Based on these excerpts, both Roger and Clair appeared to value the ability to socially interact in their learning. Additionally, their examples expressed the desire to socially interact through using their e-books. Clair, because she used the Sony Reader, was not able to use the MyScribe social notes-sharing feature, and even though Roger had access

to this feature on the ASUS Netbook e-book, he did not use it.

Allen also expressed a desire for the ability to participate in social learning with the e-book. When discussing his experiences using the e-book on the ASUS Netbook, while at the local book store with a friend, Allen stated:

Me and my friend were doing our homework at the same time. We weren't being pulled away, but were just adding a layer on conversation over our homework.

As he explained, he and his friend had face-to-face interactions, with the additional use of his e-book, talking about the course content and reading the class discussion posts. Allen further expounded on his perceptions on the value of social learning:

Everyone holds his experience in a completely different way, and sometimes getting that different point of view, or they may even have taken a similar class and been like, well, this is what I got from the subject. That kind of created more points of view, and the more points of view you have, you can kind of pull our own stuff back and say, well, I didn't think of it this way. You can apply what you learned in different ways to your discussion board answers and a lot of different things.

Allen expressed his value on the ability to learn vicariously through social models (Bandura, 1997) when discussing changes he would like to see in mobile e-books. While this sentiment appeared to be shared by Roger, Clair, and Allen in the examples given, Bob, the instructor, strongly challenged these views in his interview, citing numerous cautions, concerns, and overall issues regarding control.

In Bob's interview, he was asked about his perspective, as the instructor of the courses, regarding the social learning functionalities of MyScribe and the experiences students desired. Bob was guarded in some of his responses and oftentimes outright opposed to such features. He expressed his opinion on whether social notes sharing is a benefit for student learning:

I know lots of people think that note sharing is a benefit, but I don't look at that as

a benefit because I look at that as, if I'm reading *Gone with the Wind*, or I'm reading CliffsNotes of *Gone with the Wind*, which one is better? What you end up with with note taking is an abstraction of what's really there. I'm hoping that the book that I'm using had already been pared down so much that I don't know how you can pare it down more and make it be useful.

Undoubtedly, Bob felt that student learning would suffer from a seemingly dumbed-down learning resource, in the form of a socialized textbook. He further explained why he felt social notes sharing would harm student learning:

If you're using it as the easy way out, which is, "Let me just phone a friend and find out what they think the answer is." Instead of me just looking it up, let me just ask somebody, they'll give me the answer. Did the person learn the same by reaching out to a friend, or actually looking it up? I would argue that by looking it up, you've learned more than just the answer. You've learned a process, too. Whereas asking a friend, you don't learn from that process, so next time you need it, you're probably going to be in the same boat. You had the opportunity to learn, but you didn't take it. There will be opportunities, but will people take the opportunities and make this positive? Sure. Will people miss the opportunities? Absolutely.

Bob also shared his main concern that the social textbook could end up becoming a "Wikipedia-style" resource, without instructor and editorial ownership of the learning interactions spawned from the social textbook. This concern was illustrated in these two excerpts:

Well, I think you discuss from the text, but what happens is that you start adding notes to it, and the notes become part of the text—now the text isn't the text. The text becomes Wikipedia.

The authors were the ones that wrote it with the credentials. The students have no credentials. So when students take this student's notes over what the author wrote, I have issues with that. I don't know if students will be able to be connoisseurs of the information. What's good information, what's bad information? Right now, you know if it's in the text, that's good information. These notes that are off to the side, how do you evaluate them? When I'm reading these notes, do I take it that these are better than what the text was or these are inferior to the text? I don't know. You're mixing a couple of things that I don't know that mix together. Notes and my perceptions of what I read are different than what I read.

Bob did not feel that interactive, social learning taking place within the e-book was desirable for him, as the instructor, or a positive that encourages student learning.

Additionally, he emphasized the superiority of the textbook authors' perspectives. Bob's focus on instructor control is further echoed in the following excerpts:

That collective note taking, once it's outside of my class, I don't have control over what the people are saying, or why they're even saying it.

My idea would be to have it so that I see notes before they get released publicly. That way you could get a faculty member, somebody who is supposedly more knowledgeable, just get their comment too. If nothing else, I'm the instructor, just have the ability for the instructor, whoever's class it is, say, "Release the notes," with comment or without comment.

I'm vetting the content so that I know it's accurate. My fear is the notes will, just like the discussion posts now, students post what they think is the right answer or a good example, and you find that it's a bad example. How do you take care of that? In a discussion board, you come back right behind them and you point out and just say, "I disagree. This is really an example of . . ." When you do that in a note in a book, I, as the instructor, don't have the ability to defend it.

Thus far, Bob's comments have focused on the importance of maintaining the integrity of the original textbook, with reservations that the textbook could become too open for interpretation, if students were given the rights to annotate and comment within it. He stated strong convictions regarding his own role as the instructor, who should maintain control and ownership over the learning interactions.

There were times, however, when Bob shared comments that did show some support for certain aspects and conditions of the social text. For example, in the following excerpt, he appeared to value the sharing of notes as an additional tool for reading.

J- If you were to kind of summarize your perspective on this Wikipedia aspect or the note sharing functionality of the My Scribe e-book, it would be what?

B- Don't get me wrong, I think there's a use, I think there's a utility in it. The

problem that I see is our students wanting to do the least possible. So, given a 200-page book or given three pages of notes, which one am I going to go with? I'm going with the three pages of notes. That's where I have the issue at, is that taking the three pages of notes with the textbook is the ideal. If our students could be convinced that more is better, then this works. I am not sure that the students have the mentality of "I have the book; I need to read it like I've always done, but now I have this extra tool." It's a matter of, do our students perceive this as an extra tool, or do our students see this as a replacement? As a replacement, it's a poor replacement. As an extra tool, it's a great idea. It's convincing students that it's an added tool, not a replacement tool.

Bob expressed that, while a poor replacement for the traditional textbook, a social, interactive textbook where students could share notes and comments has utility to augment student learning. Moreover, and related to interactive student learning, throughout Bob's interview, he made it clear that he was a proponent of social constructivism.

In the following excerpt Bob expressed how the social sharing of abstract concepts connected through concrete individual examples is important for student learning:

The more it relates to the individual, the more likely it is that they're going to remember it. If you have them looking at bizarre concepts and bizarre examples that they have no connection with, they'll remember it for the test, and then they'll forget it. If it's something they can go, "my family are," "my family is," that's a more permanent connection. Something they're going to see every day, so that idea's going to be there more frequently.

The reason we teach in classes as opposed to the old Socratic mentor and mentee is because you learn from others, not just from the teacher. That's why we don't use the mentor-mentee relationship in education. It neglects that the other minions help in the learning process. They're not minions. They are active participants who have reason to contribute. They add to the scenario. If they didn't add, this would all be mentor-mentee.

In the first of these two excerpts, Bob focused on how social models could help influence individual learning within a social context (Bandura, 1997). What Bob underscored as crucial for student learning was relevant to social learning interactions. In the second

excerpt, Bob expressed an even higher value on student perspectives within a social learning space and the potential interactions within it—not just of the instructor, but the students as well. From these excerpts, one can determine that Bob placed a high value of social constructivism to foster meaningful learning.

The following excerpt, from a latter portion of Bob’s interview, was spawned by my question regarding his pending 2010 introductory sociology courses, which would use the e-book version of his text through MyScribe. His responses to this question encapsulated his perspectives on student learning with a social textbook e-book feature:

J- So, if you were to teach another course that had the e-book with MyScribe and social notes feature in the fall of 2010, and you had the ability as an instructor to make that functionality available or not. . .

B- No, I will have that. My class will have a digital book in the fall.

J- And if you have the ability to turn that functionality on or off as an instructor, what would you do?

B- I’m going to leave the functionality on. There are possible positive uses.

J- Such as?

B- Notes are positive.

J- Why?

B- Because my notes are my trimming down of the content, if they’re my notes. Now, when they’re somebody else’s notes, I think you have to be careful to make sure those notes are consistent with your notes; then they become useful. If, however, you’re just using their notes and they’re not yours, that’s a slippery path. I think you can use them with what you’ve already done, as a supplement to it. Somebody else may have a take on something you were having a difficult time with, and they may be able to explain it to you better. But I don’t think you use that as your primary means. First, the textbook. You look at it, then you go to other notes. As long as students are going to do things in that linear fashion, then we’re okay. Again, my presentation is for students to say, “I’ve got this great book. What I’m going to do is print the notes off and study from the notes page for the quiz and bypass the whole chapter.” Will that be sufficient? I don’t think so.

J- So if I'm summarizing you effectively, you see some potential benefits and some potential negative aspects of the social sharing aspect of the textbook.

B- Yes. I see it positive in that it deepens a student's ability to learn. I see a negative in that that student that's looking for a shortcut, it gives them another shortcut. I don't see that shortcut as being something that leads to a positive end result. They're short changing themselves. They're doing that specifically by just using somebody else's notes. Basically getting CliffsNotes.

J- And then the opposite would be. . .

B- Supplementing. And if the student is using those to supplement what they've already done: very positive.

J- And what they've already read from the actual text. Without the social limitation.

B- Right. Supplemental, positive. Substitute, negative. I think that's how we could sum that.

Bob undoubtedly held some positive attitudes about the use of social learning for fostering effective student learning in his classes. However, he did caution against the use of new social text features students claimed they would like to see in mobile e-books. His excerpts reveal that, to some extent, his reservations were based on his need to control information sharing and student learning interactions.

In summary, the label of social constructivism was defined for the purposes of this topical categorization as relevant for data that revealed how students felt, valued, and/or participated in social learning means. The three subcategories under this topic were students claiming they had no interactions with students with their e-books, supporting online discussions, and the desire for a social learning textbook. While some students expressed a desire for enhanced social sharing and learning tools within their e-books, no students reported using MyScribe's notes-sharing feature, and the instructor shared reservations about such features.

Situated Learning

One of the most popular topics in the literature on mobile learning (Sharples, Corlett, & Westmancott, 2002; Roschelle, 2003; Sharples, 2000; Sharples et al., 2005; Waycott, 2005) “situated cognition” or “situated learning” was included within the theoretical framework for this study. Situated cognition focuses on the context in which activities occur and their application to real-world use (Brown et al., 1989). For this theory of learning, knowledge and the acquisition of knowledge cannot be separated from the environment in which knowledge is used. An example of situated cognition is the apprentice that learns in the actual work environment, such as a midwife or a butcher (Lave & Wegner, 1991). The key components of situated cognition reside within the authentic contexts and purposes for which new knowledge is gained and used.

For the purposes of this topic category, situated learning was defined by how the mobility and location-agnostic affordances of the e-book influenced student actions, feelings, perceptions, and learning. Subcategories contained within this category were anytime, anywhere learning, disruptive locations, cognitive load, the GPS textbook analogy, and situated learning instructional design. As with social constructivism, researchers must use caution in applying the concept of situated learning in the context of e-book use. Due to the course subject matter of the student participants of this study, sociology, the site of or situation for this learning might have created the impact, rather than the location of the information medium.

Many of the students shared comments related to the notion of true anytime, anywhere learning. Whereas online learning expanded learners’ abilities to be geographically disbursed, new mobile technologies have extended that practice beyond

being bound to an office or desk. Examples of these capabilities were included these comments from Roger and Allen:

R- From my personal perspective, I've always kept a laptop in my vehicle anyway. I actually mounted a laptop, like a cop has in their police car. So, mobile computing in that sense is definitely not new to me. Would I be more apt to use it for—in a mobile sense? Absolutely. If I end up doing any sort of typical activity throughout my day, and I have the opportunity to dive into it, then it makes it a heck of a lot easier, seeing that it's right there at my fingertips.

A- Yeah, I never really went to Barnes & Noble to study before. I never really went to any kind of social situations, pulled out my textbook—because I was more comfortable, people could just see that I was on a laptop, not that I was doing schoolwork. I don't think it's because I was doing schoolwork.

Roger spoke about the times he waited in the parent pick-up line at his daughter's elementary school. During these times, he would use these “stolen” learning moments to work on his class readings and studies on the ASUS Netbook. Unlike Roger, Allen stated that taking his ASUS Netbook e-book with him to the Barnes & Noble bookstore was both novel and comfortable, and not something that he would have done with a traditional textbook in a social situation. Roger and Allen both described their participation in the mobile affordances of their e-books.

In addition to Roger and Allen, Clair shared how she used her Sony Reader e-book anytime, anywhere, as indicated in the following comments:

I felt in control of my learning because I was able to control where and when I learned. And I was able to learn in more places than before. A lot of times, when I would just have time sitting around at school to lug out a book from my book bag, and pen and pencil and paper and all this to try to make notes, that's when the bookmark came in handy. You just flip open the book, press a button, and go back to the page when needed. I learned in more places.

With my regular textbooks, it doesn't even cross my mind to take it with me when I'm going to run errands, or when I'm going to pay bills, or when I go to doctor's visits, things like that. That's not a thought, about studying. With the e-book, it was already in my purse. I'm like, “Oh, I have it here, let me just go ahead and do it.” It's easier. You can go down to the Landing and sit on the water and

study, and you don't have your pages flying back and forth in the wind or your notebook flipping pages, things like that. It really makes it easy to study anywhere.

Clair's comments focused on the convenience of taking her e-book with her while she went through her daily life. She also mentioned how this affordance influenced her own perceptions of controlling her learning, and how much she positively valued that.

Ken also mentioned how he used the mobility affordances of the e-book by describing where he used it:

On campus, obviously. The library. And my anatomy II class—I looked up a couple of things in there. Kent Campus. Bob's class, obviously. The lunchroom. At home. Use it to surf online at home, in my room actually.

Before class, in the lunchroom, catching up on the last two weeks or month or whatnot. Catching up on work, just reading chapter by chapter. Before class started, I had two or three hours to kill. So the e-book, I just read that one.

Contrastingly, Thelma said, "I sat on the couch at home. That's where I did 90% of it was on the couch at home." She did not really use the mobility of the ASUS Netbook e-book.

Thus far, these comments by Roger, Clair, and Allen focused on their perceptions of convenience, control, and ability to utilize free moments of time for their learning. However, in Clair's interview, she further expounded on how she felt about e-book mobility. She explained how she thought the e-book mobility is liberating not just in terms of location, but also in terms of motivation:

But with an e-book, with it being so small and easy to use, you can use it anywhere. You can use it on a city bus sitting on a five-inch wide seat, and you're still comfortable enough to be able to use it and not have the corner poking the person next to you or something like that. It really gives you more control. And that's motivation to me.

Many of the students' excerpts focused on the ability to not be bound to a location or physical place. Whether for the novelty, convenience, time efficiencies, or even learning

motivation, such as with Clair, the students' excerpts reflected a positive view on the mobility affordances of their e-books. The next subcategory under situated learning, disruptive locations, illustrated the potential negative learning aspects of mobility.

Two students discussed the potential downside of being able to take their learning anywhere in their individual environments. For example, Thelma, the student who previously said that she primarily used her e-book at home, stated her feelings on mobility this way:

If I get disrupted too frequently, then I'm reading the same paragraph over and over and over again. And that's why I quit trying to do it at work. I kept reading the same thing over and over again. I was so distracted from one thing to the other. At home, it was a lot easier for me. I could not shut off the work easily.

The location, yeah. Work, it was just too disruptive. I have—I get distracted too easily at work. At home, I was just more comfortable for me, because I could say, okay, now I'm home, and now I'm into school mode, my book mode. And I kind of separated it in my mind. That's how the location affects me.

Thelma specified that home was the best learning environment for her, regardless of the mobile e-book's ability to allow her to study at work or anywhere else. Thelma focused on how environmental distractions and disruptions negatively influenced her ability to read. Allen, who previously noted his "comfortable" use of his ASUS Netbook e-book in novel environments, later explained how his work environment could potentially be disruptive to his learning:

It depends on the job. I had some of my retail jobs where I would have hours and hours at a time of just sitting around. For instance, when I worked at Blockbuster, I worked at a very slow store, so there would be hours at a time without checking out a single customer. Usually my manager would sit in the back and read, and sometimes I could do homework, as long as it didn't look like I was distracted. Technically, I guess I could, but it was so long ago—it was before I owned a laptop, before I started FCCJ, so I couldn't definitely say that, but I could say it's dependent on the workplace.

These excerpts by Thelma and Allen show how they felt that, despite the mobile

affordances of the e-books, some contexts might not be conducive to e-book use and learning. This subcategory related to the next one, cognitive load.

In an experiment involving working memory capacity and multimedia lessons on an iPod, conducted with university students as subjects, Doolittle and Mariano (2008) found that mobile learners had more constraints placed on their working memories, compared to classroom-based learners. While Thelma and Allen did tangentially mention issues related to potential cognitive load in their excerpts on disruptive work locations, that was the only data related to working memory from the student interviews.

However, Bob, the instructor, discussed issues of cognitive load in his interview. For example, in the following comments, he expressed some concern over using the e-book in a true mobile fashion:

Using the device in a novel location is great, as long as you're paying attention in the novel location. If I'm sitting out on the beach enjoying the waves and looking at the sun, and I'm using my book, when I'm finished, have I really used my book, or was it there kind of like the osmosis? If I put my head on it, the electrons will bleed the book into my head, and I've learned the material. The osmosis didn't work 30 years ago, and it doesn't work today. So does having the device mean that I think that I've used it, and I may think that I'm actually studying, when in fact, because I can be in any environment, the level of my attention may vary? I can be tangentially involved in the material, or I can be deep involved in the material. If what we get by moving the device to other areas is that tangential, I'm not sure that that's a positive. When you're locked up in the library in a cubicle with a book, and that's all you have, it's really hard to have a lot of distractions.

Because of all the other demands that are placed upon you. You've got your Twitter account, you've got your Facebook, you've got your MySpace, you've got your e-mail that's coming in from five different places. Do you have the time in the day to now say, "Oh yeah, by the way, I also have my sociology book on here—now's a great time to do sociology. Oh wait, hold on, I've got a Tweet coming in." It's the information overload. If people can parcel out their life and give academia time in their day, absolutely.

Bob expressed his reservations about using the e-book in various environments. He also

stated that the environment could potentially hamper student learning, echoing Thelma's and Allen's comments. In addition to potential issues with physical environments, Bob provided examples of cognitive load caused by the virtual surroundings within the e-book, including the Internet, messaging, and social networking sites. Thelma and Allen raised some moderate concerns about cognitive load imposed by the learning environment; however, it was the instructor, Bob, who underscored the potential risks of environmental cognitive load. Collectively, in these excerpts on e-book mobility and anytime, anywhere learning, the instructor identified these characteristics as negatives for fostering student learning, while many of the students expressed them as positives for their learning.

The final two subcategories under situated cognition were the GPS textbook analogy and using situated cognition strategies in sociology instruction. As the two were indelibly interconnected and intertwined, the data and excerpts for these subcategories were analyzed concurrently. The GPS textbook analogy was an instructional design technique used by the textbook authors to motivate learners by asking them to think of themselves as amateur sociologists as they read through the textbook and worked on assignments. Bob, the instructor, was the instructional designer on the textbook and course design team. He described his role as follows:

I was to help write the instructional materials.

I was an instructional designer, and that's what it says on the cover.

It was to help facilitate the group to completing the task. I made sure that all members were comfortable with the content the way it was and played task master.

Bob worked on the writing and instructional design strategies, including the GPS

analogy, and managed the other writers on the team.

The following sections from the introductory sociology textbook (Muntz-Bell, Melvin, & Nortz, 2009) illustrated how the GPS analogy was presented to students:

Although there are obvious differences between a GPS system and a scientific discipline, we feel the analogy is a useful tool to guide you, the learner, through this course. In a very real sense, you are taking a journey, and so it makes sense to use the language you might associate with using a navigational system in your car. As we navigate through the chapters in the book, we will use some common terminology. (p. 12)

Just as the satellites “see” features of the world as a whole such as entire continents, oceans, rivers, lakes, and mountains, which permit the surveyor to create detailed and accurate maps, sociologists are concerned with seeing societies in their entirety. Sociologists call this the macro perspective. For example, a “big-picture” or macro approach to society allows the sociologist to accurately describe such major features of a society as its size, location, and organization. This allows the sociologist to create a “map” of the social world that may describe regions by the people who reside there, their numbers, their culture, the nature and kind of technology that they possess, the amount of wealth they have, as well as their race, age, gender and other characteristics. (p. 10)

GPS technology also plays an important role in mapping and in event timing. Because the satellites can “see” the location of buildings, highways, rivers, oceans, mountains, and other topographical features, they allow surveyors to describe virtually anything that exists in the world. (p. 10)

We begin our discussion by showing how we can draw an analogy between the way an onboard Global Positioning System (GPS) works to help drivers find their way around unfamiliar locations and the way sociologists approach the study of society. We also use this analogy as a guide from one chapter to the next. Next, we explain the concept of perspective and describe different ways this concept is used. We provide an overview of the history of the development of sociology as a discipline. We conclude the chapter by describing some of the basic assumptions of the sociological perspective. (p. 9)

These excerpts were taken from the first chapter of the textbook. In this chapter, the textbook designers used an instructional design technique to encourage students to think of themselves as amateur sociologists and to view their world around them with critical macro and micro lenses, just as sociologists practice. Bob, the instructional designer,

explained the use of the GPS analogy this way:

J- There's an analogy that's used at the beginning of the book and throughout the book called the GPS, the Global Positioning System. Tell me about that—what does that mean? How is it used?

B- The GPS is the theme of the sociology book, and the reason we used the theme, the GPS, is that sociology is known for its micro and macro perspectives, and most sociology courses focus on that micro/macro perspective throughout the course. Knowing that it's a micro/macro zoom-in/zoom-out, one of the team leads suggested that that sounds like a GPS. Why not use the GPS as the theme for the course? It really does work. It would be nice to have the theme even more integrated, being that in every chapter there should be a micro/macro. . . .

B- We tried to get it so that it's more personal. If it's not personal, they're reading about it, and then they forget it. Kind of like learning Latin. You learn Latin, and then you go, "Why am I learning this? No one uses it, so I'm not going to use this. I'm not going to continue." Whereas if this has some application to my family, I might remember it longer.

Bob's comments focused on the lens of the micro/macro perspectives that sociologists employ while observing their environments. He also said that he felt this instructional strategy truly does foster student learning in sociology. In the next excerpt Bob expanded on the use of the GPS analogy and how the overall design team felt about its inclusion:

J- Was the textbook actively designed around part of that principle, incorporating your observations, the GPS, your examples, your experiences? Was it designed around that concept in part?

B- I know that everybody on the team thought that it was important so that it became relevant to the individual. However, we could make it relevant to the individual by taking the assignments and the discussions and trying to make it so that there was a personal attachment there.

Bob, in his role as the instructional designer for the course, shared the design team's positive perspectives on using the GPS analogy in the textbook design.

Bob explained that he felt that, to learn sociology, students have to take the unfamiliar abstractions in the course and relate them to their own experiences:

I think that students are successful because they can ground themselves in

something that's practical. It starts off being a very abstract course.

It starts off as a very abstract course. As students learn more and get more involved in it, the more the class is grounded in things that they see around them. I know several of the students would come to class early talking about the concepts they've seen, very similar to the extra credit discussion board.

He frequently mentioned sociology's abstract nature, and how students must create concrete schema to be able to understand the concepts.

Related to this, Denise and Allen commented on the importance of making the abstract concrete by related the unfamiliar sociology materials to their own environments and experiences. For example, Denise, when asked about why she enjoyed using the Sony Reader e-book in the park observing while surroundings, stated, "You can remember it. Otherwise, in your room, you're just sitting there," and "Sometimes when I would be reading I would just look around me, and kind of observe." Additionally, when Allen was asked about using the e-book with his friend at Barnes & Noble, he stated:

[in] a lot of my classes, my standard classes anyway, you don't really feel engaged because you're just sitting back and listening and then being expected to regurgitate it on a test. It's more interesting to collect your own ideas and have your own unique experience.

Both Allen and Denise expressed the value for their learning, through the affordance of the e-book mobility, the desire to collect their own experiences, which could then be related to what they read and learned in sociology. As a specific example of this, Denise described her situated learning experiences while reading in the park:

J- Did you witness anything about race, identity, or something like that?

D- Yeah, sometimes when I would be reading, I would just look around me and kind of observe.

J- Give me an example of one of the topics.

D- One time I was just sitting, reading, and I'll just look around at people,

thinking of what I just learned.

J- Can you remember one of the topics? In his class you learn about groups, race identity, all kinds of stuff, and you're looking around at the people. What's going through your mind?

D- I'm not sure if I remember. I look at groups and how people feel comfortable with all their friends.

J- And you were witnessing some of that stuff?

D- Yeah, I was just observing.

J- Do you think that helped your learning as you were doing that?

D- You witness it first person—it's right there.

J- Do you think that there's a benefit for you personally to actually reading in the real world and seeing that stuff in terms of remembering it and using it on tasks?

D- Yeah, I think so.

J- But what do you think contributed to your learning and made you successful overall?

D- I was really interested in the topics.

J- Do you remember reading any of these chapters?

D- This chapter—"Society, Culture, and Technology."

J- So you read that chapter. Tell me what was going through your mind and what you were seeing around you and what you were thinking about.

D- I was reading the new technology thing, and I was looking at the kids.

J- Tell me about the kids. What did they have?

D- They had their phones, just the culture they were in and how things are today. And how things have changed since a long time ago.

J- Do you think that helped your learning?

D- Yeah, because I could put a picture to what I was learning.

J- You could put a picture to it, and that was the picture of what you were seeing

in the park?

D- Mmm-hmm. Compared to if I was in my room with the book, I would have to use my imagination.

J- What about in a classroom reading the book, or something like that? What would it be like?

D- The teacher is there to guide you and help you, but with the online class, you have to teach yourself.

Of all the student interviews, Denise's experiences in the park were the most illuminating on the topic of situated learning. In her responses, she described employing the GPS technique created by Bob and the course design team to observe her world, drawing connections to sociology concepts and her readings.

Many of the students described the potential benefits of true anytime, anywhere learning through the mobility afforded by their e-books, both those on the Sony Reader and the ASUS Netbook. Bob, while commenting on the importance of making the abstract concrete in his sociology instruction and design, expressed reservations about the effects of the increased cognitive load placed on the students' various environments. However, in his role as the course instructional designer, Bob supported use of the GPS analogy, which encouraged students to learn by considering themselves amateur sociologists observing the world around them, to make abstract concepts concrete and strengthen their learning. Allen and Denise provided examples of how they employed the GPS analogy, in their situated learning experiences at a bookstore and a park.

In summary, situated cognition focuses on the context in which activities occur and their application to real-world use (Brown et al., 1989). Situated cognition furthers the belief that knowledge and the acquisition of knowledge cannot be separated from the environment in which knowledge is used. The key components of situated cognition

reside within the authentic context and purpose for which new knowledge is gained and used. In this study, this topical category defined situated learning as data that informed how the mobility and location-agnostic affordances of the e-book influenced student actions, feelings, perceptions, and learning. Subcategories contained within this category were anytime, anywhere learning, disruptive locations, cognitive load, the GPS textbook analogy, and situated learning instructional design.

Summary of Level 2 Data Analysis

Through coding the student and instructor interviews and sociology text, topical categories, some of which were identified in the theoretical framework, were identified (Table 4). The level 2 data were comprised of the student interviews, instructor interviews, and the sociology textbook. These were selected and organized for their ability to enlighten students' learning experiences using mobile e-books.

Level 3 Data Analysis: Thematic Cross-Case Syntheses

Introduction

The purpose of the third and final level of analysis was to address the subquestions that stemmed from the primary research question about the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses—that is, what were the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses? The subquestions were stated as follows:

- Subquestion A: What factors contributed to students' successful use of mobile e-books to support their learning?
- Subquestion B: What factors inhibited students' successful use of mobile e-books to support their learning?

- Subquestion C: What changes to mobile e-books do students want that would best support use of these devices for learning?

To address these questions, the final level of data analysis employed the general analytical strategy of relying on theoretical propositions (Yin, 2009), and the data were examined through a constructivist collective case study, which utilized analysis methods and techniques chosen to enhance understanding. These methods and techniques included constant comparative analysis, open, and axial coding (Corbin & Strauss, 2008), and Yin's (2009) analysis techniques, pattern-matching and cross-case synthesis. The overall purpose of these chosen data analysis strategies and techniques was to develop insight into the student learning experiences with mobile e-books as viewed through the theoretical framework established in Chapter 2 (Figure 1).

Research Subquestion A: What Factors Contributed to Students' Successful Use of Mobile E-books to Support Their Learning?

Three main factors emerged from the data that created increased understanding of this question for these students using mobile e-books. These were the factors of nonlinear use, mobility, and situated learning.

Nonlinear use, as defined and discussed in the level 2 analysis of this chapter, transpired when students described instances where they used the e-book in a nontraditional way—for example, skipping around a chapter instead of reading it from beginning to end or page-by-page. While traditional, print textbooks can also be used in a nonlinear fashion, the students in the study described how they used unique features of the e-books that increased nonlinear usage, particularly the search and bookmarking functions. For instance, in Thelma's interview, she enthusiastically detailed how she initially used the e-book on the ASUS Netbook in a traditional, linear fashion; however,

she soon discovered the e-book's search function. She described how this greatly increased her efficiency when she worked on class assignments and participated in online discussions.

Thelma's use of the e-book's search function related to Clair's use of bookmarking in the e-book. She described instances of using the search functionality on her Sony Reader e-book, but also went into enthusiastic detail on how she used its bookmarking functionality. Just as Thelma described key word searching, Clair noted how much faster she was able to complete assignments by using her numerous bookmarks that linked to definitions, key concepts, and terms.

In particular, Clair described how she used this increased efficiency when completing her online discussions. The most striking statement about her learning behavior was when she said that, due to the extra time the efficiency of bookmarks in the e-book afforded her, she decided to help other students in the class. When probed about this behavior, Clair explained that previously, she did not do this with a traditional textbook, because it would have taken too long, and she was not motivated to invest the time. In this instance, Clair increased her social learning behavior with the particular nonlinear functionality made available by the e-book.

In addition to the factor of nonlinear use, mobility emerged as a characteristic of students' successful e-book use. Mobility, and the unique affordances of mobility, has been a focus of much of the literature on mobile learning, describing its positive potential for learners (Roschelle, 2003; Sharples et al., 2005; Traxler, 2005). Mobility is literally the ability for learners to be location-agnostic, using mobile devices in their unique and

changing environments. In this third level of data analysis, mobility referred to portable, location-agnostic, and flexible use of the e-books.

In his interview, Ken described how he used his ASUS Netbook e-book while he waited on campus between class sessions. Similar to this portable use, Roger described how he made use of downtime to get some quick studying in or reading. Roger shared how he used to have a laptop mounted in his truck, and that “mobile computing in that sense is not new to me.” He further explained that he would use the e-book on his ASUS Netbook in the parent pick up line to read for his course while waiting for his elementary school daughter. These stolen learning moments are similar to the successful experiences shared by Clair.

Clair, a 21-year-old mother of an 18-month-old baby, described how she used her Sony Reader e-book in various environments, including in the hospital with her baby. She described holding the baby while quietly flipping through pages with buttons on the Sony Reader e-book. She further explained that although the hospital did not allow laptops or cell phones, she was able to continue using her e-book.

Like Clair, Allen and Denise shared information pertaining to mobility situated in the students’ individual contexts, the affordance of portability and flexible use; however, their experiences also provided examples of situated learning. Allen and Denise explained how and where they used their mobile e-books, Allen with the ASUS Netbook and Denise with the Sony Reader. Allen shared how much his friend enjoyed coffee, and they often studied and worked together in the local Barnes & Noble. Denise shared how, on multiple occasions, she went to a favorite park of hers and brought the Sony Reader to read, study, and observe what was happening around her. Both Allen and Denise used

their e-books in a portable, mobile fashion, and they shared some thoughts on how this influenced their cognition as well.

When I asked Allen if he had ever made connections between what he was studying and his environment, he shared one example of the concept of race. His comments focused on applying the abstract definitions in the book and in class and seeing concrete examples while at the bookstore.

When asked the same question about making connections, Denise provided much thoughtful detail. She described how she liked to view her surroundings firsthand and to create her own mental images of her experiences as she was in the park reading; this type of activity was encouraged by the GPS analogy, as previously explained with sample excerpts from the first chapter of the sociology textbook. Students were asked to look at the world through the lens of a virtual GPS, from both macro and micro perspectives—to think of themselves as amateur sociologists studying the concepts presented in the text. Denise did this in the park. One example she shared was from the textbook chapter “Navigating Sociology: Society, Culture, and Technology.” She described seeing children in the park using phones and technology and contrasted this with past culture. Denise not only read about the changes related to society, culture, and technology—she witnessed examples of these changes in the park. She further explained how she created a mental picture through this situated use of the e-book. In both of these examples, Allen and Denise described situations and e-book use that were mobile and situated in contexts that supported their successful learning behavior.

This phenomenon of the environment influencing (Brown et al., 1989) learning was both used as part of the overall instructional design of the textbook and encouraged

by the instructor. Paradoxically, the instructor and textbook lead instructional designer, when pressed, remained skeptical on the likelihood of learning connections occurring through the use of e-books in a mobile fashion, situated in the learners' unique environments.

Nonlinear use, mobility, and situated learning were factors that illustrated how students successfully used mobile e-books for their learning. Some student cases illustrated basic portability and anytime, anywhere learning use, while others went beyond this, suggesting potential cognitive influences of situated use.

Interestingly, Bob, the instructor and instructional designer, simultaneously appeared to support and oppose the tenants of situated learning. Predating the prominence of mobile devices, such as modern e-books and devices and their increasing ability to create situated learning opportunities (Traxler, 2005, 2009), perhaps Bob had a dated view of situated learning, where he was reluctant to consider its potential within the current omnipresent use of mobile devices for learning.

Research Subquestion B: What Factors Inhibited Students' Successful Use of Mobile E-books to Support Their Learning?

Two main factors from the data enhanced understanding of the factors that inhibited students' successful use of mobile e-books to support their learning, perceived value of the e-book and mobility.

Of all the students, only one student, Melody, did not persist and resorted to using the traditional print copy of the textbook. In her interviews Melody shared numerous excerpts and examples of how she viewed the e-book. Cumulatively, these illustrated her perceptions of the ASUS Netbook e-book as having little to no value for her learning. All other students persisted in their use of the e-book for the duration of the course and

expressed varying levels of satisfaction, from acceptable (Ken) to the only way they wanted to use a textbook (Clair and Thelma). So why was Melody the one exception?

Interestingly, in addition to describing how she did not value the ASUS Netbook e-book, Melody simultaneously described her feelings of high technology self-efficacy. She compared the e-book to the simplicity of a television and a small computer and confidently shared how she used technology everyday without difficulty. In spite of this seemingly high self-efficacy, Melody quit using the ASUS Netbook e-book after approximately 3 hours. This behavior was explained by expectancy x value theory, where the learner's perceived ability, expectancy for success, and usefulness/interest compound to predict learning behavior (Wigfield & Eccles, 2000, p. 70). Melody expected to be successful and had high self-efficacy; however, she did not value using the e-book. Therefore, despite having high expectations for success, Melody's lack of value using the e-book for her learning led her to not persist.

The following interview excerpt described the unrealistic expectations Melody had for the device: "I really thought, I was thinking of it in terms of. . . I guess I was thinking of it more as an entertaining kind of thing—pop it open and bam!, there it is. Type in page 17, there it is," which suggests a misconception of what the mobile e-book could do for her learning. Put another way, she, as the learner, was still required to take in and process information in her reading, and the e-book would not learn for her, as her comment suggested. This, combined with her general undervaluing of the e-book resulted in her not persisting, as expectancy x value theory would suggest.

Mobility was the second factor that addressed the question about factors inhibiting students' successful use of mobile e-books to support their learning. In the

previously examined data pertaining the first research subquestion, students described mobility in positive terms. They shared examples and experiences of using the e-book in a mobile fashion that suggested how mobility was a success factor for their learning. Contrastingly, students also shared perceptions of mobility in negative terms.

Examples of mobility as an inhibiting factor for student learning were provided by Allen and Thelma. Thelma, a strong proponent of using the ASUS Netbook e-book—who further shared that she would only want to take courses with electronic textbooks—described where she used the e-book and subsequent challenges caused by the location. Thelma said that she attempted to use her e-book at work while on lunch and breaks. However, she would be interrupted too frequently, and therefore could not concentrate. She said that these interruptions resulted in her having to read passages multiple times, and she finally stopped using that time and context to study. She completed her thoughts on mobile use by stating that she preferred to use the e-book at home, on the couch and at the dining room table.

Allen's comments were similar to Thelma's. He described how using the e-book in a work context could present concentration challenges. Thelma's and Allen's feelings related to Doolittle and Mariano's (2008) study on working memory capacities within mobile learning scenarios, which showed how a learner's environment may negatively impact his or her learning and retention.

These students' experiences aligned with Bob's perspectives on the potential offered by mobility to foster situated learning experiences. He explained that just because a student was reading or learning within a chosen context, augmented learning of abstract concepts would not necessarily become more concrete for students through their

situated experiences. Additionally, Bob warned of the harm environmental distractions—both in the physical environment and within the device itself—could have on concentration and deep learning.

Perceived value of the e-book and mobility provided insight to the factors that inhibited students' successful use of mobile e-books to support their learning. One student ended up not persisting, due to a misconception about the e-book and the low value she placed on its use. Moreover, some students described mobility as a positive influencing factor for their learning, and some saw this same factor as a negative factor. Bob, the instructor, had reservations about the situated learning potential of mobile use and expressed the more negative potential of cognitive load's influence on successful learning. Evidently, more research is needed on the situated potential and influences of cognitive load on mobile learners.

Research Subquestion C: What Changes to Mobile E-books do Students Want That Would Best Support Use of These Devices for Learning?

In addressing the question about what changes to mobile e-books students wanted, which they felt would best support use of these devices for learning, four factors were identified. These ranged from issues in basic usability, such as print functionality, to more learning-oriented concerns, such as the concept of a social textbook (that is, one that is interactive and collaborative). The four factors were removing restrictions, adding advanced searching, providing a short user guide, and creating interactive social learning functionality.

Allen, a student who described his positive use of the ASUS Netbook e-book for his learning, explained that he would like to see the e-book become less “gimped-out,” which he further detailed as increasing print capabilities, sharing across devices and

environments, and creating more relaxed digital rights management (DRM) policies (such as how music purchased on iTunes can only be played on certain devices or with certain user accounts). Allen, a self-described “techie,” expressed concerns about having more control over his e-book and its use. He wanted to be able to move the e-book across computing devices and platforms with greater ease, and to print the entire text if he wanted to, even though he did not print from his ASUS Netbook e-book.

In past studies (Allen & The Student PIRGs, 2008), students raised such concerns over the length of time an electronic textbook was made available, which can range anywhere from 2 months to permanently. Most electronic textbooks are not available permanently and only last for approximately the duration of the course. Additionally, there are often restrictions on what percentage of the textbook can be printed, and printing can be costly (Allen & The Student PIRGs, 2008, p. 12). Allen’s comments aligned with concerns other students have raised.

Roger also described a particular aspect of the e-book that he would have liked to use, namely more advanced searching capabilities. Performing key word searches was one of the most favored and useful features students said they employed for their learning. Roger was familiar with this type of efficient, nonlinear use through his previous experiences with electronic car engine manuals, similar to the generalizing experiences shared by Allen and Thelma, who also had used electronic reading materials before using the sociology e-book. While Roger explained that the searching on the ASUS Netbook e-book was useful, he felt the function was too limited and simplistic. He explained that a search yielded too many results, and this slowed him down. He wanted to be able to search within specific sections and chapters, instead of the entire e-

book. While the ASUS Netbook e-book did not precisely match Allen's and Roger's desired capabilities, they both valued the use of the e-book and persisted in using it for their learning throughout the course. This is contrasted with Melody's experience.

Allen's and Roger's value and persistence contrasted Melody's. As mentioned, she was the one student who did not persist in using the e-book, in spite of her feelings of high technology competence and self-efficacy. One change Melody said that she would like to see with the ASUS Netbook e-book was the addition of a short demonstration guide about how to use it. Despite explaining her ability to competently navigate within the e-book on her own, and having compared this ability to the ease of using a TV remote, Melody felt that a short demonstration guide could have helped her. Her interview ended with her saying that she wished she would have kept the Sony Reader e-book that she originally selected instead of changing her mind and using the ASUS Netbook.

Although the reasons why Melody thought the Sony Reader e-book might have been better for her are unclear, her belief might have been due to the Sony Reader's simplicity and singular e-book functionality. Unlike the ASUS Netbook, the Sony Reader is only an e-book reader, not a full-fledged computer using MyScribe, the multifunctional e-book software. Further research on multifunction e-book readers compared to single-use devices, like the Sony Reader and Amazon Kindle, may provide researchers and educational technology leaders better insight into students' mobile e-book learning expectations and persistence.

While the first three changes discussed above were proposed primarily by individual students, the final e-book change desired spanned multiple student

perspectives. A change that Allen, Clair, and Roger wanted to see in the e-book was enhanced interactive social learning tools. The students described an e-book that connected students more, including their notes and class conversations. These three students felt that an e-book should be a conduit to a class learning environment and opportunity for interactions, rather than a stand-alone content collection. While the ASUS Netbook e-book had limited abilities for students to share comments and notes, no student used these tools. Additionally, the Sony Reader e-book did not have these capabilities. The students' comments here regarding a social text collectively illustrated the desire to learn and participate in their text in a more interactive and socially constructive way. They wanted the ability to connect with each other, to share ideas, questions, thoughts, and needs. This ability is similar to the emergence of popular social networking sites like LinkedIn, Facebook, and MySpace, but the difference in this situation is that the purpose of this connectivity would be for students to interact with their peers and learning community.

The students' desire for enhanced interactive social learning tools was perhaps best understood through the theoretical framework for this study. Supported by information processing theory, students were more metacognitive regarding their learning when they requested the ability to create a learning community out of their course textbooks. Individuals who are in touch with how certain strategies and actions affect their learning, positively or negatively, are those that are metacognitive (Flavell, 1976). These students expressed their metacognition by expressing the belief that access to more opportunities for social interactions and interactivity would result in potential positive learning results. The students may understand that they would learn best within a social

context, which would give them the opportunity for the greatest success in their course. Perhaps students would be better able to construct meaning from the abstract course concepts and terms within this collective context.

Furthermore, students might feel that interacting more with their peers in a more social and interactive context would increase their motivation. With support from peers and access to a collection of their ideas, notes, and thoughts, individual students may feel more confident in their abilities to be successful in that course and discipline. For this purpose of increasing opportunities for meaningful learning experiences, student preference for a social text is supported by the literature on learning theory, which provided the theoretical framework for this study. In particular, social learning theory (Bandura, 1997) stresses the importance of social interactions among learners for individuals to construct understanding. Moreover, if constructivist educators' and leaders' goals are to foster in-depth critical thinking and learning, perhaps the creation of a more interactive, social learning community embedded in the e-book, for the purpose of enhancing student learning, is an idea that should be explored.

Although the students expressed a desire for a social textbook, Bob, the instructor and instructional designer of the course textbook, shared many reservations and a general aversion to adding a social text concept to the e-book. His feelings were based on a fear that students would collectively "race to the bottom" to form a shallow consensus on readings, not read the entire text, and essentially end up with digital CliffsNotes. A proponent of nonlinear reading with the e-book, bookmarking, and social learning, Bob was adamant in his opposition to a truly interactive and social community built around the textbook. He felt that the authors, designers, and editors in the textbook creation

process were the ultimate authorities and experts in the discipline, and further felt that students should not be afforded the ability to have more control over how they interact, comment on, and ask questions of the textbook knowledge. Overall, Bob was concerned about the control of information in student learning interactions, and he wanted to ensure that there were methods for him to monitor the students and regulate their learning.

Bob's reticence sharply contrasted the students' perspectives. In addressing the question of what changes students wanted to see in their e-books, the four factors identified were removing restrictions, adding advanced searching, providing a short user guide, and creating social learning functionality. Whereas some students focused on basic usability, such as print functionality and digital rights management, the factor that was most aligned with learning—the focus of this study—was the students' preference for a social text. Although the students believed that a social text could enhance their learning and success in the course, the instructor was cautious about the concept and stressed the desire for control.

Summary of Level 3 Data Analysis

The purpose of the third and final level of analysis was to address the three subquestions of this study, which examined factors contributing to and inhibiting students' successful use of mobile e-books to support their learning, in addition to what changes to mobile e-books students felt would best support their use of these devices for learning. The factors that increased understanding were student nonlinear use of the e-books, benefits of mobility, and situated learning. The factors that inhibited students' successful use of mobile e-books to support their learning were perceived value of the e-book and mobility, in this context defined as increased cognitive load (Doolittle &

Mariano, 2008). Finally, the changes to mobile e-books students said they wanted were removing restriction, adding advanced searching, providing a short user guide, and creating social learning functionality.

Summary of Chapter 4

This chapter presented an in-depth narrative pertaining to the study's data analysis, including an overview of the data analysis, a summary of the data sources that comprised the collective case study database, and the three levels of data analysis. Relying on theoretical propositions (Yin, 2009), constant comparative analysis, open and axial coding (Corbin & Strauss, 2008), and Yin's (2009) analysis techniques, pattern-matching, and cross-case synthesis, all cases and case data were synthesized in the MAXQDA Plus research database to increase understanding of the primary research question and research subquestions.

Students were found to be competent with the e-books, confident, and metacognitive. Students used the e-books in social learning and situated learning contexts. In some cases students reported on an increase in social learning behaviors while using the e-book. Others described how the affordances of the e-book's mobility positively influenced their learning, by helping link abstract textbook concepts to the concrete. In contrast, some student cases illustrated the negative aspects of the e-book's mobility, mainly caused by an increased environmentally-imposed cognitive load. One student, despite having high self-efficacy using the e-book, stopped using it altogether because she did not see value in it for her learning. The major novel factor that emerged from student data was their desire for a more interactive and social learning-enabled e-

book. Lastly, the instructor was cautious about the potential benefits of the situated learning and the interactive social learning affordances of mobile e-books.

The final chapter will address the primary research question, what were the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses? The study's six dominant conclusions will be presented, as well as recommendations for future research.

CHAPTER 5 SUMMARY AND DISCUSSION

Introduction

Chapter 5 will provide a summary of the study and its findings, in particular, the six major conclusions I identified from the study's results. Through the research questions, epistemological stance, methods, and analyses, the purpose of this study was to inform educators on how students used mobile e-books for their learning in both online and hybrid sections of an introductory sociology course at Florida State College at Jacksonville (FSCJ), a large state college in the southeastern United States.

As college leaders consider moving toward the use of digital textbooks and mobile readers and computing devices at their institutions, they must better understand how students use these materials to learn. In particular, they must increase their understanding about how student learning will be influenced, positively or negatively, as little data currently exists regarding this facet of mobile learning. This chapter will conclude by examining the study's limitations and providing recommendations for future research.

Summary of the Study

Increasingly flexible, mobile distance learning methodologies are now beginning to be used for access-challenged student populations; however, significant data on issues related to teaching and learning in this method are lacking (Sharples, 2007; Sharples et al., 2005). College and university leaders need to better understand the emerging

delivery trends, such as mobile learning, as it relates to technologies and pedagogy. By becoming more knowledgeable, leaders will be better equipped to support and serve their students, while furthering their historical mission of providing access and learner-centered education (Gleazer, 1980; Parnell, 1985).

FSCJ will transition from paper-based course textbook materials to electronic textbooks for many of its 100- and 200-level courses by the fall 2011 semester. As part of the college's SIRIUS Academics initiative, a course and textbook design college-publishing consortium, FSCJ will no longer print and sell paper-based versions of SIRIUS course textbooks. The SIRIUS initiative that was originally introduced to the college, as a college quality improvement plan in 2003 is one that is designed to reduce overall textbook costs to students and improve the quality of student learning experiences (FSCJ, 2009, "About SIRIUS"). As a measure that reduces textbook costs to students and makes college education more affordable and accessible, students will receive course textbooks in an entirely electronic format that can be used online and on mobile e-book reading devices. With the pending move to electronic textbooks, students will no doubt be affected; however, it is yet unclear how and to what extent.

By studying these initial experiences of students using mobile electronic textbooks at FSCJ, educational leaders will better inform their actions and decisions during the college-wide transition to this instructional technology. What is of particular interest and importance for responsible public stewards and student constituents they serve is how student learning will be influenced or affected by this shift. Supported by the literature (Kukulka-Hume & Traxler, 2005; Sharples et al., 2005), what is needed now in terms of research is a focus on students' learning experiences with mobile

technology, not usability or the technology itself.

Making this transition to mobile e-books for college courses will require leaders to have more information, data, and understanding about how student learning may or may not be affected by solely using electronic, mobile textbooks. For this reason, I employed a qualitative case study design grounded in the literature about mobile learning theory, which investigated college students' experiences using dedicated mobile digital e-book readers in undergraduate introduction to sociology courses. How the students used the devices and digital course textbooks was the focus of the research, and the overall purpose was to gain an enhanced understanding of the students' learning behaviors in a college course using these emerging educational technologies.

Archival student journal data, my chain of evidence notes, artifact notes, student interview transcripts, instructor transcripts, and the electronic SIRIUS Introductory Sociology e-book collectively comprised the data sources for this study. These data were loaded into the qualitative data analysis software MAXQDA Plus (Kuckartz & Kuckartz, 2002) to form the collective case study database. The database was securely stored, accessible only to me, and loaded on a computer owned by FSCJ. The names of the students and the instructor were replaced with pseudonyms they selected during their interviews to protect their privacy.

The primary research question—what were the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses?—guided this study, its purpose, and its methodology. Through using such an open-ended, qualitative question, I sought an in-depth, authentic understanding and case record of student learning experiences with mobile e-books in a college education setting. To

further this research purpose, I also employed three subquestions: (a) what factors contributed to students' successful use of mobile e-books to support their learning?, (b) what factors inhibited students' successful use of mobile e-books to support their learning?, and (c) what changes to mobile e-books did students want that would best support use of these devices for learning? By employing these questions, an enhanced, detailed case record was developed that revealed six major conclusions based on the learning experiences of students in two college sociology courses that used mobile e-books during the fall 2009 semester.

I employed a qualitative case study analytical strategy of relying on theoretical propositions (Yin, 2009). The design methodology I selected utilized analysis methods and techniques chosen for their abilities to enhance understanding of a specific instance of a phenomenon. These techniques included the constant comparative analysis, open and axial coding (Corbin & Strauss, 2008), and Yin's (2009) analysis techniques of pattern-matching and cross-case synthesis. The overall purpose of these chosen data analysis strategies and techniques was to enhance insight to students' learning experiences with mobile e-books, as interpreted through the theoretical framework comprised of constructivism, social learning theory, self-efficacy theory, expectancy x value theory, self-determination theory, and situated learning illustrated in Figure 1.

The data were examined within a framework constructed of the literature on mobile learning and through a lens consisting of the most frequently cited theories on learning. As described in the previous chapter, the data analysis was comprised of a three-level analysis process. In the third level, the data were analyzed across cases to explore thematic patterns (Yin, 2009) on the students' learning experiences.

Conclusions Drawn from the Study

The following section in this chapter discusses the six major conclusions that I identified through the three levels of data analysis. These conclusions related to the study's primary research question and corresponding subquestions.

Students Expressed Feelings of Competence

In response to Research Subquestion A—what factors contributed to students' successful use of mobile e-books to support their learning?—students reported that they competently used their e-books. Referring to the study's theoretical framework, self-determination theory assumes that people have three basic needs, including feelings of competence. The students in this study received no formal instruction on using the e-books, how to turn the devices on or to navigate in the e-book itself. Students were simply provided the device of their choice to use. Usability simply did not emerge as a problem or hindrance in this study, as students expressed a universal competence in their abilities to use the e-books. Likening the e-books to laptops, televisions, and other familiar technology, students apparently were able to generalize these past experiences to the e-books. As supported by the literature on mobile learning (Kukulka-Hume & Traxler, 2005; Sharples et al., 2005) and the call for a research agenda that focuses on student learning rather than mobile device usability, the students in this study expressed no issues related to usability. And the students' competence related to their perceptions of confidence.

Students Expressed Feelings of High Self-Efficacy

Also in response to Research Subquestion A—what factors contributed to students' successful use of mobile e-books to support their learning?—all of the students

in this study expressed feelings and perceptions of high self-efficacy. Even the one student who chose to stop using the e-book altogether early in the course expressed feelings that she could use it competently and easily for her class.

Self-efficacy is considered by leading researchers as a powerful cognitive force that is not necessarily directly tied to learners' abilities, but rather their beliefs about their individual skills and abilities, which profoundly influence their behavior (Bandura, 1997, p. 391). Moreover, in self-efficacy, past success with similar tasks is an indicator of future performance. Students universally expressed beliefs of being empowered and in control, and they expected to be successful in using the e-book for their learning. While some students, like Thelma and Denise, did express a short "warm-up" period when initially using the ASUS Netbook and Sony Reader e-books, they quickly started using the e-book successfully and continued to use it throughout the course. Even Melody, the student who stopped using the ASUS Netbook e-book after a few hours and expressed a devaluing of the e-book for her learning, said that she was confident in its use. This could be a paradox, but she also could have been expressing metacognition about her own learning style and preferences, when she resorted to the hard copy of the text. Melody had actually compared the e-book to the ubiquity and simplicity of a television where "she had the remote." Additionally, toward the end of her interview, she stated that she should have chosen the Sony Reader e-book, which could give credence to the notion that she simply did not like the ASUS Netbook version of the e-book. Many consumers have experienced the process of choosing a mobile phone or television, or discarding a device in favor of a different one, based on individual or even affective preference. Further research into affective preferences and choices with e-book and

mobile learning technology may further understanding about how these choices influence learner persistence, value, and eventual learning outcomes.

In terms of students' successful use of the e-book, self-efficacy was fundamental, which directly related to the primary research question: what were the learning experiences of students using mobile e-books in online and classroom-based introductory sociology courses? This view is shared by Wang and Wang (2008), researchers and instructors, who developed the first empirical measure of self-efficacy in mobile learning. As for the instructor in this case study, his early interview comments characterized self-efficacy as a "learning bump" that needed to be overcome before students could get on to the business of his class, which he defined as learning sociology. His comments supported the notion, advanced by Wang and Wang, that self-efficacy in mobile learning is a fundamental construct that must be addressed before students can focus on their learning.

In their discussions and conclusions of the development of a mobile computing self-efficacy scale (MCSE), Wang and Wang (2008) stated that the MCSE measures an individual's intention to use mobile computing devices. Those with higher scores on the scales' five dimensions are more likely to persist in using the devices. Wang and Wang further suggested that this tool could be useful to identify where the dimensions of self-efficacy were low, and then take corrective action to facilitate use of mobile applications. As these researchers suggested, the measure of MCSE may be particularly useful for educators considering a mobile e-book program, especially before implementing such a program wide-scale. The instructor in this study's comments echoed this concern, in saying that students must feel that they can use of the mobile e-book first, before they can

begin to use such a tool for their course and overall learning. This fundamental aspect, and apparent first step in exploring mobile learning applications, such as the use of mobile e-books in college courses, is perhaps why Wang and Wang's MCSE is currently the only quantitative empirical measuring scale related to learning with mobile devices.

Within this collective case study, all students were found to have high feelings of self-efficacy using their mobile e-books for their learning. However, these perceptions did not always result in persistence in e-book use or success in the course. One student, despite describing feelings of high self-efficacy, expressed that she stopped using the ASUS Netbook e-book after 3 hours, instead resorting to the traditional hard copy. During the instructor interview, he shared that this student did not pass the course and had actually quit attending class. Apparently, for this student, her overall learning experience was not ideal. The cause for the student's abandonment of the course was unknown, but evidence as to why she did not persist in the use of her e-book was revealed, which pertains to the next major conclusion of this study, student value of e-book use.

Students Valued Using the E-books for Their Learning

In addition to students' perceptions and feelings of high self-efficacy in using the e-books for their learning, all but one student expressed the positive value of using the e-book. This factor and conclusion enlightens Research Subquestion A—what factors contributed to students' successful use of mobile e-books to support their learning?—and Research Subquestion B, what factors inhibited students' successful use of mobile e-books to support their learning? The students' learning experiences with the mobile e-

books is best understood when viewed through the theoretical framework of this study, and in particular by employing expectancy x value theory.

Expectancy x value theory on learner motivation and persistence, while related to self-efficacy, is better-suited for enhancing understanding of the learning experiences of the students who valued and persisted in using the mobile e-books. In this theory, researchers (Wigfield & Eccles, 2000) contend that a learner's expectancy for success on a certain outcome, coupled with its perceived value, is an indicator of learner behavior and performance. Within expectancy x value theory, the value of a task is revealed by four constructs—intrinsic interest, importance, utility value, and cost (Eggen & Kauchak, 2007). The extent to which an individual finds a given task appealing is known as intrinsic interest. Students interested in particular topics in sociology may be more motivated to read these in a textbook. Related to self-efficacy, the learner's perceived importance of a task is related to his or her self-concept and his or her ability to complete the task successfully. The utility value of a task is the extent to which completing the task will benefit the learner reach a certain goal. An example of utility value is the perceptions of students' use of the e-book as a beneficial learning tool.

Lastly, the cost of a task is the negative side of participating in a behavior. If students feel the e-books are too difficult to use and master, they may not persist and instead resort to a method that is perceived to have less associated cost. The fact that all but one student valued the use of the e-book illustrated that the students felt the technology was useful and helpful for their learning in the course. Additionally, addressing the two subquestions, the value students placed on their e-books appears to have been a key factor for whether or not students successfully used the e-books. All but

one student successfully used the mobile e-books in lieu of a traditional paper-based textbook.

Within this bounded case study, it is apparent that the student's choice to persist in the use of mobile e-books was partly based on the perceived value each placed on them. Only one student placed a low value on using the e-book chose not to persist, while all others both valued the e-book for their learning and persisted in its use throughout the course. The factor of e-book value and associated cost was revealed as a factor that could contribute to or inhibit students' successful use of e-books. Further studies on student motivation for using the e-books—in particular the factors of student perceived value and cost—may increase understanding of why some students would choose to successfully use this technology for their learning and why others would choose not to persist.

Students Perceived E-book Use as Metacognitive and Individualized

Addressing Research Subquestion A—what factors contributed to students' successful use of mobile e-books to support their learning?—the fourth major conclusion that emerged from this study was that students were individualized and metacognitive in their e-book use. Mobile devices, unlike traditional computers, have been found to be regarded as more personal by users (Leadbeater, 2004; Plant, 2001). This may begin to explain why students in this case study, while describing similar uses of their e-books, also reported individual e-book uses that they felt best support their learning in the course. Examples of personalized use were students using the e-book as a music player while reading, reading the e-book in a nonlinear fashion, using the e-book as a learning

tool that minimized social distractions and barriers, and using the e-book as a situated learning tool.

Each of the above example of students' individual e-book use related to information processing theory, which explains how stimuli enter individual memory, and how these stimuli are treated and stored into catalogs referred to as schema (Mayer, 1996). The cognitive approach of information processing theory, through its analogies to computer hardware functions, attempts to explain the individual mental processes that take place in the perception, storage, and retrieval of information (Mayer, 1996). The key components of working memory are automaticity, encoding, and metacognition. Essentially, metacognition is a person's knowledge about his or her learning and the related processes (Flavell, 1976, p. 231). For example, if students feel that listening to music while reading their e-book helps them focus and block out environmental distractions, then they may persist in that practice. Other students may understand that they perform better on tests after they have discussed key concepts with some friends, and therefore seek opportunities for social learning. These are both examples of students acting on their own metacognition and beliefs about how they can foster successful learning outcomes.

Clair, Denise, and Ken all expressed that they used the e-book as a music device. Some explained, as Clair did, that this was a way to minimize learning distractions. Whether on a road trip to a sister's wedding or on campus in between classes, these students described instances of enhancing their concentration with the e-book by using it with music. Reflecting back to the learning theories presented in the theoretical framework of this study, information processing theory is a key to understanding the

learning experiences of students in these examples with music. These students, by describing how they enhanced their ability to concentrate, read, and study with the e-book, exercised their metacognition about their own understandings of how they learn best—by using the e-book with music. The students augmented their surroundings to create personal learning environments that they thought would best support their learning.

The use of music in conjunction with the students' e-books was done in both individualized and metacognitive ways. An example of an individual use was provided by Clair. While in the hospital, she concurrently read her Sony Reader e-book and used headphones to listen to music on the device. Denise provided a metacognitive example. She used the music player on the Sony Reader e-book to block out environmental distractions, knowing that this augmentation of her environment would yield more effective use of her reading and study time. Claire personalized her use of the e-book by augmenting it with some music. Denise, being in touch with her learning, knew she would have better results studying if she minimized external distractions. The students' understandings of how they best learned with the e-book were also demonstrated by their efficient, nonlinear use of the e-book.

All students in this case study gave examples of how they used the e-books' various functionalities, like searching and bookmarking, to best support their learning. Some students expressed individual, metacognitive epiphanies, such as when Thelma discussed how the key word searches provided multiple benefits for her. This functionality saved her time, allowed her to be more efficient as she participated in the discussion boards, and helped her review the course concepts with more depth and understanding. Thelma explained that because searching was quick and efficient, she

found herself taking the time to review the concepts, instead of guessing. She referred to this as “constant reinforcement,” as she read and reread passages in her text, and looked up concepts and definitions while she completed the online quizzes and discussions.

Similar to Thelma’s use of key word searches, Clair expressed that using bookmarks in the Sony Reader e-book increased her learning interactions in the online discussion boards. She compared using the bookmarks to a hard copy of text; with the hard copy, she would have to flip through pages to find information. However, the bookmarks in the e-book saved her time, and she then used this time to revisit the online discussions and help her classmates by providing information from the e-book. Clair was metacognitive in her thinking regarding not just her own learning but how her extra participation in the discussion would enhance the overall learning of her class.

What the above examples with Thelma and Clair illustrated is that these students used the e-books thoughtfully, with premeditated actions that they thought would help their overall learning. Both students were unique in how they used the e-book to support their learning, and both might have exercised metacognition. The types of assessments the instructor used, particularly online discussions and mastery learning quizzes, could have influenced the learning behaviors students demonstrated with the e-books, since these types of activities may facilitate certain student behaviors, such as Thelma’s key word searches and Clair’s bookmarking.

Related to purposeful and individual e-book use, students also took time to consider their environments and social contexts. Allen, in particular, was contemplative while discussing how he used the ASUS Netbook e-book in public, at a local bookstore with a friend. He described how he felt that using his e-book in public raised fewer social

barriers, as opposed to a traditional, print textbook. Alan felt that he could be more discrete with the e-book, but still make use of his time there to learn and participate in his class.

Like Allen, Clair's experience using her Sony Reader e-book in the hospital provided an example of metacognitive e-book use. She related the story of quietly using the e-book with one hand, while her baby slept in her other arm. Clair explained that the e-book afforded her the ability to discretely read while waiting to see her doctor; she enjoyed that no one could tell what she was doing, which could have had the benefit of minimized social interactions and disruptions. Both Allen and Clair, in their personal methods, exercised knowledge and behaviors about using their e-books. Clair, however, appeared to have more distinctly practiced metacognition, based on her cognitive beliefs about her learning with the e-book.

The various examples detailed in this section, such as listening to music or considering environmental and social aspects of e-book use, demonstrated how student learning experiences in this case study were personal and perhaps metacognitive. This metacognition contributed to students' successful use of the mobile e-books. In addition to these metacognitive uses of the e-book, students augmented their learning by choosing their individual learning contexts, which corresponds to how mobility affords enhanced learning experience, the next major conclusion that will be discussed.

Student Use Demonstrated that E-books Can Enhance Learning

E-book use as a learning enhancement relates to Research Subquestion A—what factors contributed to students' successful use of mobile e-books to support their learning?—and the primary research question, what were the learning experiences of

students using mobile e-books in online and classroom-based introductory sociology courses? Much of the research on mobile learning has shifted its focus back to learning applications, and in particular, on the affordances of the mobility aspect (Sharples et al., 2005). In his emerging theories on mobile learning, Sharples advocated a research agenda that investigates how learners being situated within their authentic environments might influence their learning. Drawing mainly on research in situated learning (Brown et al., 1989), Sharples et al. (2005) and others (Traxler, 2005, 2009) contended that through mobility, learners may experience more contextualized, authentic learning opportunities that transcend those typically available within the confines of a classroom.

While there may be great potential in exploiting the situated nature of mobile learning applications, such as Denise witnessing sociology concepts while reading the e-book in her favorite park, some limited studies have stated a need for caution. In particular, one study on the working memory constraints of students suggested that the mobility of mobile learning for college students could negatively impact learning recall (Doolittle & Mariano, 2008). Within this multiple case study, the instructor expressed this caution regarding student mobility and its impact on learning.

Thelma said that she primarily chose to use her e-book at home, which for her was the most comfortable and had the fewest distractions. She further explained that within her work environment, there were too many distractions to use the e-book effectively for her learning. Allen also expressed reservations about using the e-book within a work context. He preferred to use the e-book while in public, such as at a local bookstore with friends. Both Thelma and Allen expressed their sense that where they used the e-book impacted their ability to learn effectively, demonstrating metacognition

in their choices. In these two cases, students expressed a level of metacognition, where they thought the location of their e-book use had the ability to positively or negatively influence their learning.

Allen enjoyed being social with the ASUS Netbook e-book, at a local bookstore with friends. He described drawing connections between concepts in his e-book and the social interactions and environments around him. Through these situated learning interactions, some students explained how they were better able to make the abstract concrete, which helped them learn. This was similar for the other students that used their e-books in various contexts outside the formal classroom.

Denise said that the park was the context where she enjoyed being a firsthand observer of the world around her. Taking the suggestion of the textbook's use of the GPS analogy, she acted as an amateur sociologist, in the field to collect data and observations. She detailed how she metacognitively drew connections from her reading in a chapter on technology and culture to children she saw in the park. Through this act, the mobility of the e-book, the use of situated learning as an instructional design technique in the GPS analogy, and her metacognition, Denise connected the abstract and conceptual to more authentic, situated learning experiences.

Unlike the students' awareness of how the e-book mobility provided opportunities for enhanced learning experiences, the instructor expressed strong reservations and skepticism about the potential for mobile learning to produce higher-level learning through situated cognition, even though this concept remains a prominent theme in current research pertaining to this aspect of mobile learning (Corlett, Sharples, Bull, & Chan, 2005; Sharples, 2000; Sharples et al., 2005; Waycott, 2005). In this collective case

study, students actually described examples where they thought their learning was enhanced through firsthand observations while studying in particular environments. In particular, Denise took the suggestion of the textbook and its designers to become an amateur sociologist and observe her surroundings, to look for concrete examples of the abstractions contained within the text. Allen and Roger also gave examples of how this situated influence supported their learning.

Nevertheless, some students, such as Thelma, raised concerns about the challenges of using the e-book in certain contexts they found distracting, like their work environments; these concerns were echoed in the instructor's interview comments. Students mentioned disruptions that caused constraints on working memory, which impacted student learning outcomes (Doolittle & Mariano, 2008). Therefore, although some students reported the learning benefits within situated learning contexts, more research is needed to explore situated learning afforded by mobile devices, and the potential of this situated learning to influence learning in both positive and negative ways. Specifically regarding the situational affordances of mobile e-books, more research is needed that focuses on how having access to all required course texts and materials on one, portable device is unique, and, more importantly, how this mobility affects student learning.

For the students in this multiple case study, the oft-mentioned affordance of the situated learning opportunities within mobile learning applications were apparent only through Allen's and Denise's experiences, yet their examples illustrate potential for instructional designers and textbook authors to purposefully integrate content that fosters more authentic learning outcomes, similar to the GPS analogy in the sociology textbook

used by the students in this study. More in-depth empirical studies are needed to explore the mobile learning literature's promotion of situated learning, and to gain more knowledge about its effectiveness.

Student and Instructor Views on the Learning Value of Social Texts Diverged

The final major conclusion of this study pertained to the concept of a “social text,” which relates to Research Subquestion C, what changes to mobile e-books do students want that would best support use of these devices for learning? Students used the e-books socially, in face-to-face contexts—such as Allen at the bookstore, where he “added a layer of conversation” over his class by chatting with his friend—and also in the virtual context of the online discussion boards, as reported by Clair and Thelma. Roger and Clair also expressed a desire to use their e-books in more socially interactive ways, with embedded interactive discussions, messaging, and information sharing. Some students, such as Clair, reported that they exceeded the normal effort they exerted while interacting in the online discussions, because using the e-book and its features facilitated these actions. Students described using their e-books in a multitude of social ways and said that they desired increased ability to be connected to their peers and to facilitate collaborative learning.

When asked about the changes students wanted to see in their mobile e-books, a majority of them expressed a desire for more learning interactivity embedded in the texts. The types of interactions students called for were instant messaging, discussion boards, note sharing, and comments, all embedded within the context on their e-book. Similar to their use of popular social networking sites, such as Facebook, MySpace, and LinkedIn,

students desired ways to connect with one another to further their ability to understand reading concepts, share notes and ideas, and to ask each other questions.

This desire for a social textbook relates to the theoretical framework of this study, and in particular social learning theory. This theory supports the notion that learning is inherently a social process (Schunk et al., 2008), and “constructivism is a psychological perspective contending that individuals form or construct much of what they learn and understand through individual and social activity” (p. 326). Perhaps, in part, due to the increasing connectedness facilitated by the Internet, social networks, and immediate access to information, the students within this case study desired a textbook that allowed them to be connected to fellow classmates, and the mobility to choose situated learning experiences. With magazines and books being published on mobile devices that are socially connected and embedded within shared networks like Facebook, these students yearned for a similar experience with their sociology e-book. More research is needed into the possible use of social textbooks and their impact on student learning.

Although the students all supported the use of social texts in their courses, Bob, the instructor, held an opposing perspective. Bob was interviewed after all of the student interviews concluded, and he was informed of the students’ desire for more learning interactivity opportunities through a social text. While Bob presented a single faculty member’s perspective, he adamantly opposed this idea expressing reservations that students openly interacting and sharing within the textbook would encourage shallow learning. He likened the result of notes sharing within the e-book to “digital CliffsNotes,” where students could learn shallow and potentially incorrect ideas shared by fellow classmates and without any significant depth. A self-described social

constructivist who encourages interactivity within the classroom and the online classroom discussions, Bob felt that overall student learning would be diminished through the use of an embedded social text. However, Bob's comments were based on hypothetical experiences. To determine whether his concerns are unfounded or not, more research is needed about instructor perspectives of more open and interactive instructional technologies, like the social textbook, after instructors have actually used them with students. This real-world experience would provide more authentic instructor perceptions of interactive textbooks.

In addition to warning against using social texts and how they could hinder student learning, Bob emphasized his need, as the instructor, for control over information and student interactions. He expressed a desire to maintain the ability to monitor discussions and information sharing among students. He further expounded on the overall supremacy of the textbook content, the authors, and editors over the information generated through student learning interactions. In this study, the students' and instructor's views of social texts were diametrically opposed.

Although social texts are an emerging feature of mobile learning, some research on social text annotations has begun to emerge. Chiarella and Lajoie (2010) seemed to suggest that student learning communities successfully identified the author's most important sections of a text; however, the instructor's role in this learning scenario and the resulting impact on student learning is a topic for further research. Regarding the learning experiences for the students in this case study, the desire for the social text seemed to suggest that students using mobile e-books wanted more social learning opportunities, with content situated within the interactive text.

Researchers such as Bandura (1997) have explored the significant influence learning social context has on individuals and learning. Bandura described the interplay of the individual within environments as heavily influential for learning. He also contended that learning happens through social contexts via the influence of social modeling, where individuals are vicariously influenced through actions of others within a given context. For example, in the margins of a socially connected textbook, a student might read about another student's experience with a sociology concept such as "in-group;" he or she then gains a vicarious, deeper understanding of an otherwise abstract concept. Given the perpetually networked and connectedness of modern society, the opportunities to connect with one another and potentially learn socially from one another are infinite and a natural characteristic of the contemporary world.

Therefore, perhaps the students in this study who stressed the importance of social learning felt that this would yield the most success for their learning. They also may have felt that their time was best spent learning socially, or it may have been a preference or unconscious decision. Regardless of their motivations, students in the study participated in social learning activities with their e-books and expressed a desire for more capabilities that would increase opportunities for social learning through use of a social text.

Summary of the Major Conclusions

The findings of this study yielded six major conclusions related to students' e-book use. All of the students were competent in their use of the mobile e-books, and expressed high self-efficacy regarding their individual beliefs about using the e-books. Overall, students valued the use of the e-book for their learning. Students were

individualized and metacognitive in their learning with the mobile e-books. By exploiting the mobility of the e-books, students also enhanced their learning socially and within situated learning opportunities. In addition to situated learning, students expressed the desire for more interactive, socially-embedded learning experiences within the electronic texts, while the instructor felt this would result in shallow and unfocused learning, a scenario where he had less control. These divergent views regarding the social text, as well as other factors explored in the six major conclusions of this study, can provide guidance for future research.

Limitations of the Study

This collective case study was designed to explore the mobile e-book learning experiences within its situated boundaries. The study of each student case was carried out to further the understanding of the implementation of mobile e-books at a state college that is transitioning to e-books for its in-house published SIRIUS textbooks. The findings from this qualitative study were not intended to be generalized to other populations; rather, the purpose was to enhance understandings of the learning experiences of these students with the mobile e-books. By doing this, opportunities for further research were generated, as well as an enhanced understanding of how these students used e-books for their learning.

Students who volunteered for this research self-selected into the study; therefore, there was an increased likelihood that they were already “early adopters” of technology. Additionally, most of the students that participated in the study were in their twenties. Younger students may have been more conformable with mobile technologies, due to their lifelong immersion in a world saturated with hi-tech devices exposure to these

devices. Also, the students who did not use e-books were not studied and interviewed. This nonuser perspective may have contributed to the overall understanding of mobile e-book learning experiences within this bounded study. Future studies would also benefit from acquiring more heterogeneous subjects.

I conducted in-depth interviews with each of the students participants, with open-ended question prompts designed to address their mobile e-book learning experiences. However, self-report data (Hindelang, Hirschi, & Weis, 1979) is not always a reliable indicator of true individual perspectives, feelings, and behaviors. Future studies on mobile e-book learning experiences will be beneficial in further enhancing the knowledgebase and educational leaders' understanding of student learning with mobile technologies, such as e-books.

Recommendations for Educational Leadership

Educational leaders need to immediately engage with the impending shift to digital and increasingly portable learning materials, such as textbooks. This means employing pilot studies and action research, as well as engaging in a larger, national debate with colleagues and peers who are negotiating this imminent change. Issues such as those uncovered in this study can provide focal points for these efforts, with student learning, success, and access as primary concerns.

As stated at the beginning of this study, the landscape of instructional technology, electronic texts, and higher education is changing rapidly. In this global information age, instructors no longer have control over students' access to information and knowledge. While this aspect is a positive in regards to learner access, it is also a call for educational leaders to become actively involved in this change. What is unprecedented now is that

the Internet connects students to the entire world and a wealth of information. However, within this overload of information, in order for students to be successful and thrive as citizens, they need to become critical consumers of information. They will need to have the skills and information savvy necessary to weigh the validity of various information sources and to evaluate their utility. Responsible educational leaders must create and instill policies and practices that are relevant to this modern age and adequately prepare students to be successful in it. Directly tied to the conclusions of this study regarding students' desires for a social text, leaders must foster a fundamental curriculum of information literacy.

For students to be successful consumers and creators of information, and to become critical, savvy learners and citizens in the current information age, they have to become increasingly information literate. This means students will have to take in multiple sources of information, data, and opinions, and synthesize meanings, values, and agendas to ultimately create their own understandings and schema. Related to this study and the student's desire for social interactions embedded in their electronic mobile texts, learning in this type of environment would be useful in preparing them to become increasingly information literate. In practice, students would be actively engaged and critically evaluating various opinions from their peers and outside sources, as well as defending their individual perspectives. This would be similar to a lively graduate seminar or community of practice. Additionally, this scenario might resemble the social media that most of society actively participates in now, where news stories, articles, and media are all interactive and essentially an opportunity for socially constructivist conversations. For educational institutions to be relevant to student learning and prepare

them for success in life outside of higher education, leaders need to prepare now for this shift, one that is already well.

Related to this shift to more interactive social learning is the use of mobile learning devices in student-selected and situated contexts. Leaders need to be aware that students within this digital information age are increasingly mobile and connected via portable technologies. This means that student learning is transcending the classroom and formal learning environments. Due to a variety of factors, including the convenient access of portable learning devices, necessity, and a lack of time, students are using mobile devices as they progress through their daily lives and in novel locations. Some students, as in this study, reported that they actively and metacognitively sought contexts that could augment their learning. The analogy of the GPS contained within the textbook and the authors' suggestion for students to become amateur sociologists also seemed to encourage this pursuit. The affordances of mobile instructional technologies will increasingly make learning opportunities more ubiquitous and accessible to students outside of the classroom. Educational leaders need to ensure that this opportunity is harnessed and incorporated into curricula, designs, and assessments. This shift to a more interactive, ubiquitous, and open learning environment will undoubtedly present both opportunities and challenges for educational institutions and higher education overall. Educational leaders will be responsible for navigating this shift and preparing their organizations for success.

One potential disconnect and challenge identified from this study was the role of faculty in this transition. Educational leaders must be prepared to address faculty concerns, such as those expressed by the instructor in this study. If students and

instructors have opposing views, as in this study, leaders must take actions that reconcile these divergent conceptions, values, and expectations for learning. Perhaps through increased awareness of these new technologies and learning affordances, along with training and professional development, faculty that are reluctant to change will eventually begin to become more cognizant of how students learn in the modern information age. During this transition, educational leaders must inspire faculty growth and change, rather than alienating them. By drawing connections between the urgent need for students to demonstrate information literacy, the socially connected global society, and the value of the faculty role in overall student learning, educational leaders can ensure their institutions' success and fulfill their ultimate mission of preparing students for success.

Recommendations for Future Research

The purpose of this study was to explore the learning experiences of students using mobile e-books in college sociology courses. By viewing the data collected through the theoretical framework defined in Chapter 2, comprised of mobile learning and learning theory literature, the following topics are recommended for further research, organized by the major conclusions of this study: competence, self-efficacy, e-book value, metacognitive and individual e-book use, impacts of mobility, and the social textbook.

Students were found to have high self-efficacy when using the e-books for their learning. How self-efficacy may influence their learning and persistence would be a beneficial research topic. Additionally, the factors influencing student self-efficacy with e-books would also be an important area to explore. Students will need to perceive

themselves as competent and able to use emerging instructional technologies before these tools will become accepted and adopted by them (Wang & Wang, 2008).

Another recommendation for future research is examining students' perceived value of mobile e-books. As this study demonstrated, students may have high self-efficacy with the technology but not find value in its use or application for their learning. Researchers, and especially educational leaders implementing mobile e-books, need to better understand why students would or would not value learning tools such as these, and if value—or lack thereof—influences students' likelihood to persist.

Overall, the students in this bounded multiple case study were found to be thoughtful in their use of the mobile e-books. This individual metacognition manifested in personalized ways with each student, whether based on his or her selected environment to study and read, or how he or she used various functionalities, like searching and bookmarking. The underlying shared element, however, is that students based their individual utilitarian use on what they perceived to be best for their learning. Research that explores how this metacognition influences learner behaviors—specifically, what factors influence learners' choices in selecting their various learning environments, and how they perceive this supporting their learning—will add to the knowledgebase of students' mobile e-book learning experiences.

Related to learners' choices on how and where they use mobile e-books is the situated learning afforded by this technology. The situated learning potential is mentioned throughout much of the literature on mobile learning (Kukulska-Hume & Traxler, 2005; Sharples et al., 2005), and within this bounded case study, students expressed experiencing some benefits to their learning. Students exploited the mobility

aspect of their e-books to study in novel locations, which enhanced their learning by moving from abstract definitions of textbook concepts to more experiential, concrete understandings.

Areas for further study may include inquires that explore the benefits of learners being situated within their chosen and experiential contexts. Additionally, as this case study uncovered, inquires exploring instructional design practices of embedding opportunities for situated and authentic learning should be studied, to explore their impact on learning within mobile e-book applications. However, as recent research has already revealed, learners' environments can also provide negative influences and distractions. Issues such as environmental cognitive load (Doolittle & Mariano, 2008) and other potential, as yet undiscovered, challenges must be studied to better understand contextual and environmental influences.

The final recommendation for further research is based on the concept of the social textbook. Within this case study, students overwhelmingly wanted to see more interactive and collaborative learning opportunities within their e-books. The instructor did not support this type of learning environment, as he felt it would diminish the students' learning depth and remove his ability to control the learning discourse. Even though this study only provides a single faculty member's perspective, more inquires are needed to explore the potential benefits and challenges of more open and interactive learning environments that are embedded within course context, such as electronic textbooks. Moreover, how this type of learning environment would be received and used by instructors is largely unknown at this time and needs to be examined.

Lastly, how interactive and social textbooks impact student learning, and the roles of instructor and student in this context, is an area rich for inquiries. Modern society is increasingly connected and networked, especially to media that is more socialized. The fundamental question for educators is how these characteristics filtering into learning environments will change learning and the learning process.

Conclusion

This study was exploratory in nature, seeking to better understand how the students within the limited boundaries of this collective case study used mobile e-books for their learning. Through the data analyses and discussions, six major conclusions emerged, which indicated opportunities for further research. These conclusions related to competence, self-efficacy, e-book value, metacognitive and individual e-book use, impacts of mobility, and the social textbook. Research agendas that further knowledge and understanding in these areas, as suggested in the previously stated recommendations for future research, may advance insight for educational leaders and designers on how the move to mobile e-books in higher education impacts student learning.

While students were overall competent and reported feelings of high self-efficacy in their use of the mobile e-books, as with any new piece of learning technology, the questions of effect and value remained. Mobile learning technology and how students perceive its value will influence if and how the technology is successfully used. Individual learners must perceive the technology as a valued tool before they will use and eventually adopt it. Also, the technology must not impose an extra burden on students, such as increased cognitive load (Doolittle & Mariano, 2008), but rather become transparent within their learning experiences.

Students in this study augmented their learning through the use of the mobile e-books, through purposely and individually selected contexts that enhanced situated learning, and through the mobile affordances of the e-books. This mobile use enhanced students' understandings of abstract textbook concepts by situating them in contexts where they could foster concrete learning experiences. In addition to this type of authentic learning, students also wanted to have more social learning opportunities embedded within the e-books. They wanted to share ideas, start conversations, and interact with each other to enhance their understandings and learning.

These student experiences and views directly opposed the instructor's. This disconnect between students and instructors will challenge educational leaders to transform their institutions and implement policies that effectively prepare and support faculty, who might express skepticism and be reluctant to change. However, this may also prove to be an opportunity to address how these innovations impact faculty's emerging roles—and ultimately, how those in the field of education conceptualize teaching and learning in a more open, and networked society. Specifically, as colleges and universities transition to digital instructional technologies, such as e-books, more research is needed regarding how this transition will affect multiple aspects of the learning experience, including students and their learning, the relationship and interactions of students and faculty, the faculty's roles and responsibilities, and the learning environments, both virtual and classroom-based.

Within this bound case study, this need for understanding technology's impact on learning was clearly illustrated by the students' desire for increased embedded social interactivity within their learning resources and environments. Socially connected media

and information is a part of everyday life for many in today's society, and the teaching and learning at educational institutions—especially individual classrooms—will not be immune to this change. Educational leaders must understand the nature of social textbooks, and how they might significantly change their institutions.

In a world that is more open and connected, students' learning environments should reflect this reality. The age of the closed-off classroom, classroom-based or virtual, is quickly becoming less relevant in preparing modern learners and citizens in the fast-paced, global information age. For more authentic, contextualized learning experiences, teachers and students must transcend the limitations of the traditional classroom. Learning with connected mobile devices is an example of this change. Educational leaders must immediately begin to prepare for these changes, to ensure successful transitions into the future.

Appendix A
FSCJ Student Volunteer Letter

August 11, 2009

Student,

The purpose of this investigation is to explore the use of electronic textbooks in college courses. If you participate in this research, you will receive an electronic textbook for your course and a mobile computing device for use during the 12-week course term. At the end of the term, you will return the materials and mobile device to Jeff Kissinger at 501 West State Street #207W, Jacksonville FL 32202; Phone: 904.632.5052; E-mail: jkissing@fscj.edu.

Your participation is strictly voluntary. You may refuse to participate at all, or choose to stop your participation at any point in the research, without fear of penalty or negative consequences of any kind. Your participation in the study will involve filling out a short survey at the beginning and end of the course term. Additionally, you will be asked to fill out weekly journals that document your experiences with the electronic textbook. Finally, after the course is completed, you agree to participate in an interview for approximately 45 to 60 minutes with Jeff Kissinger, the principal investigator.

All of your personal information and responses will be kept confidential and secure. If you have any questions regarding the study, please contact Jeff Kissinger (Phone: 904.632.5052; E-mail: jkissing@fscj.edu) or the College's Institutional Review Board Administrator (Phyllis Renninger, Director of Resource Development, 904.632.3327).

Sincerely Yours, Jeff Kissinger

Appendix B
UNF Informed Consent Letter and Form: Student

XXXX XX, 2010

Dear Student,

My name is Jeff Kissinger, and as a doctoral student at The University of North Florida in the department of Leadership, Counseling, and Instructional Technology, I would like to formally invite you to participate in an exciting research study on the use of portable electronic textbooks. This research is being supervised and has been approved by The University of North Florida and its Institutional Review Board (IRB).

You are being asked to participate in this study because of your recent experience as one of 13 students using an eBook in Mr. Ganza's fall 2009 course SYG 2000 Introduction to Sociology course. By participating in this study, you will contribute valuable feedback on the use of these new instructional tools and on Florida State College at Jacksonville's transition to electronic textbooks for its SIRIUS courses.

Your participation is strictly voluntary. You may choose not to participate, or choose to stop your participation at any point during the research without fear of penalty or negative consequences of any kind. The purpose of this research is to explore the use of portable electronic textbooks in college courses, and your recent experiences are highly valued to me and for this study.

Your participation in the study will involve being interviewed by me about your recent experiences in Mr. Ganza's course that used SIRIUS electronic textbooks and mobile e-book readers. The expected time for the interview will be 60 to 120 minutes, and it will be recorded and transcribed. All student information, grades, and responses will be kept confidential by having student volunteers choose a pseudonym. Additionally, all data that is to be collected will be maintained securely on college password protected and limited access computers.

While there is no direct benefit or monetary compensation for participation, students who agree to volunteer will have an opportunity to share their experiences with electronic textbooks to help assist Florida State College at Jacksonville's ability to best serve its students and the community.

For all questions about volunteering for this study, please contact Jeff Kissinger (Phone: 904.632.5052; E-mail: jkissing@fscj.edu). Should you have any concerns about this study please contact my faculty research supervisor, Dr. Kasten (Phone: 904.620.1789; E-mail: kkasten@unf.edu) or The University of North Florida's Institutional Review Board IRB Vice Chairperson Kareem Jordan at 904.620.1723.

If you are interested in volunteering for this study that will consist of thirteen total volunteers and are at least 18 years of age or older, please copy and paste this entire

form into an e-mail, fill in your name and date, then send it to jkissing@fscj.edu, which will serve as your electronic signature and official consent to participate. Upon receipt of this e-mail form, I will e-mail you verification that you are officially participating and contact you to set up an interview time.

Thank you for your interest in this study, and I sincerely hope you choose to participate.

Jeff Kissinger

**University of North Florida Leadership, Counseling, and Instructional Technology
Informed Student Consent Form**

I, _____ (*print student name here*) _____, am 18 years of age or older and agree to volunteer for the Portable Electronic Textbook Study at The University of North Florida in February 2010. There are no foreseeable risks associated with this study. I understand that I may, at anytime, without fear of any negative consequences, withdraw from this study. I agree to participate in the requirements as detailed in this form and understand that my information and responses will be used under a confidential pseudonym.

_____ Date _____

Student Signature

Student Phone Number _____

Student E-mail Address _____

_____ Date _____

Principal Investigator Signature

Please e-mail this form to Jeff Kissinger at jkissing@fscj.edu or deliver a signed hard copy to Jeff Kissinger, Florida State College at Jacksonville, 501 West State Street #207W, Jacksonville FL 32202.

Appendix C
UNF Informed Consent Letter and Form: Instructor

XXXXXX XX, 2010

Dear Instructor,

My name is Jeff Kissinger, and as a doctoral student at The University of North Florida in the department of Leadership, Counseling, and Instructional Technology, I would like to formally invite you to participate in an exciting research study on the use of portable electronic textbooks. This research is being supervised and has been approved by The University of North Florida and its Institutional Review Board (IRB).

You are being asked to participate in this study because of your recent experience as the instructor for two fall 2009 SYG 2000 Introduction to Sociology courses that used electronic eBook readers. By participating in this study, you will contribute valuable feedback on the use of these new instructional tools and on Florida State College at Jacksonville's transition to electronic textbooks for its SIRIUS courses.

Your participation is strictly voluntary. You may choose not to participate, or choose to stop your participation at any point during the research without fear of penalty or negative consequences of any kind. The purpose of this research is to explore the use of portable electronic textbooks in college courses, and your recent experiences are highly valued to me and for this study.

Your participation in the study will involve being interviewed by me about your recent experiences teaching that used SIRIUS electronic textbooks and mobile e-book readers. The expected time for the interview will be 60 to 120 minutes, and it will be recorded and transcribed. This information will be confidential and only accessible to me. Throughout the interview recordings you will be asked to use a pseudonym. Additionally, all data that is to be collected will be maintained securely on college password protected and limited access computers.

While there is no direct benefit or monetary compensation for participation, if you agree to volunteer you will have an opportunity to share your experiences with electronic textbooks to help assist Florida State College at Jacksonville's ability to best serve its students and the community.

For all questions about volunteering for this study, please contact Jeff Kissinger (Phone: 904.632.5052; E-mail: jkissing@fscj.edu). Should you have any concerns about this study please contact my faculty research supervisor, Dr. Kasten (Phone: 904.620.1789; E-mail: kkasten@unf.edu) or The University of North Florida's Institutional Review Board IRB Vice Chairperson Kareem Jordan at 904.620.1723.

If you are interested in volunteering for this study that will consist of thirteen total volunteers and are at least 18 years of age or older, please copy and paste this entire

form into an e-mail, fill in your name and date, then send it to jkissing@fscj.edu, which will serve as your electronic signature and official consent to participate. Upon receipt of this e-mail form, I will e-mail you verification that you are officially participating and contact you to set up an interview time.

Thank you for your interest in this study, and I sincerely hope you choose to participate.

Jeff Kissinger

**University of North Florida Leadership, Counseling, and Instructional Technology
Informed Instructor Consent Form**

I, _____ (*print instructor name here*) _____, am 18 years of age or older and agree to volunteer for the Portable Electronic Textbook Study at The University of North Florida in February 2010. There are no foreseeable risks associated with this study. I understand that I may, at anytime, without fear of any negative consequences, withdraw from this study. I agree to participate in the requirements as detailed in this form and understand that my information and responses will be used under a confidential pseudonym.

_____ Date _____

Instructor Signature

Instructor Phone Number _____

Instructor E-mail Address _____

_____ Date _____

Principal Investigator Signature

Please e-mail this form to Jeff Kissinger at jkissing@fscj.edu or deliver a signed hard copy to Jeff Kissinger, Florida State College at Jacksonville, 501 West State Street #207W, Jacksonville FL 32202.

Appendix D
UNF IRB Approval Letter



UNIVERSITY of
NORTH FLORIDA.

Office of Research and Sponsored Programs
1 UNF Drive
Jacksonville, FL 32224-2665
904-620-2455 FAX 904-620-2457
Equal Opportunity/Equal Access/Affirmative Action Institution

MEMORANDUM

DATE: May 11, 2010

TO: Mr. Jeffrey Kissinger

VIA: Dr. Katherine Kasten
Leadership & Counseling

FROM: Dr. Kareem Jordan, Vice Chairperson
UNF Institutional Review Board

RE: Review by the UNF Institutional Review Board IRB#10-024:
"Collective Case Study of Mobile E-book Learning Experiences"

This is to advise you that your project, "Collective Case Study of Mobile E-book Learning Experiences," has undergone "expedited, category #6 & #7" review on behalf of the UNF Institutional Review Board and was approved.

This approval applies to your project in the form and content as submitted to the IRB for review. Any variations or modifications to the approved protocol and/or informed consent forms as they relate to dealing with human subjects must be cleared with the IRB prior to implementing such changes. Any unanticipated problems involving risk and any occurrence of serious harm to subjects and others shall be reported promptly to the IRB.

Your study has been approved for a period of 12 months. If your project continues for more than one year, you are required to provide a Continuing Status Report to the UNF IRB prior to 3/30/2011 if your study will be continuing past 04/29/2011. *We suggest you submit your status report 11 months from the date of your approval date as noted above to allow time for review and processing.*

As you may know, **CITI Course Completion Reports are valid for 3 years.** Dr. Kasten's completion report is valid through 04/22/2011 and Mr. Kissinger's completion report is valid through 12/03/2012. If your completion reports expire soon please take CITI's refresher course. Once you complete all of the CITI modules a completion report will be emailed to our office. For faster file updating purposes, however, please notify this office when you complete your CITI refresher course.

Should you have questions regarding your project or any other IRB issues, please contact the Office of Research and Sponsored Programs at 904.620.2455.

Thank you,

Research Integrity Staff

UNF IRB Number: 10-024
Approval Date: 4/30/10
Revision Date:

Appendix E
Semistructured Student Interview Questions

Background Questions:

1. What is your pseudonym and age?
2. Did you take the online course or classroom-based course?
3. Which e-book did you use?
4. Do you own or have any previous experience with electronic books?
5. Which features did you use? [text to speech, highlighting, bookmarking, notes, sharing notes]

Learning-Related Question Prompts

1. Take me on an average day as you were using the e-book. Describe what you did, how you did it, and how you felt.
 - Was it difficult to use?
 - Did you expect to be successful using it?
 - What value did you place on using the e-book for your learning?
 - Were you afraid of using the device for your learning?
2. What were some of the places you used the e-book? Were these places you have gone before to read or study?
3. How do you think the location of where you used the e-book influenced your learning?
 - In general describe how your reading or study environment helps or hinders your learning.
 - How did using the e-book change how you read or studied based on your location?
4. How confident were you using the e-book? Why do you feel this way?
 - Did you feel in control of your learning using the e-book?
 - What motivated your use of the e-book?
 - How did using the e-book influence your motivation?
5. Has using the e-book influenced your beliefs about your capabilities with respect to your own learning and understanding? If so, please explain how.
6. Suppose I were a new student considering taking courses that exclusively used e-books, and I asked for your advice on whether or not to take these courses. What would you tell me and why?
7. What do you think contributed to your learning and success in the course, and how did using the e-book influence this if at all?
8. Has the e-book changed how you used textbook materials for your learning in this course?
9. Has the e-book changed the places where you read and studied in this course?
10. Did you use the e-book individually, with other classmates, or both? Explain and share some examples.
11. If you could improve upon anything about the e-books, what would it be and why?
12. What else would you like to say about your experiences that you have not already said?
13. Would you take a course with an e-book again? Why or why not?

Appendix F
Semistructured Instructor Interview Questions

Background Questions:

1. Please share your pseudonym, teaching background, and age.
2. Describe the two courses you taught using the e-books.
3. Which features do you know students used? [text to speech, highlighting, bookmarking, notes, sharing notes]

Student Learning-Related Questions

1. How did students use the e-books in your two sociology courses?
-Where did they use them? Inside class and outside class?
2. What challenges did you perceive to students using the e-books to support their learning?
3. What benefits did you perceive to students using the e-books to support their learning?
-Do you think they were motivated to use the e-books and how?
4. How confident or insecure do you think students were using the devices? Why?
-Do you think the e-books drove students to be successful and why/why not?
-What value do you think students placed on using the e-books for this class and their learning?
5. Did you hear of students using the e-books in novel locations or ways? If so, where and how?
-How do you feel where they study or read has an influence on their learning for this course?
6. What do you think contributed to students' learning and success in the course, and how did using the e-book influence this, if at all?
7. If you could improve upon anything about the e-books, what would it be and why?
8. What else would you like to say about your experiences you have not already said?
9. Would you teach a course with an e-book again? Why or why not?

REFERENCES

- Abdullah, N. (2007). *A study into usability of tools for searching and browsing e-books with particular reference to back-of-the-book index*. (Doctoral dissertation, University of Strathclyde). Retrieved from <http://dspace.fsktm.um.edu.my/handle/1812/215>
- Abdullah, N., & Gibb, F. (2008). Students' attitudes towards e-books in a Scottish higher education institute: Part 1. *Library Review*, 57(8), 593-605.
- Allen, N., & The Student PIRGs. (2008, August). Course correction: *How digital textbooks are off track and how to set them straight*. Retrieved from <http://www.studentpirgs.org/uploads/0b/9e/0b9e1d998ea89a92839789f43b506988/course-correction.pdf>
- Anderson, J. R., Reder, L. M., & Simon, H.A. (1996). Situated learning and education. *Educational Researcher*, 25(4), 5-11.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, 64, 359-372.
- Baddeley, A. J. (1992). Working memory. *Science*, 255(5044), 556-559. doi:10.1126/science.1736359
- Bandura, A. J. (1986). *Social foundations of thought and action*. Greenwich, CT: JAI Press.
- Bandura, A. J. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Barker, P. (1992). Electronic books and libraries of the future. *The Electronic Library*, 10(3), 139-149.
- Brown, A. (2009, March 4). *Northwest, McGraw-Hill e-book trial garners national media coverage*. [Press release]. Retrieved from <http://www.nwmissouri.edu/UniversityRelations/news/newsreleases/090304mcgrawhill.htm>
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42.
- Bruning, R. H., Schraw, G. J., & Ronning, R. R. (1999). *Cognitive psychology*. Englewood Cliffs, NJ: Prentice-Hall.
- Bush, V. (1945). As we may think. *The Atlantic Monthly*, 176(1), 101-108. Retrieved from <http://www.theatlantic.com/doc/194507/bush>
- Campbell, N. K., & Hackett, G. (1986). The effects of mathematics task performance on

- math self-efficacy and task interest. *Journal of Vocational Behavior*, 28, 149-162.
- Cavanaugh, T. (2002). Ebooks and accommodations: Is this the future of print accommodation? *TEACHING Exceptional Children*, 35(2), 56-61.
- Cavanaugh, T. (2003). eBooks an unknown reading option. In R. Ferdig and C. Crawford (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2003* (pp. 1387-1389). Chesapeake, VA: Association for the Advancement of Computing in Education.
- Cavanaugh, T. (2004). Using electronic texts as the course textbook. R. Ferdig, C. Crawford, R. Carlson, N. Davis, J. Price, R. Weber and D.A. Willis (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2004* (pp. 1113-1117). Chesapeake, VA: Association for the Advancement of Computing in Education.
- Cavanaugh, T. (2005). *The digital reader: Using ebooks in k-12 education*. Eugene, OR: International Society for Technology in Education (ITSE).
- Cavanaugh, T., & Cavanaugh, C. (2008). *eBook libraries (the whole list)*. Retrieved from http://drscavanaugh.org/ebooks/libraries/ebook_libraries_list.htm
- Chang, C. Y., Sheu, J. P., & Chan, T.W. (2003). Concept and design of ad hoc and mobile classrooms. *Journal of Computer Assisted Learning*, 19(3), 336-346.
- Chen, Y. S., Kao, T. C., & Sheu, J. P. (2003). A mobile learning system for scaffolding bird watching learning. *Journal of Computer Assisted Learning*, 19(3), 347-359.
- Cheung, W. S., & Hew, K. F. (2009). A review of research methodologies used in studies on mobile handheld devices in k-12 and higher education settings. *Australasian Journal of Educational Technology*, 25(2), 152-183.
- Chiarella, A. F., & Lajoie, S. P. (2010, June). Social annotation: Emergent text signals through self-organization. In *Proceedings of the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2010* (pp. 1456-1462). Chesapeake, VA: Association for the Advancement of Computing in Education.
- Churchill, D., & Churchill, N. (2008, May). Educational affordances of PDAs: A study of a teacher's exploration of this technology. *Computers & Education*, 50(4), 1439-1450. doi:10.1016/j.compedu.2007.01.002
- Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics. In L.B. Resnick (Ed.), *Knowing, learning and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Lawrence Erlbaum.

- Collins, B. (2011, January 4). Computing in the real world. *PC Pro*. Retrieved from <http://www.pcpro.co.uk/news/364015/over-100-tablets-to-launch-at-ces>
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, *19*(2), 189-211.
- Corbeil, J. R. (2007). Are you ready for mobile learning? *The EDUCAUSE Quarterly*, *30*(2), 51-58.
- Corbin, J. M., & Strauss, A. L. (2008). *Basics of qualitative research* (3rd ed.). London, UK: Sage.
- Corlett, D., Sharples, S., Bull, S., & Chan, T. (2005). Evaluation of a mobile learning organiser for university students. *Journal of Computer Assisted Learning*, *21*, 162-170.
- Cox, A., & Mohammed, H. (2001). *E-books*. FreePint80. doi:10.1108/07378830310467427
- Danaher, P., Gururajan, R., & Hafeez-Baig, A. (2009). Transforming the practice of mobile learning: Promoting pedagogical innovation through educational principles and strategies that work. In R. Hokyoung & D. Parsons (Eds.), *Innovative mobile learning: Techniques and technologies* (pp. 21-46). Hershey, PA: Information Science Reference (IGI Global).
- Dieterle, E., & Dede, C. (2006, April). *Straightforward and deep effects of wireless handheld devices for teaching and learning in university settings*. Paper presented at the 2006 American Educational Research Association Conference, San Francisco, CA. Retrieved from http://gseacademic.harvard.edu/~hdul/AERA_2006_Dieterle_Dede.pdf
- Dillon, D. (2001). E-books: The University of Texas experience, part 2. *Library Hi Tech*, *19*(2), 113-124.
- Doolittle, P., & Mariano, G. (2008). Working memory capacity and mobile multimedia learning environments: Individual differences in learning while mobile. *Journal of Educational Multimedia and Hypermedia*, *17*(4), 511-530.
- Eggen, P., & Kauchak, D. (2007). *Educational psychology: Windows on classrooms* (6th ed.). Upper Saddle River, NJ: Prentice Hall.
- Eggen, P., & Kauchak, D. (2010). *Educational psychology: Windows on classrooms* (8th ed.). Upper Saddle River, NJ: Pearson.
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki, Finland: Orienta-Konsultit Oy.

- Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), 133-156.
- Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd ed., pp. 119-161). New York, NY: Macmillan.
- Flavell, J. H. (1976) Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp. 231-236). Hillsdale, NJ: Erlbaum.
- Florida Distance Learning Task Force. (2009, February 26). *Final report*. Retrieved from <http://www.fldlc.org/pdfFiles/dltf%20finalreport.pdf>
- Florida State College at Jacksonville. (2009). *SIRIUS*. Jacksonville, FL. Retrieved from <http://www.sirius-education.org/about.html>
- Gil-Rodriguez, E. P., & Planella-Ribera, J. (2008). *Educational uses of the e-book: An experience in a virtual university context*. In A. Holzinger (Ed.), *HCI and usability for education and work*. 4th Symposium of the Workgroup Human-Computer Interaction and Usability Engineering of the Austrian Computer Society (pp. 55-62). Graz, Austria: USAB. doi:10.1007/978-3-540-89350-9
- Glaser, B. G., & Strauss, A. L. (1968). *The discovery of grounded theory*. Chicago, IL: Aldine.
- Gleazer, E. J., Jr. (1980). *The community college: Values, vision and vitality*. Washington, DC: American Association of Community and Junior Colleges.
- Greeno, J. G., Collins, A. M., & Resnick, L. B. (1996). Cognition and learning. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 15-46) New York, NY: Macmillan. Retrieved from <http://www.educ.msu.edu/DWongLibrary/CEP900/Library/Greeno.pdf>
- Harris, P. (2001). Going mobile. *Learning Circuits*. Retrieved from http://www.astd.org/LC/2001/0701_harris.htm
- Hawkins, D. (2000). Electronic books: A major publishing revolution. Part 1: General considerations and issues. *Online*, 24(4), 14-28.
- Hernon, P. (2007). E-book use by students: Undergraduates in economics, literature, and nursing. *The Journal of Academic Librarianship*, 33(1), 3-13.
- Hindelang, M., Hirschi, T., & Weis, J. (1979). Correlates of delinquency: The illusion of discrepancy between self report and official measures. *American Sociological Review*, 44, 995-1014.

- Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of Technology and Teacher Education*, 13(2), 277-302.
- Ismail, R., & Zainab, A. N. (2007, June). *Factors related to E-books use amongst IT students*. Paper presented at the International Conference on Libraries, Information and Society, Petaling Jaya, Malaysia. Retrieved from http://dspace.fsktm.um.edu.my/bitstream/1812/260/1/26MY_Roesnita_OK.pdf
- Johnson, L., Levine, A., & Smith, R. (2009). *The 2009 horizon report*. Austin, TX: The New Media Consortium. Retrieved from <http://www.nmc.org/pdf/2009-Horizon-Report.pdf>
- Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). *The 2010 horizon report*. Austin, TX: The New Media Consortium. Retrieved from <http://www.nmc.org/pdf/2010-Horizon-Report.pdf>
- Kossen, J. S. (2001). When e-learning becomes m-learning. *E-learning*. Mobile e-learning Section. PalmPower Enterprise Edition. Retrieved from <http://www.palmpowerenterprise.com/issues/issue200106/elearning001.html>
- Kozol, J. (1991). *Savage inequalities: Children in America's schools*. New York, NY: HarperPerennial.
- Kuckartz, A. M., & Kuckartz, U. (2002). *Qualitative text analysis with MAXQDA*. Retrieved from <http://public.centrodeestudiosandaluces.es/pdfs/S200106.pdf>
- Kukulska-Hulme, A., & Traxler, J. (Eds.). (2005). *Mobile learning: A handbook for educators and trainers*. London, UK: Routledge.
- Lam, P., Lam, S. L., Lam, J., & McNaught, C. (2009). Usability and usefulness of eBooks on PPCs: How students' opinions vary over time. *Australasian Journal of Educational Technology*, 25(1), 30-44.
- Langston, M. (2003). The California State University e-book pilot project: Implications for cooperative collection development. *Library Collections, Acquisitions, and Technical Services*, 27(1), 19-32.
- Laouris, Y., & Eteokleous, N. (2005). We need an educationally relevant definition of mobile learning. In H. van der Merwe & T. Brown (Eds.), *Mobile technology: The future of learning in your hands, mLearn 2005 book of abstracts* (p. 28). Paper presented at the 4th World Conference on mLearning. Cape Town, South Africa: mLearn 2005.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

- Leadbeater, C. (2004). *Learning about Personalization: How can we put the learner at the heart of the education system?* Nottingham, UK: DfES. Retrieved from <http://www.innovation-unit.co.uk/images/stories/files/pdf/Learningaboutpersonalisation.pdf>
- Levine-Clark, M. (2007). Electronic books and the humanities: A survey at the University of Denver. *Collection Building*, 26(1), 7-14.
- Levy, M., & Kennedy, C. (2005). Learning Italian via mobile SMS. In A. Kukulska-Hulme, & J. Traxler (Eds.), *Mobile learning: A handbook for educators and trainers* (pp. 76-83). London, UK: Routledge.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage.
- Lynch, C. (2001, May 28). The battle to define the future of the book in the digital world. *First Monday*, 6(6). Retrieved from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/issue/view/134>
- Mayer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review*, 8, 357-371.
- Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology*, 82(1), 60-70.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Mifsud, L. (2004, August). *Research in the use of handheld technologies in compulsory education: A review of literature*. Paper presented at the International Robotics and Intelligent Systems Conference (IRIS) 27, Faljensberg, Sweden. doi:10.1504/IJMC.2008.019822
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63, 81-97.
- Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation. *Computers & Education*, 49(3), 581-596.
- Mullins, C. (2007). Community colleges. In M. Moore (Ed.), *Handbook of distance education* (2nd ed., pp. 491-500). Mahwah, NJ: Lawrence Erlbaum.
- Muntz, P. A., Melvin, J., & Nortz, C. (2009). *Introductory sociology* (2nd ed.). Jacksonville, FL: SIRIUS.

- Murphy, C., Coover, D., & Owen, S. (1989). Development and validation of the computer self-efficacy scale. *Educational and Psychological Measurement*, 49(4), 893-899.
- O'Malley, C., & Fraser, D. S. (2004). *Literature review in learning with tangible technologies*. Bristol, UK: Futurelab. Retrieved from <http://hal.archives-ouvertes.fr/docs/00/19/03/28/PDF/Claire-Omalley-2004.pdf>
- Parnell, D. (1985). *The neglected majority*. Washington, DC: Community College Press.
- Patten, B., Arnedillo-Sánchez, I., & Tangney, B. (2006). Designing collaborative, constructionist and contextual applications for handheld devices: Virtual learning? *Computers & Education*, 46(3), 294-308. doi:10.1016/j.compedu.2005.11.011
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- Perry, D. (2003). *Handheld computers (PDAs) in schools*. Coventry, UK: Becta ICT Research. Retrieved from http://partners.becta.org.uk/page_documents/research/handhelds.pdf
- Petracco, P. (2001). Weighing in on backpacks. *School Leader*, Info Link. Retrieved from http://www.njsba.org/members_only/publications/school_leader/May-June-2001/info_link.htm
- Piaget, J. (1969). *Psychology of intelligence*. Paterson, NJ: Littlefield, Adams.
- Plant, S. (2001). On the mobile: The effects of mobile telephones on social and individual life. *Motorola*. Retrieved from http://www.motorola.com/mot/doc/0/234_MotDoc.pdf
- Princeton University. (2009). *E-reader pilot program*. Retrieved from <http://www.princeton.edu/ereaderpilot/>
- Quinn, C. (2000, Fall). mLearning: Mobile, wireless, in-your-pocket learning. *LiNE Zine*. Retrieved from <http://www.linezine.com/2.1/features/cqmmwiyp.htm>
- Rao, S. S. (2003). Electronic books: A review and evaluation. *Library Hi Tech*, 21(1), 85-93.
- Rogers, Y., Price, S., Fitzpatrick, R., Fleck, R., Harris, E., Smith, H., Randell, C., Muller, H., et al. (2004). Ambient wood: Designing new forms of digital augmentation for learning outdoors. In A. Druin (Ed.), *Proceedings of the 2004 Conference on Interaction Design and Children: Building a Community* (pp. 3-10). New York, NY: ACM. doi:10.1145/1017833.1017834

- Roschelle, J. (2003). Keynote paper: Unlocking the learning value of wireless mobile devices. *Journal of Computer Assisted Learning*, 19(3), 260-272. doi:10.1046/j.0266-4909.2003.00028.x
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- Ryu, H., & Parsons, D. (2009). Designing learning activities with mobile technologies. In H. Ryu & D. Parsons (Eds.), *Innovative mobile learning: Techniques and technologies* (pp. 1-20). Hershey, PA: Information Science Reference (IGI Global). Retrieved from <http://www.igi-global.com/downloads/excerpts/8262.pdf>
- Sannier, A. (2009, May 6). Please welcome ASU's newest freshman to campus: the Kindle [Web log post]. Retrieved from <https://uto.asu.edu/blog/2009/05/06/please-welcome-asus-newest-freshman-to-campus-the-kindle/>
- Santrock, J. W. (2009). *Educational psychology* (4th ed.). Boston, MA: McGraw-Hill.
- Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2008). *Motivation in education: Theory, research, and applications* (3rd ed.). Upper Saddle Ridge, NJ: Prentice Hall.
- Seppälä, P., & Alamäki, H. (2003). Mobile learning in teacher training. *Journal of Computer Assisted Learning*, 19(3), 330-335.
- Sharples, M. (2000). The design of personal mobile technologies for lifelong learning. *Computers & Education*, 34(3-4), 177-193.
- Sharples, M. (2007). *Big issues in mobile learning: Report of a workshop by the kaleidoscope network of excellence mobile learning initiative*. Nottingham, UK: Learning Sciences Research Institute.
- Sharples, M., Corlett, D., & Westmancott, O. (2002). The design and implementation of a mobile learning resource. *Personal and Ubiquitous Computing*, 6(3), 220-234. Retrieved from <http://www.eee.bham.ac.uk/sharplem/Papers/mobile%20learning%20puc.pdf>
- Sharples, M., O'Malley, C., & Taylor, J. (2004). A study of mobile learning as part of everyday learning. In J. Attewell & C. Savill-Smith (Eds.), *Mobile learning anytime everywhere: A book of papers from mLearn 2004* (pp. 211-212). Rome, Italy: mLearn.
- Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a theory of mobile learning. In H. van der Merwe & T. Brown (Eds.), *Mobile technology: The future of learning in your hands*. mLearn 2005 book of abstracts, 4th World Conference on

- mLearning (p. 58). Cape Town, South Africa: mLearn.
- Shieh, D. (2009, January) Northwest Missouri State U. tries e-book readers, with mixed results. [Web log post]. Retrieved from <http://chronicle.com/blogPost/Northwest-Missouri-State-U/4469/>
- Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review*, *84*, 127-190.
- Simon, E. J. (2002). An experiment using electronic books in the classroom. *Journal of Computers in Mathematics and Science Teaching*, *21*(1), 53-66.
- Skinner, B. F. (1974). *About behaviorism*. New York, NY: Knopf.
- Song, Y., & Fox, R. M. (2007). Investigating into learner perception and use of the handheld affordances in higher education. In R. Kwan, R. Fox, F. T. Chan, & P. Tsang (Eds.), *Enhancing learning through technology: Research on emerging technologies and pedagogies* (pp. 229-239). Singapore: World Scientific.
- Song, Y., & Fox, R. M. (2008). Integrating incidental vocabulary learning using PDAs into academic studies: Undergraduate student experiences. *Hybrid Learning and Education*, *6*, 238-249.
- Stake, R. E. (1994). Identification of the case. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 236-247). Thousand Oaks, CA: Sage.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Strauss, A. L., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage.
- Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction*, *4*, 295-312. doi:10.1016/0959-4752(94)90003-5.
- Tinker, R. F., & Krajcik, J. S. (Eds.). (2001). *Portable technologies: Science learning in context*. New York, NY: Kluwer.
- Traxler, J. (2005). Institutional issues: Embedding and supporting. In A. Kukulska-Hume & J. Traxler (Eds.), *Mobile learning: A handbook for educators and trainers* (pp. 175-186). London, UK: Routledge.
- Traxler, J. (2009). Learning in a mobile age. *International Journal of Mobile and Blended Learning*, *1*(1), 132.
- Trinder, J. (2005). Mobile technologies and systems. In A. Kukulska-Hume & J. Traxler

- (Eds.), *Mobile Learning: A handbook for educators and trainers* (pp. 2-24). London, UK: Routledge.
- U. S. Government Accountability Office. (2005). *College textbooks: Enhanced offerings appear to drive recent price increases*. Washington, DC: GAO. Retrieved from <http://www.gao.gov/new.items/d05806.pdf>
- VERBI Software. (2009). MAXQDA Plus [computer software]. Marburg, Germany.
- Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.
- Wang, Y.-S. (2007). Development and validation of a mobile computer anxiety scale. *British Journal of Educational Technology*, 38, 990-1009.
- Wang, Y.-S. & Wang, H.-Y. (2008). Developing and validating an instrument for measuring mobile computing self-efficacy. *CyberPsychology & behavior*, 11(4), 405-413.
- Wang, Y.-S., Wu, M., & Wang, H.-Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, 40(1), 92-118.
- Waycott, J. (2005). PDAs as lifelong learning tools: An activity theory based analysis. *Learning, Media & Technology*, 30(2), 107-130.
- Weber, C. L., & Cavanaugh, T. W. (2006). Promoting reading: Using eBooks with gifted and advanced readers. *Gifted Child Today*, 29(4), 56-62.
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25(1), 68-81.
- Wood, R. E., & Locke, E. A. (1987). The relation of self-efficacy and grade goals to academic performance. *Educational and Psychological Measurement*, 47, 1013-1024.
- Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage.
- Zurita G., Nussbaum, M., & Sharples, M. (2003). Encouraging face-to-face collaborative

learning through the use of handheld computers in the classroom. In L. Chittaro (Ed.), *Proceedings of Mobile HCI 2003* (pp. 193-208). Berlin, Germany: Springer-Verlag.

VITA Jeffrey Scott Kissinger

Education

2011	Doctorate of Education	University of North Florida
1997	Masters of Special Education	University of Florida
1995	Master of Education	University of Florida
1994	Bachelor of Arts English	University of Florida

Professional Experience

2009-Present	Chief Learning Solutions Architect	FSCJ
2006-2009	Director Distance Learning	FSCJ
2003-2006	Instructional Program Manager	FSCJ
2000-2003	Senior Instructional Designer eLearning Manager- ChildCare Education Institute	
1999-2000 Schools	Special Education Teacher	Gwinnett County Public
1997-1999 Schools	Special Education Teacher	Orange County Public
1996-1997	Education Program Assistant	University of Florida
1995-1996 Schools	English Teacher	Bradford County Public

Selected Publications & Presentations

4/2011 Leveraging IT Resources to Support Faculty as eBook Authors “Partnering with Pedagogy” 2011 Campus Technologies Summit Ft Lauderdale, FL

Workshop 2/2011 The End of the Textbook and Learning Management System
Instructional Technology Council ITC eLearning 2010, St Petersburg, Florida

2/2011 Artificial Intelligence and Story Telling For Creating Powerful Learning
Experiences National Alliance of Community & Technical Colleges NACTC Midland,
TX

Keynote 1/2011 Faculty Academic Convocation Teaching, Learning, and Technology of the Future: The Gold Standard of Learning Essex College NJ

11/2010 Fifth Annual I/ITSEC Serious Games Showcase & Challenge Academic Evaluator Orlando, FL

11/2010 The Emerging Learnscape At Florida State College 16th Annual Sloan-C International Conference on Online Learning Orlando, FL Paper and presentation

10/2010 Enabling Mobile Learning Access Through the Power of Story and Artificial Intelligence E-Learn 2010--ACE World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education Orlando, FL Paper and presentation

6/2010 Changing Learning with Mobile, Paperless eBooks ED-MEDIA 2010--World Conference on Educational Multimedia, Hypermedia & Telecommunications Toronto, Canada Published paper and presentation

Panel 4/2010 Creating and Maintaining an Institutional Culture for Successful Online Learners National Institute for Staff & Organizational Development (NISOD) Austin, Texas

Keynote 4/2010: Global Corporate College, Informal Workplace Learning: Harnessing the Power of the Modern Social & Mobile World for Your Organization's Knowledge Workers

Keynote 4/2010: College of Lake County Faculty Conference, A Teacher Cuts Through the Teaching & Learning Technology Noise: Practical Strategies for Modern Teaching & Learning

2/2010 Going Digital & Portable: The College-wide Move to Electronic Textbooks, Instructional Technology Council eLearning 2010, St. Portland, Oregon

2/2010 Academic Social Networking: Playing with a Purpose, National Alliance of Community & Technical Colleges NACTC. St Petersburg, Florida

10/2009 Paperless, Mobile-Enabled, and Cost-Cutting 21st Century Courses, The 15th Sloan-C International Conference on Asynchronous Learning Networks, Orlando, Florida.

10/2009 Mobile Learning for Deployed Military Students, 8th World Conference on Mobile and Contextual Learning. mLearn 2009 Published paper and presentation

4/2009 Teaching and Learning in a Virtual Environment: A Second Life Workshop, 20th International Conference on College Teaching & Learning Faculty, Jacksonville, Florida

4/2009 Blending Culture and Technology: Understanding NetGen and Their Needs, 89th Annual American Association of Community Colleges Convention, Reno, Nevada