THE USE OF TECHNOLOGY FOR ENHANCING THE LEARNING EXPERIENCES OF

UNDERGRADUATE STUDENTS: FROM ONLINE EDUCATION TO THE USE OF

MOBILE DEVICES AND WEB-BASED PROGRAMS

A Dissertation

Presented in Partial Fulfillment of the Requirements for the

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Authorization to Submit Dissertation

This dissertation of Jeffrey L. Hochstrasser, submitted for the degree of Doctorate of Education with a Major in Education and titled: "The Use of Technology for Enhancing the Learning Experiences of Undergraduate Students: From Online Education to the Use of Mobile Devices and Web-Based Programs," has been reviewed in final form. Permission, as indicated by signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

This three article dissertation is the culminating requirement for the Professional Practices Doctorate, resulting in a terminal Ed.D. degree at the University of Idaho. As such, it consists of three articles specifically relating to educational concerns at Brigham Young University-Idaho. The goal was to address specific situations or needs observed at that campus. This dissertation specifically explores the use of technology in undergraduate education, from online classes to the use of mobile devices and web-based programs for enhancing learning. In addition to the three research articles (Chapters 2-4) mentioned, two more chapters, consisting of an introduction and a concluding discussion are included. Based on the research results of these studies, recommendations were made that may positively affect all related stakeholders.

The first chapter is an introduction to this dissertation, including a history of the educational doctorate degree (Ed.D.) and a comparison with the traditional Ph.D. The Professional Practices Doctorate is also discussed along with its value and practicality. The second chapter consists of a group study researching the correlation between online remote instructors' self-efficacy in areas of online pedagogy, subject matter expertise and technology use and student satisfaction levels. While this study found no significant correlation, other interesting findings, may prove valuable to the BYU-Idaho online stakeholders.

Chapter Three is a multiphase mixed-method study employing a phenomenological approach including in-depth interviews with five undergraduate students to discover how mobile devices are being used to enhance their learning. Frequently used web-based programs were identified through the process along with the most popular resources

undergraduate students connect to with their mobile devices to find the information needed. The effectiveness of instructor-generated text message reminders was also tested in three undergraduate classes and found that 88.6% of the students surveyed believed text reminders had a positive effect on overall course performance.

 The fourth chapter is a concept paper summarizing the studies and making recommendations for practice, based on the findings. The last chapter is a concluding discussion, which also includes recommendations for future research.

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also extended to my committee members, Dr. Corinne Mantle-Bromley, Dr. Raymond

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spearheaded this PPD program and to all those faculty members who taught courses

along the way. I also recognize the cooperation and support of the administration at

both the University of Idaho and Brigham Young University-Idaho, which helped make

the studies for this dissertation research possible.

Dedication

Words cannot express how grateful I am to my wife, Debbi for her love and support over the

years in everything I have done educationally, professionally, and personally. This

dissertation is just one more item where her support, love and encouragement

have helped make it possible.

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CHAPTER 1: INTRODUCTION TO THE PROFESSIONAL PRACTICES DOCTORATE

This study was designed to fulfill the purpose of the University of Idaho Professional Practices Doctorate in Education (PPD), resulting in a Doctorate of Education (Ed.D.) degree, meaning it focused on understanding, developing, and implementing solutions to local problems. PPD programs are distinguished from traditional doctorates in that they incorporate "practice-rooted research, work-based learning, employment-related skills and cohort-driven pedagogies" (Willis, Inman, & Valenti, 2010, p. 99). The characteristics of PPD programs are thus included in PPD dissertations. This introduction compared the purposes and outcomes of PPD programs with traditional Ph.D. programs. Specifically, it focused on the Ed.D. degree as a type of PPD, examined PPD dissertation options, and explored the collaborative nature of this research study.

PPD programs are usually characterized by building content and skills that are broader and more interdisciplinary than traditional Ph.D. programs. Since the students in these programs are often older and working in their chosen professions, the PPD allows students to focus on problems within their professional workplace, rather than on academic philosophies and theories (Green & Powell, 2005). The PPD prioritizes professional knowledge over academic knowledge, its goal being to address real and often localized problems, rather than developing academic theories (Willis et al., 2010). While some scholars have debated the validity of PPD programs (Le Belle, 2004; Willis et al., 2010, p. 29-32), founders of the Carnegie Project on the Education Doctorate endorse the PPD doctorate program in Education, and uphold the idea that this "new degree can help restore respect for the excellent work of education practitioners and leaders" (Shulman, Golde, Bueschel, & Garabedian, 2006, p. 28).

Historically, educators have debated the purposes and outcomes of Ph.D. programs in Education compared to Ed.D. objectives and outcomes. The first doctorate of education (Ed.D.) was offered from the University of Toronto in 1881, and later in the United States at Harvard in 1920 (Green & Powell, 2005, p. 87). The purpose of the Ed.D. is to prepare practitioners, as opposed to scholars and researchers in traditional Ph.D. programs.

Institutions such as the University of Illinois and the University of Idaho focus the Ed.D. dissertation around solving problems rather than discovering universal knowledge. The University of Illinois characterizes their Ed.D. dissertation as a "synthesis of experiences that is the hallmark of a highly qualified professional. The demonstration of these qualities may take a variety of forms such as: (a) a field study; (b) a scholarly, original paper; . . .or (c) an analytic report" (College of Education at Illinois, 2013, par. 1). In addition, Clark University, Harvard Graduate School of Arts and Sciences, Louisiana State University, and the University of Alabama support the three-article dissertation format used by the University of Idaho PPD program (University of Idaho, 2011; Willis et al., 2010, p. 47).

The three-article dissertation format incorporates five elements in the dissertation, including an introduction that explains the three articles contained in the dissertation, followed by three publishable articles, and a conclusion that ties together findings from the articles and proposes both solutions to problems of practice and implications for future scholarship (Willis et al., 2010, p. 46). Overall, the purpose of the PPD dissertation is to prepare leaders who have the requisite skills to identify an authentic, researchable issue or problem related to their practice and to conduct disciplined inquiry that can identify promising solutions (T. Brown-Ferrigno, personal communication, September 5, 2012).

Table 1.1 summarizes the similarities and differences between the three types of dissertations.

Table 1.1

Types of Dissertations

Chapter	Traditional	3 Article (TAD)	PPD
1	Introduction	Introduction	Problem
2	Literature Review	Article 1	Context of Research
3	Methodology	Article 2	Action Research
4	Results	Article 3	Results
5	Discussion	Conclusion	Reflective Analysis

Finally, it must be noted, "PPD dissertations tend to be done collaboratively rather than by a lone researcher, because most of the significant issues of professional practice call for collaboration" (Willis et al., 2010, p. 39). The research in this study was cohort-based. The first article presented in this dissertation was collaborative, and as such, some overlap between articles is expected. Individual articles may share the same theoretical framework, methodologies, or method of gathering data (Willis et al., 2010, p. 25). In this dissertation, each researcher's individual study, as well as the group study, focused on a current problem with technology in education. The research informs online learning at private institutions such as Brigham Young University-Idaho (BYU-I), a private university located in the northwestern United States.

While traditional research seeks to generalize findings, action research focuses on specific situations and localized solutions (Stringer, 2007). Therefore, the foci of the researchers' various studies identified problems of practice that were worthy, marketable, and original (Willis et al., 2010). Participatory Action Research (PAR) is suited to developing and implementing solutions to local problems, and fulfills the purpose of the PPD program in its objective of practice-driven research. In a similar manner, some of the

individual qualitative studies utilized the Rapid Assessment Process (RAP) and used cohort members as co-researchers and analysts (Beebe, 2001). The PPD's focus on work-related learning and employment-driven skills were inherent in both the group and individual studies.

The research team for the group study included Jeffrey Hochstrasser, an instructor at BYU-I; Heather Carter, an online instructor and administrator at BYU-I; Rachel Huber, a BYU-I online instructor and former online student; and Brett Yadon, an online administrator at BYU-I. The cohort focused their research on current technology issues in the classroom and organization. The study's stakeholders included both online students and students in traditional face-to-face classrooms at BYU-I, online and campus faculty at the same university, BYU-I online learning departments and administration, online servant leadership programs, and the University of Idaho.

In addition to the collaborative research, each member of the research team conducted individual research to complete two of the three articles for the three-article dissertation. The individual studies employed various types of research, and all focused on understanding and improving online learning or technology used in higher education.

The individual portion of this dissertation includes a multiphase, mixed-method study (Chapter Three). A phenomenological approach was first taken to discover how undergraduate students are using mobile devices for educational purposes and what resources are accessed for needed information. In addition the potential of instructor generated, text message reminders sent to students for overall course improvement was also studied.

Chapter Four consists of a concept paper written for professional educators and more specifically for colleagues of the researcher. It includes a summary of the research studies and recommendations for implementing mobile technology strategies resulting from that study. Chapter Five is the concluding discussion of the research performed, the results from the studies and recommendations for future research.

References

Beebe, J. (2001). *Rapid assessment process: An introduction*. Walnut Creek, CA: AltaMira.

    College of Education at Illinois. (2013). Dissertation. In *Graduate Student Handbook*

    (Ed.D. Degree Requirements). Retrieved October 1, 2013 from

    http://education.illinois.edu/students/grad_handbook/edd

Green, H., & Powell, S. (2005). *Doctoral study in contemporary higher education*.

    Maidenhead, England: The Society for Research into Higher Education/Open

    University Press/McGraw-Hill Education.

La Belle, T. (2004, April). *Credential inflation and the professional doctorate in California*

    higher education. Berkeley, CA: Center for Studies in Higher Education, University

    of California Berkeley. Retrieved from

    http://cshe.berkeley.edu/publications/publications.php?id=75

Shulman, L., Golde, C., Bueschel, A., & Garabedian, K. (2006). Reclaiming education's

    doctorates: A critique and a proposal. *Educational Researcher*, *35*(3), 25-32.

Stringer, E. T. (2007). *Action Research (3rd ed.)*. Thousand Oaks: Sage.

University of Idaho. (2011). *Professional Practices Doctorate (Ed.D.): About Professional*

    Practices Doctorate. Retrieved from

    http://www.uidaho.edu/ed/leadershipcounseling/professionalpracticesdoctorate

Willis, J., Inman, D., & Valenti, R. (2010). *Completing a professional practice dissertation*.

    Charlotte: Information Age Publishing, Inc.

CHAPTER 2: SELF-EFFICACY IN ONLINE TEACHING:

HOW INSTRUCTOR CONFIDENCE AFFECTS STUDENT SATISFACTION

(Heather Carter, Jeffrey Hochstrasser, Rachel Huber, Brett Yadon)

Abstract

Online learning is the most rapidly growing area in higher education. This study explored the correlation between instructor self-efficacy (N = 265) and student satisfaction (N = 9179) with online courses. Instructor self-efficacy in online teaching was examined in terms of the instructors' confidence in online teaching pedagogy, use of technology, and subject matter expertise (as measured by the Online Instructor Self-efficacy Survey). Student satisfaction levels with the course, instructor, and perceived learning were measured by end-of-semester student evaluations. Statistical analysis revealed that instructors with over three semesters of teaching experience at BYU-I were found to have significantly higher self-efficacy but lower student satisfaction levels than instructors who had been teaching less than three semesters. In addition, a significant difference was found in terms of student satisfaction and class standing, with more advanced students being less satisfied with their instructors, their perceived learning, and their online course. Analysis of data from pre-college (Pathway) students revealed significant differences from the traditional students in this study. A slight negative correlation was found between instructor self-efficacy in technological online instruction and student satisfaction with non-matriculated (Pathway) students. This indicated the more confident an instructor was in their technological skills, the lower the student satisfaction was with the online course for the non-matriculated students. Suggestions for future research were discussed.

Keywords: higher education, online learning, self-efficacy, student satisfaction, technology

Online learning is an increasing part of the landscape of higher education in the United States. Enrollments in online courses have increased steadily since 2005 (Wasilik & Bolliger, 2009). A recent survey indicated 50% of college presidents believe that ten years from now a majority of students will be taking classes online (Parker, Lenhart, & Moore, 2011). In 2012, almost seven million students in the United States, or 32% of all higher education students, were taking courses online (Allen & Seaman, 2013).

Despite this high rate of growth in online enrollments, in 2012 over two-thirds of faculty members at American universities reported that they did not accept the value and legitimacy of online learning (Allen & Seaman, 2013). This same rate of acceptance, or non-acceptance, has been relatively consistent for the last ten years, and shows no sign of changing (Allen & Seaman, 2011, 2013). Even acceptance of online education by students is in question. In a study consisting of counseling and school psychology graduate students found a significant preference toward face-to-face teaching when compared with hybrid and strictly online courses (Taylor & Huang, 2010). These findings could be explained by personality types that prefer face-to-face learning over the online environment (Harrington & Loffredo, 2010). Students who preferred online classes based their preferences on convenience, enjoyment of computer technology, and interest in innovation (Harrington & Loffredo, 2010).

Online programs are less expensive and offer more flexibility for students. Even without considering student preferences, online courses are being offered at a rate that exceeds the growth of traditional courses in higher education (Allen & Seaman, 2013; Harrington & Loffredo, 2010). Increasing enrollments, accompanied by a consistent

questioning of the value of online education, justify a need to examine ways the quality of

the online student experience might be improved while maintaining escalating growth rates.

Problem Statement

Brigham Young University-Idaho (BYU-I), located in the northwestern United

States, is among those institutions of higher education experiencing exponential growth in

online learning (see Figure 2.1). In Fall Semester 2009, when BYU-I first developed a

separate online program, 67 remote adjunct instructors were hired to teach 35 different

online courses. By Fall Semester 2013, four years later, the number of online instructors had

increased by 683% (Routson, 2013). The university hired 525 instructors to teach 142

different online courses, spread across 732 sections. In Fall 2013, on the first day of

registration, the number of enrollments reached 30,742 (Routson, 2013).
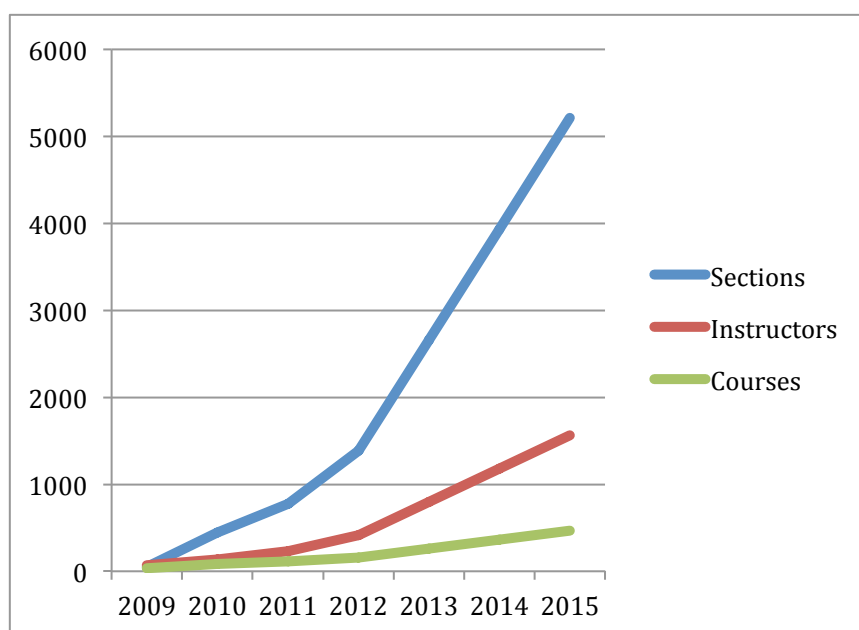
Figure 2.1. Current and projected growth in Online Learning at BYU-Idaho.

From Fall 2013 to Winter 2014, the online program increased its number of

instructors yet again, by 29%. Since the online courses at BYU-I are staffed almost

exclusively by remote instructors, escalating online enrollments will mean more remote adjunct faculty to hire, train, and develop each year.

The rapid growth in online students and online instructors necessitates increased training. Not only must new instructors be trained on the technicalities of teaching, they must also learn a new online teaching pedagogy. The growth has also forced the online department to continually adapt their management procedures as data is gathered comparing online student satisfaction levels to student satisfaction in the same on-campus courses. The university faces challenges of improving the quality of online education and increasing student satisfaction ratings, while supporting high levels of accelerated growth.

Purpose Statement

This study explored the correlation between instructor self-efficacy in teaching online and student satisfaction levels from end-of-semester evaluations. Specifically, online teaching self-efficacy was examined in terms of instructors' confidence in online teaching pedagogy, use of technology, and knowledge of the subject matter. This study identified correlations between self-efficacy and student satisfaction in order to enable the university to improve satisfaction, develop better hiring strategies, and improve instructor training and professional development.

Significance of the Study

BYU-Idaho has three main imperatives from Kim B. Clark, its current President: lower the cost of education, serve more students, and improve students' learning experience (Clark, 2005). The university's online program has helped fulfill two of these missions, by lowering the cost of education and serving more students than ever before. Still, the university continues to explore ways to improve student satisfaction, especially in the online

learning program. Examining instructor self-efficacy as it correlates with student satisfaction is significant because of the potential impact an instructor's self-efficacy may have on students' experience and satisfaction (Bandura, 2005).

In addition, this study may provide additional guidelines for hiring and training online faculty members who, in the end, will help improve the online learning experience for students. Finally, students' experience with the online platform at this particular university can be generalized and found applicable to other online institutions throughout the United States.

Literature Review

Students are considered the main stakeholders in the educational process. One way to measure quality in online education is to look at student satisfaction with courses and instructors (Astin, 1993; Donald & Denison, 1996; Katiliute & Kazlauskiene, 2010; Schuh & Upcraft, 2002). Self-efficacy theory has its roots in social cognitive theory, and is built on a constructivist framework, which has implications for online learning. This review of the literature examined research concerning domains of online instructor self-efficacy and how they relate to student experiences in online learning.

Student Satisfaction

Student satisfaction in higher education is often used as a key indicator of institutional effectiveness and success (Donald & Denison, 1996; Katiliute & Kazlauskiene, 2010; Schuh & Upcraft, 2002). Satisfaction has been found to have a larger impact on grades than grades have on student satisfaction (Bean & Bradley, 1986). In addition, student satisfaction has been related to increased retention and enrollment, along with improved academic performance (Beil & Shope, 1990; Beltyukova & Fox, 2002; Tinto, 1993).

One of the factors linked to increased student satisfaction with online learning is interaction with instructors. Students connect to instructors in online courses through the presence of quality, plentiful interaction in the use of technology, online-specific pedagogy, and course competency. In general, the more frequent and instructive the interaction with faculty, the more satisfied students are with their experience in online classes (Ali & Ahmad, 2011; Astin, 1993; Jackson, Jones, & Rodriguez, 2010; Kuh, 2003; NSSE, 2005).

A quantitative study of 917 undergraduate students identified several predictors of student satisfaction in online learning (Sahin, 2007). Personal relevance was found to be the strongest predictor of student satisfaction. This involves linking course content with personal experiences of the students and creating courses that are learner-centered, and involve students' out-of-school knowledge and skills. Instructor support was identified as the second most significant predictor of student satisfaction in the online learning environment. This includes timely help, useful feedback, and easy communication. Active learning, which allowed students to involve their own learning strategies, problems, and solutions to the course, was the third strongest variable in predicting students' satisfaction. Addressing these predictors of student satisfaction when developing online courses increases "student motivation, participation, and ultimately, learning" (Sahin, 2007, p. 6).

Research findings are mixed concerning the relationship between gender and student satisfaction, and which gender tends to be more satisfied with the online educational experience. Using a survey that employed a data set of 1185 students from 27 online courses, one study found female students significantly more positive about e-learning than male students (Gonzalez-Gomez, Guardiola, Rodriguez, & Alonso, 2012). This contradicted previous studies, which revealed greater e-learning valuation and satisfaction and a more

positive perception of online learning among male students (Lu & Chiou, 2010; Ong & Lai, 2006). Still other studies indicate no gender effect on attitudes towards online learning (Cuadrado-Garcia, Ruiz-Molina, & Montoro-Pons, 2010; Hung, Chou, Chen, & Own, 2010). All of these studies used similar quantitative data-gathering methodologies, involving participant surveys gathered from a significant number of university students. Ong and Lai (2006) is the exception, which utilized participants employed at six international companies that implement their own e-learning programs. Though the results from these studies show mixed results concerning gender as a variable influencing student satisfaction with online learning, one may still conclude that gender is a variable that should continue to be monitored in future research.

Theoretical Framework

Self-Efficacy Theory is a component of Social Cognitive Theory, which is founded in Constructivism. Having at its foundation the concept of constructing knowledge through experience and social interaction, Constructivism provides a framework for understanding, predicting, and changing human behavior (Crotty, 1998; Paul, 2005). As it relates to education:

> Constructivist principles…help designers and teachers create learner-centered, collaborative environments that support reflective and experimental processes. Students and instructors can then build meaning, understanding, and relevant practice together and go far beyond the mere movement of information from instructors' minds to students' notebooks. (Jonassen, Davidson, Collins, Campbell, & Haag, 1995, p.1)

Since online learning is also founded on the principle of constructivism, many research studies of online instruction are associated with constructivist theory (Jonassen et al., 1995; LeNoue, Hall, & Eighmy, 2011).

Self-efficacy Theory

Self-efficacy theory describes an individual's belief about his or her perceived ability to accomplish certain tasks and/or succeed in a particular situation (Bandura, 2005). It can also be viewed as an individual's self-judgment of personal capabilities, and is often required to begin and successfully complete various tasks at a certain level (Shazadi, Khatoon, Aziz, & Hassan, 2011). For example, an individual with high self-efficacy in angling would feel comfortable handling a fishing rod and confident about his or her ability to land a catch during a fishing trip. However, when fishing in a new situation or with different equipment, this same individual may have lower self-efficacy, especially if initial attempts were not successful. Likewise, teacher efficacy is context-specific and a teacher's level of self-efficacy may change from one class period to another (Goddard et al., 2000). Therefore, a teacher may have high self-efficacy teaching geography in a traditional classroom setting. However, when teaching a different subject, or in an online environment or with new technology, the teacher's self-efficacy may be lower.

Self-efficacy and outcome expectations can be described in terms of their relationship with motivation to learn (Bandura, 1977). Individuals will engage in learning if they believe in their ability to learn (efficacy expectations) and they also believe their efforts at learning will be rewarded (outcome expectations). Figure 2.2 depicts Bandura's theory of self-efficacy.
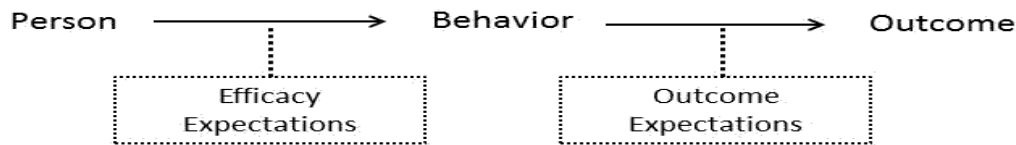
Figure 2.2. Efficacy and Outcome Expectations (Bandura, 1997, p. 193).

Self-efficacy theory has implications for andragogy, the theory of adult learning developed by Malcolm Knowles. Some of the elements influencing adult learners are their tendency to draw from past experiences, self-directed learning, internal motivation, and a readiness to learn (Chan, 2010). Adults tend to learn what they believe they need to know, and to learn for immediate action rather than for future use (Chan, 2010; Knowles, Holton, & Swanson, 2012).

Domains of Online Teacher Self-Efficacy

Goddard, Hoy, and Hoy (2000) suggested that one way for school administrators to improve student achievement "is by working to raise the collective efficacy beliefs of their faculty" (p. 502). They concluded, "it is not enough to hire and retain the brightest teachers—they must also believe they can successfully meet the challenges of the task at hand" (Goddard et al., 2000, p. 503). High teacher self-efficacy has been found to correlate with increased student learning, student test scores, student motivation, and student achievement (Goddard et al., 2000; Henson, 2001). These findings are consistent across a broad range of demographics, but are limited to the face-to-face classroom. This review of the literature focused on research in terms of self-efficacy in online learning pedagogical skills, technological skills (Hung & Blomeyer, 2012), and course subject matter knowledge (Tschannen-Moran & Woolfolk-Hoy, 2001; Wright, 2010). These three domains were selected for two reasons. First, they correlated to the areas that have been shown to influence

student satisfaction (Jackson et al., 2010). Secondly, the relationship between content, pedagogy, and technology had been examined for several years.

The knowledge base teachers need to effectively teach with technology has previously been conceptualized in terms of Technological Pedagogical Content Knowledge (TPACK) (Koehler & Mishra, 2005; Schmidt et al., 2009). According to this framework, technology knowledge refers to knowledge about various technologies such as the Internet, interactive whiteboards, and software programs. Content knowledge refers to knowledge about course subject matter. Pedagogical knowledge is knowledge of the "methods and processes of teaching," including assessment, student learning, and classroom management (Schmidt et al., 2009). It is important to note that while TPACK examines knowledge in these three domains, it does not measure self-efficacy.

Research has found that instructors' self-efficacy in online teaching influences and is influenced by their confidence in online pedagogies, technology, and subject matter. Self-efficacy is context-specific, and may be high in one area and low in another (Bandura, 2005; Tschannen-Moran & Woolfolk-Hoy, 2001). For example, an online learning instructor may have high self-efficacy in terms of skills with technology and in terms of subject matter, but low self-efficacy in terms of online teaching pedagogy.

The importance for teachers to develop unique pedagogical knowledge and skills to teach in the online environment has been established in primary and secondary education (Deubal, 2008), as well as in higher education (Baran, Correia, & Thompson, 2013). A correlation has also been found between high teacher technological self-efficacy and years of experience in teaching online, as well as pedagogical training in the use of technology (Lee & Tsai, 2010). In relation to content, a teacher's self-efficacy is neither consistent

across activities nor across subject matter (Bandura, 1997; Tschannen-Moran & Woolfolk-Hoy, 2001).

Figure 2.3 depicts the relationship of self-efficacy with the three domains of the online instructor (Carter, Hochstrasser, Huber, & Yadon, 2013). It should be noted that although Online Instruction Pedagogy is found at the top of the circle, this does not suggest that one aspect of self-efficacy is more important than another.
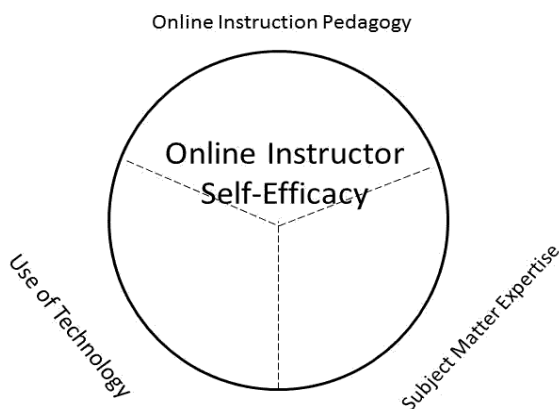
Figure 2.3. Constructs of Online Instructor Self-Efficacy.

If instructors believe they have subject matter expertise, as well as competence in the use of technology and in online instruction pedagogy, they will provide a better learning environment for students to build their understanding and knowledge of the course material. Research indicates that when this occurs, the results are reflected in increased student satisfaction (Sahin, 2007).

Research Question and Hypotheses

This descriptive study explored the relationship between instructor self-efficacy and student satisfaction for online courses using a quantitative analysis of survey responses.

Research Question: What is the relationship between self-efficacy in online teaching and the level of student satisfaction with their online class? Because self-efficacy is always described as being specific to a certain area, this study examined which aspects of instructor self-efficacy are most significant in impacting online student satisfaction—technology, pedagogy, or content.

H_1 – There is a correlation between instructor self-efficacy *overall* and student satisfaction.

H_2 – There is a correlation between instructor self-efficacy in their *use of technology* and student satisfaction.

H_3 – There is a correlation between instructor self-efficacy in their *pedagogical skill* and student satisfaction.

H_4 – There is a correlation between instructor self-efficacy in their *subject matter expertise* and student satisfaction.

Methodology

This was a descriptive study, measuring the correlation of instructor self-efficacy with student satisfaction. This study was conducted with remote instructors currently teaching online for BYU-I. Demographic data in terms of age, gender and teaching experience and subjects taught was gathered from the Demographic Information Form, which each survey participant was asked to complete (see Appendix A for the complete form). In addition, this study used two survey instruments: one for instructors measuring online instructor self-efficacy, entitled Online Instructor Self-efficacy Survey (see Appendix B); and the other for students indicating satisfaction with course and instructor, as measured

by the BYU-Idaho Course Evaluation administered at the end of each semester (see

Appendix C).

Research was conducted after approval of the Institutional Review Board (IRB) from

both BYU-I and the University of Idaho. IRB approvals can be found in Appendix D and E.

Researchers were trained in and followed the general ethical principles and code of conduct

of the American Psychological Foundation (APA, 2010, p. 5-7) and completed certification

from the National Institutes of Health (NIH). The nature of the surveys did not require

identifying students or instructors individually. The data was analyzed in aggregate. To help

protect the identity of instructors and enhance their comfort with taking the survey, all

instructors were assigned a participant number by the researchers. This participant number

was used to link instructors to the course satisfaction results. The researchers did not share

individual self-efficacy scores with BYU-I; rather, all data was presented in aggregate.

Assessments

The Online Instructor Self-efficacy Survey (OISS) was adapted by the researchers,

using as their model the Online Educator Self-Efficacy Scale (Hung & Blomeyer, 2012), the

Online Technologies Self-Efficacy Scale (Miltiadou & Yu, 2000), Lee's Self-efficacy

Instrument (Lee, 2003), and the Teacher Efficacy Construct (Tschannen-Moran &

Woolfolk-Hoy, 2001). The OISS contained 38 questions designed to assess the self-efficacy

of online teachers' pedagogical skills, technological skills, and subject matter expertise. It

used a semantic differential scale, ranging from 1 (very confident) to 4 (not confident at all).

It also included two open-ended questions for each of the three categories, allowing

instructors to elaborate on what added to or diminished their confidence. See Appendix B

for the complete instrument. It should be noted that while elements of the OISS were

identified in TPACK, the OISS was not designed to mirror TPACK. The focus of the OISS was to assess self-efficacy, and therefore the questions in the survey separate application of technology skills from other pedagogical techniques, whereas in the TPACK, all pedagogy is in one category. OISS design allowed researchers to combine understanding and application of technology into one category, and separate application of technological knowledge from other elements of pedagogy.

The second assessment instrument used was the BYU-Idaho Course Evaluation, administered to students at the end of each semester for all courses at BYU-I. This survey contained 43 questions about each student's performance and expectations in the class, as well as perceptions of the course and instructor. It used a five point rating scale about student satisfaction for the course in relation to other college courses the student had taken. The course evaluation used in this study has been administered at BYU-Idaho since 2008.

Data Collection

Researchers used the Qualtrics survey software to collect data. Prior to this research, data collection was in place for the student satisfaction measures, since each semester BYU-I administers a student survey for every course. The two quality measures of course and instructor ratings were already part of the survey. The correlation for these two quality measures was calculated for each self-efficacy question and for the three general categories of technological skill, knowledge of subject matter, and skill in online teaching pedagogy, as well as overall teaching self-efficacy.

Data Analysis

A Spearman rho correlation was conducted for all hypotheses. Analysis looked for a correlation between student satisfaction and instructor self-efficacy in terms of technological

skill, pedagogical skill, subject matter knowledge, and overall online teaching self-efficacy.

It must be noted that 44% of the instructors taught classes in a Pathway program, which is a

year-long program of general study skills and academic start courses designed to help non-

matriculated students become college-ready. Because these are not traditional courses or

traditional students, an analysis was conducted both with and without their data.

Phase I: Instrument Validation

The study had two phases. The goal of the first phase was to improve the content

validity of the OISS. Ten Caucasian professionals (male = 8; female = 2) between the ages

of 28 and 43 were asked to review and critique the OISS. Eight (80%) agreed to critique the

OISS. Two of the professional reviewers held Ph.Ds in Instructional Design and six held

Masters Degrees. All were either directors in research and development (n = 3) or managers

of online instructors at BYU-I (n = 5). All reviewers were either from BYU-Idaho's

Research and Development team or Online Course Improvement Department, and routinely

develop and administer BYU-I assessments. In addition, they were all stakeholders in this

research project.

The eight participants were asked for specific feedback on improving the instrument

from a research and development perspective, as well as from the viewpoint of stakeholders.

Four participants gave detailed and comprehensive feedback through email, and two

participants shared their feedback in person. The other two participants said they wouldn't

change anything.

As a result of stakeholder feedback, the two open-ended questions that were at the

end of each category of the OISS were reduced to just one open-ended question relating to

the specific topic of the section. In addition, the demographic survey was changed to require

instructors to select one primary course and teaching area, rather than allowing them to check multiple boxes. The survey then reminded instructors of their initial teaching area choice as they began the subject matter area of the survey. The revised survey also requested instructors to reflect on their own confidence levels, regardless of course design, class size, and other variable factors. Other minor changes to wording, punctuation, and grammar improved overall clarity.

Phase II: Study

Using the revised survey instrument, the final study was conducted in Fall 2013. Due to the relative ease of surveying all members of the populations, the survey was sent to all online instructors and all students in online courses. Therefore, all 486 instructors teaching online at BYU-I in the 2013 Fall Semester were invited to participate in the study by completing the OISS. The student population included all students enrolled in online courses at BYU-I during the same semester (n = 18,336). Instructors were invited to respond to the OISS prior to students completing the end-of-semester surveys. Because the data collection procedures were already in place for students, researchers were able to obtain survey results for all online students who completed the end-of-semester survey.

<div align="center">

Results

</div>

Participants

Instructors. All remote adjunct instructors (N = 486) from the Fall 2013 semester were invited to participate in the OISS, and 265 instructors (54.5%) completed the survey. Of those responding, 50.6% were female and 49.4% were male. The majority of instructors were Caucasian (54%), with 2.7% identifying themselves as Hispanic, 1.4% Asian and .02% African American and the same percentage (.02%) identified as East Indian.

Because the population of Pathway students was markedly different than traditional college students, the analysis was split into three datasets: one including all responses (All Instructors), another with only Pathway students (Pathway), and the last with non-Pathway students (Non-Pathway). Pathway courses were separate from other online courses at BYU-Idaho and therefore the datasets were easily categorized. The majority of instructors (n = 168) taught non-Pathway courses (63.4%), followed by 117 instructors (44.2%) who taught Pathway courses. Some overlap existed, since 20 instructors taught both Pathway and non-Pathway courses. Female respondents (n = 134; 50.6%) were only slightly higher than male respondents (n = 131; 49.4%).

When asked about experience teaching online at BYU-Idaho, 65 were in their first semester teaching (24.5%), 23 had previously taught one to two semesters (8.7%), 84 had three to five semester's experience (31.7%), and 93 had over five semesters of online experience at BYU-Idaho (35.1%). Seventy-two instructors (27.2%) taught online for other universities. Of those, 13.9% had one or two semesters of experience teaching online at other universities, ten (13.9%) had three to five semesters of experience, and the remaining 72.2% had over five semesters (n = 52) of experience teaching online at other universities.

Students. Survey responses were collected from 18,336 online students. However, since only 54.5% of instructors responded to the OISS, only 9,179 student responses could be utilized in this analysis. To clarify, only the responses from students who had classes from instructors responding to the OISS were used to test the hypotheses presented in this study. Females accounted for 66.5% of the population (n = 6,102), and 33.5% were male (n = 3,077). The majority of students were Caucasian (89.5%) with 6.02% identifying themselves as Hispanic, 1.4% Asian and 3.1% identifying themselves as "other."

Freshmen constituted 16.3% of the student participants (n = 1,492); 17.8% of the students were sophomores (n = 1,637); 15.5% were juniors (n = 1,419); and 17.3% were seniors (n = 1,592). The remaining third of the students, 33.1%, were not matriculated into BYU-Idaho (n = 3,039). These were students enrolled in the Pathway program.

Students who completed the survey were taking courses in a variety of areas, with the largest category of students (42.4%) taking General Education courses (n = 3,890). Students who were taking courses in their major accounted for 30.2% of the students (n = 2,774), while 4.4% of the students were enrolled in online courses for their minor (n = 403), and 5.6% of the students completed the survey as part of an elective online course (n = 510). The remaining students either categorized their course as "other" (16.2%; n = 1,490) or did not identify a category for their course (1.2%; n = 112).

Measurements

Student Evaluations. Annual student evaluations asked questions about student performance (including their level of commitment and expected grade), instructor, course, and course core values. The evaluation also asked for students' perceived learning and satisfaction in comparison to other courses they had taken, along with overall ratings of the course and instructor. Students were asked to rate their level of satisfaction in the course compared to other courses completed on a scale from -2 (meaning much less satisfied as compared to other courses) to +2 (meaning a great deal more satisfied as compared to other courses). When students felt their satisfaction was the same as other college courses they had taken, it was rated as zero.

Student Satisfaction. The majority of students (97.2%) rated their level of satisfaction in the course compared to other courses (n = 8,918), with a mean of 0.97 (SD = 1.13);

median of one; and a mode of two, which is a positive response. However, it must be noted that a chi square test of independence between students' year in school and satisfaction with their online course in comparison to other courses they had taken was significant, $X^2(16, N = 17931) = 2493.513, p < .001$, Cramer's V = .186. Freshmen responded in the neutral range (-1 to 1); the sophomores and juniors responded more negatively (-2 to 1); and seniors were the most negative (responding -2 to 0), meaning at the most negative response they were "a great deal less" satisfied with their online courses than other college courses they had taken. Significantly more (.01 level) juniors and seniors than one might expect by chance responded with a -2 rating (a great deal less satisfied). In addition, significantly fewer (.01 level) students than one might expect by chance, rated their learning as a 2 (a great deal more satisfied). This was true for freshmen, sophomores, juniors, and seniors. This means that fewer freshmen, sophomores, juniors, and seniors, (than one might expect by chance) were a great deal more satisfied with their online course as compared to other courses.

The opposite was true for the Pathway students. Significantly fewer (.01 level) Pathway students than one might expect by chance rated their satisfaction with the online course as compared to other courses between -2 to 1 (-2 = 0.2%; -1 = 0.9%; 0 = 3.0%; 1 = 6.1%). In addition, significantly more Pathway students than one would expect by chance, indicated they were a great deal more satisfied with their online course compared to other courses (2) they had taken (21.9%). Overall, Pathway students were more satisfied with their online courses than traditional university students.

Perceived learning. Students were also asked how much they had learned in the course compared to other courses completed. They were given a scale from -2 (much less satisfied as compared to other courses) to +2 (a great deal more satisfied as compared to

other courses). When students compared how much they learned in relation to other college courses they had taken, 98.1% responded (n = 9,009). The mean was 1.07 (SD = 1.04); median was one; and mode was two. This represents an overall positive response.

With respect to students' perceived learning, a chi square test of independence between students' year in school and perceived learning compared to other courses was significant, $X^2(16, N = 18120) = 1859.416, p < .001$, Cramer's V = .160. Freshman and sophomore students responded in the neutral range (-1 to 1), meaning most felt they learned as much in their online course as they had learned in other university courses they had taken. Juniors responded more negatively (-2 to 1), indicating that they learned anywhere from a "great deal less" to only a little more in their online course than in other classes they had taken. Finally, seniors responded the most negatively (responding -2 to 0). The most positive rating from any senior (a zero score) indicated that he or she learned about the same in his or her online course as in other courses he or she had taken. Significantly more juniors and seniors (.01 level) than one might expect by chance responded with a -2 rating, meaning they felt they had learned 'a great deal less' in their online course than from their other courses.

Data indicated the more schooling students received, the less learning they felt they acquired from their online courses compared to others they had taken. In addition, significantly fewer students (.01 level) than one might expect by chance rated their learning as a two. This was true for freshmen, sophomores, juniors, and seniors. In other words, no class of students indicated that they had learned 'a great deal more' in their online class than in other classes they had taken.

Once again, the opposite was true for Pathway students. Significantly fewer Pathway students (.01 level) than one might expect by chance rated their perceived learning compared to other courses between -2 to 1 (-2 = 0.4%; -1 = 0.6%; 0 = 3.2%; 1 = 7.0%). In addition, significantly more Pathway students than one would expect by chance indicated they were a great deal more satisfied with the amount of information learned in their online course compared to other courses (2) they had taken (21%). Overall, Pathway students felt they learned more in their online courses than traditional university students.

Course rating. Students were asked to rate their instructor and how much they believed they had learned from the course. They were given a seven-point scale ranging from very poor (1) to exceptional (7). Ninety-eight percent of the students (n = 8,994) rated their perception of how much they had learned in the online course, with a mean of 5.55 (SD = 1.43); median of six; and mode of seven. This represented a very positive response. Moreover, when students were asked to give their overall rating of their instructor using the same scale, the mean was 5.94 (SD = 1.27)—also a very strong rating, with 98.6% (n = 9,046) of students responding.

Online Instructor Self-efficacy Survey (OISS). The OISS measured the self-efficacy of online instructors in terms of online pedagogy, subject matter expertise, and technological skills (Carter et al., 2013). It used a semantic differential scale, ranging from 1 (very confident) to 4 (not confident at all). Ninety-five percent of the instructors (n = 251) completed the assessment. Inter-item reliability was measured by Cronbach's alpha and found to be high (.87).

Overall, instructors' self-efficacy (n = 251) as measured by the OISS ranged from 1.0 to 2.11, and had a mean of 1.34 (*sd* = .21), indicating confidence in their online teaching

ability. Instructors' self-efficacy in their pedagogical skills (n = 259) ranged from 1.0 to 2.58, with a mean of 1.57 (*sd* =.316). Though instructors were less confident in their ability with online teaching pedagogy, they still generally reported confidence. Instructors' self-efficacy in their technological skills (n = 259) ranged from 1.0 to 2.17 and had a mean of 1.195 (*sd* = .228), showing that instructors felt more confident about their technological skills in teaching online than with their online pedagogy. Finally, instructors' self-efficacy in the subject matter ranged from 1.0 to 2.38 with the mean score of 1.34 (*sd* = .33). The mean for subject matter self-efficacy was interestingly the same as instructor self-efficacy for online pedagogical skills. Taken altogether, these results show that remote instructors at the university felt confident about their online pedagogy, technological skills, knowledge of subject matter, and overall online teaching, with their highest self-efficacy in their technological skills, as rated by the OISS.

Experience and self-efficacy. With respect to self-efficacy and experience teaching online, a significant difference was found in instructors' self-efficacy depending on how long they had been teaching at BYU-Idaho. An ANOVA revealed that teachers who had taught for BYU-Idaho for over three semesters were significantly higher in self-efficacy for online pedagogy than teachers who were in their first semester teaching (as identified by the Games-Howell post hoc test), $F(3, 255) = 3.364$, $p = .019$, $eta^2 = .038$ (medium-small). This was also true for instructors' self-efficacy with online teaching technology, $F(3, 255) = 5.359$, $p = .001$, $eta^2 = .059$ (medium), and overall self-efficacy, $F(3, 247) = 6.052$, $p = .001$, $eta^2 = .073$ (medium). However, there was no significant difference in the instructors' self-efficacy of their subject matter knowledge with respect to the amount of time they had taught at BYU-Idaho, $F(3, 255) = 1.819$, $p = .144$, $eta^2 = .021$ (small). Analysis of the data

in Table 2.1 identified that experience teaching at BYU-Idaho increased instructors' self-efficacy with both online teaching technology and online pedagogy, but knowledge of subject matter was something instructors brought to their teaching with little influence from university experience or professional development programs.

Table 2.1

*ANOVA: OISS * Experience Teaching at BYUI*

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Pedagogy SE							
Between groups	.983	3	.328	3.364	.019	.038	Medium-small
Within groups	24.839	255	.097				
Total	25.822	258					
Technology SE							
Between groups	.797	3	.266	5.359	.001	.059	Medium
Within groups	12.643	255	.05				
Total	13.441	258					
Subject SE							
Between groups	.605	3	.202	1.819	.144	.021	Small
Within groups	28.2877	255	.111				
Total	28.892	258					
Overall SE							
Between groups	.745	3	.248	6.052	.001	.073	Medium
Within groups	10.13	247	.041				
Total	10.1874	250					

Analysis

H_1 – There is a correlation between instructor self-efficacy *overall* and student satisfaction.

H_2 – There is a correlation between instructor self-efficacy in their *use of technology* and student satisfaction.

H_3 – There is a correlation between instructor self-efficacy in their *pedagogical skill* and student satisfaction.

H_4 – There is a correlation between instructor self-efficacy in their *subject matter expertise* and student satisfaction.

A Spearman rho correlation was conducted for all four hypotheses to identify if there was a correlation between instructor self-efficacy in online instruction and student satisfaction in their online courses. The effect size for correlational studies most commonly used is the correlation coefficient itself (Kotrlik & Williams, 2003). Hopkins (1997) suggests using the following criteria to interpret the correlation coefficients: less than .10 as trivial, .10 to .30 as small, .30 to .50 as moderate, .50 to .70 as large, and .70 as very large. See Table 2.2 for complete statistical analysis of the correlations.

Table 2.2

Spearman Rho Correlation of Self-efficacy with Student Satisfaction

	Pedagogy		Technology		Subject		Overall	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*
All Students	0.021	.740	0.130	.035	0.092	.137	0.085	.167
Pathway	0.041	.663	0.185	.046	0.055	.558	0.110	.239
Non-Pathway	-0.128	.099	0.056	.470	-0.084	.277	-0.080	.305

A significant correlation was found (All Students: $p = .035$; Pathway: $p = .046$) between high instructor self-efficacy with technology and decreased student satisfaction with the class. This indicated the more confident an instructor was in their technological skills, the lower the student satisfaction was with the course. These findings were significant, primarily for the Pathway student population. However, it must be noted that the effect size was small. The correlation was so slight that any relationship between the two data sets should be more rigorously studied before drawing any conclusions or recommending action.

Additional Analysis

In addition to the original hypotheses examined in this study, data was also available to run correlations between instructors' self-efficacy and students' perceived learning, along with an overall rating of the instructor and course. With respect to students' rating of the course, the only significant correlation ($p = .02$) was between the Pathway students and the instructors' self-efficacy in technology. Pathway students rated courses where the instructor had high self-efficacy with technology lower than those where the instructor had a lower self-efficacy with technology. However, it must be noted that the effect size shown was small ($r = .216$). The correlation was so slight that any relationship between the two data sets should be more rigorously studied before drawing any conclusions or recommending action. Complete statistical analysis can be found in Table 2.3.

Table 2.3

Spearman Rho Correlation of Self-efficacy with Course Rating

	Pedagogy		Technology		Subject		Overall	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*
All Students	-0.013	.834	0.115	.061	0.046	.454	0.041	.511
Pathway	-0.019	.841	0.216	.020	0.007	.944	0.063	.502
Non-Pathway	-0.133	.086	0.011	.892	-0.111	.152	-0.125	.107

No significant correlation was found between instructors' self–efficacy in online instruction and students' rating of the instructor. See Table 2.4 for the complete statistical analysis.

Table 2.4

Spearman Rho Correlation of Self-efficacy with Instructor Rating

	Pedagogy		Technology		Subject		Overall	
	r	p	r	p	r	p	r	p
All Students	0.002	.980	0.072	.245	0.107	.084	0.022	.725
Pathway	-0.048	.608	0.146	.116	0.071	.445	0.012	.901
Non-Pathway	-0.076	.325	-0.022	.774	0.006	.943	-0.086	.270

In analyzing instructors' self-efficacy and students' perception of how much they
learned compared to other courses, the only significant correlation found ($p = .021$) was
between all students in respects to the instructors' self-efficacy with technology. The more
confident the instructor felt with his or her technological skills, the less the students
perceived they learned from the course compared with other courses. Again, the correlation
was so slight ($r = .141$) that any relationship between the two data sets should be more
rigorously studied before drawing any conclusions or recommending action. See Table 2.5
for complete statistical analysis.

Table 2.5

Spearman Rho Correlation of Self-efficacy with Student Perceived Learning

	Pedagogy		Technology		Subject		Overall	
	r	p	r	p	r	p	r	p
All Students	-0.010	.871	0.141	.021	0.076	.218	0.072	.241
Pathway	-0.047	.614	0.169	.069	0.025	.786	0.043	.648
Non-Pathway	-0.135	.081	0.090	.248	-0.113	.146	-0.071	.365

Satisfaction and instructor experience. Student evaluations were also analyzed
with respect to amount and location of instructors' teaching experience. Small but
significant correlations were found. The more experience an instructor had teaching for
BYU-Idaho, the less satisfied (Satisfaction) students were with his or her course as

compared to other courses they had taken ($p = .029$, $r = -.134$). Analysis revealed similar results for student perceived learning (Learning) and course rating (Course), with a significance of .009 and .027 respectively. In contrast, the rating of BYU-I experience to instructor rating (Instructor) did not reach a significant threshold ($p = .093$). Table 2.6 depicts the complete correlational results between teaching experience and the student evaluations. Again, the correlations were so slight that any relationship between the two data sets should be more rigorously studied before drawing any conclusions or recommending action.

Due to the significant relationship between BYU-I teaching experience and student satisfaction, additional analysis was conducted by separating instructors who had experience only at BYU-Idaho ($n = 206$) and those with experience at other universities ($n = 79$). Note that when these populations were combined, they were slightly higher than the 265 instructors used for self-efficacy analysis. This is because there were 20 instructors who completed the demographic information, who did not complete the remainder of the survey. Correlations were conducted for each of these groups, and a significant correlation was found between student satisfaction and semesters of experience for instructors with only BYU-Idaho experience ($p = .001$, $r = -.231$). The more experience teaching at BYU-I (only) the less satisfied the students were in the online course. In comparison, no significant correlation was found for those who had taught at other universities ($p = .192$, $r = .148$). As with course satisfaction, analysis revealed a significant correlation between teaching experience and student ratings for the instructor, course, and student perceived learning in courses taught by instructors whose only teaching experience was at BYU-Idaho. The same correlation with experience did not exist for those who had taught at other universities. The

more experience teaching at BYU-I (only), the lower students rated the online course and instructor. In addition, the more experience teaching at BYU-I (only), the less satisfied students were with the online course and how much they had learned compared to other courses. See Table 2.6 for complete statistical analysis.

Table 2.6

Teaching Experience Correlations to Student Evaluations

	All BYU-I Instructors		Other Universities		BYU-Idaho Only	
	r	*p*	*r*	*p*	*r*	*p*
Course	-0.161	.009	0.160	.159	-0.177	.011
Instructor	-0.104	.093	0.207	.067	-0.173	.013
Learning	-0.136	.027	0.132	.246	-0.262	<.001
Satisfaction	-0.134	.029	0.148	.192	-0.231	.001

Analysis of the descriptive data with respect to teaching experience reveals a slightly different story for student satisfaction in online courses compared to other courses taken.

All Instructors

A one-way analysis of variance test was calculated to identify if there was a significant difference between instructors (All BYU-I Instructors) based on the amount of teaching experience at BYU-I. The analysis found significance. The courses of instructors with over five semesters of experience at BYU-I were rated significantly lower than the courses of instructors teaching their first semester at BYU-I. The more teaching experience at BYU-I, the less satisfied the students were with the course in comparison to other courses they had taken, $F(3, 281) = 3.742$, $p = .012$, eta^2 = .038 (medium-small). Table 2.7 presents the source table from this analysis.

Table 2.7

ANOVA: Course Rating by Experience (all BYU-I Instructors)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	4.698	3	1.566	3.742	.012	.038	Medium-small
Within groups	117.581	281	.418				
Total	122.279	284					

In addition, instructors with over three semesters of teaching experience at BYU-I were rated significantly lower than instructors teaching their first semester at BYU-I. The more teaching experience at BYU-I, the lower the students rated the instructor, $F(3, 281) =$ 4.907, $p = .002$, eta$^2 = .05$ (medium). See Table 2.8 for the source table of this analysis.

Table 2.8

ANOVA: Student Instructor Ranking by Instructor Experience (all BYU-I Instructors)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	4.262	3	1.421	4.907	.002	.05	Medium-small
Within groups	81.342	281	.289				
Total	85.603	284					

With respect to how much the students perceived they learned compared to other courses taken, the same pattern was found. Students perceived learning significantly less from courses taught by instructors with over three semesters of experience at BYU-I than from courses taught by instructors teaching their first semester at BYU-I. The more teaching experience at BYU-I, the lower the students rated the amount they learned in the online class compared to other courses, $F(3, 281) = 7.128$, $p < .001$, eta$^2 = .071$ (medium-large). Table 2.9 presents the source table from this analysis.

Table 2.9

ANOVA: Student Perceived Learning by Instructor Experience (all BYU-I Instructors)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	4.338	3	1.446	7.182	<.001	.071	Medium-large
Within groups	56.578	281	.201				
Total	60.916	284					

Accordingly, students were significantly less satisfied with their online course compared to other courses from instructors with over three semesters of experience at BYU-I and rated the amount of their satisfaction (compared to other courses) from instructors teaching their first semester at BYU-I significantly higher. The more teaching experience at BYU-I, the lower the students rated their satisfaction as compared to other courses, $F(3, 281) = 6.445$, $p < .001$, eta$^2 = .064$ (medium). See Table 2.10 for the source table from this analysis.

Table 2.10

ANOVA: Student Course Satisfaction by Instructor Experience (all BYU-I Instructors)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	6.067	3	2.022	6.445	<.001	.064	Medium
Within groups	88.18	281	.314				
Total	94.247	284					

BYU-I Only Teaching Experience

An independent samples t-test was conducted to identify if there was a significant difference between course rating for instructors who only taught at BYU-I (only) and those with teaching experience at other universities and found significance. Effect size was measured by Cohen's d with the following analysis: small (.20); medium (.50); large (.80). Courses taught by instructors who had only taught at BYU-I were rated significantly higher than courses taught by instructors with experience at other universities, $t(283) = -2.103$, $p =$

.036, d = .28 (small). In addition, instructor ratings for those who had only taught at BYU-I were significantly higher than instructor ratings with experience at other universities, $t(283)$ = -1.911, p = .036, d = .26 (small).

With respect to how much the students perceived they learned compared to other courses taken, the same pattern was found. Students perceived they learned significantly less from courses taught by instructors with teaching experience at other universities. The students rated the amount they learned (compared to other courses) from instructors who had only taught at BYU-Idaho significantly higher than the instructors with experience at other universities, $t(283)$ = -2.643, p = .009, d = .359 (medium-small).

Accordingly, students were significantly less satisfied with their online course with instructors with teaching experience at other universities compared to other courses taught by instructors who had only taught at BYU-I. The students rated their satisfaction with the online class compared to other courses they had taken significantly higher when the teacher had taught only at BYU-I compared to instructors who had experience teaching at other colleges, $t(283)$ = -2.103, p = .036, d = .34 (medium-small).

Teaching Experience at Other Universities

A one-way analysis of variance test was calculated to identify if there was a significant difference in course ratings between courses taught by instructors who had teaching experience at other universities (Other Universities) based on the amount of teaching experience. There was no significant difference in how students rated courses taught by instructors with teaching experience at other institutions based on their level of experience, $F(2, 76)$ = 2.386, p = .099, eta^2 = .06 (medium). Table 2.11 presents the source table from this analysis.

Table 2.11

ANOVA: Course Rating by Instructor Experience (Other Universities)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	1.731	2	.865	2.386	.099	.06	Medium
Within groups	27.563	76	.363				
Total	29.294	78					

In contrast, instructors with over five semesters of experience teaching were rated

significantly higher than instructors with less than two semesters of teaching experience at

other universities. The more teaching experience at other universities, the higher the students

rated the instructor, $F(2, 76) = 3.598$, $p = .032$, eta$^2 = .087$ (medium). Table 2.12 presents

the source table from this analysis.

Table 2.12

ANOVA: Student Rating of Instructor by Instructor Experience (Other Universities)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	1.638	2	.819	3.598	.032	.087	Medium-large
Within groups	17.299	76	.228				
Total	18.937	78					

With respect to how much the students perceived they learned compared to other

courses taken, there was no significant difference in relation to the amount of experience the

instructor had teaching at other universities, $F(2, 76) = 2.216$, $p = .116$, eta$^2 = .055$

(medium). Table 2.13 presents the source table from this analysis.

Table 2.13

ANOVA: Perceived Learning by Instructor Experience (Other Universities)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	.752	2	.376	2.216	.116	.055	Medium
Within groups	12.901	76	.170				
Total	13.653	78					

Accordingly, there was no significant difference in students' satisfaction with their online course compared to other courses with respect to the amount of experience the instructor had teaching at other universities, $F(2, 76) = 2.611$, $p = .080$, $eta^2 = .055$ (medium). Table 2.14 presents the source table from this analysis.

Table 2.14

ANOVA: Student Course Satisfaction by Instructor Experience (Other Universities)

	SS	*df*	*MS*	*F*	*p*	eta^2	**Effect size**
Between groups	1.430	2	.715	2.611	.08	.06	Medium
Within groups	20.817	76	.274				
Total	22.247	78					

Table 2.15 includes the complete descriptive statistics of teaching experience with respect to student satisfaction.

Table 2.15

Teaching Experience and Student Evaluation: Descriptive Statistics

	All Instructors		**BYU-I Only**		**Other Universities**	
	M	*SD*	*M*	*SD*	*M*	*SD*
Course	5.628	0.656	5.678	0.667	5.496	0.613
Instructor	5.999	0.549	6.038	0.566	5.899	0.493
Learning	1.153	0.463	1.197	0.473	1.037	0.418
Satisfaction	1.062	0.576	1.115	0.584	0.923	0.534

Self-efficacy and experience. Correlation results between instructor self-efficacy in online pedagogy and experience teaching online revealed that the more experience an instructor had teaching for BYU-I, the more confident he or she felt about his or her online pedagogical abilities ($p = .010$). Even stronger correlations were found between instructors' confidence in using online teaching technologies (email, discussion boards, attaching images, creating hyperlinks, sharing video files, etc.) and instructor experience at BYU-I

($p < .001$). As Table 2.16 shows, the longer an instructor had taught for BYU-I, the higher self-efficacy he or she reported in these areas. In contrast, there was no significant correlation found between instructor self-efficacy with subject knowledge and teaching experience at BYU-I ($p = .089$).

However, the correlation was significantly different if the remote instructor had experience teaching at other universities. The more experience an instructor had teaching at another university, the lower his or her self-efficacy in their online pedagogy ($p < .001$, $r = .213$). Still, this correlation is small enough that any relationship between the two data sets should be more rigorously studied before drawing any conclusions or recommending action.

Table 2.16

Teaching Experience Correlations to Instructor Self-efficacy

	BYU-I Experience		Other Universities	
	r	*p*	*r*	*p*
Pedagogy	-0.159	.010	0.213	<.001
Technology	-0.224	<.001	0.015	.802
Subject	-0.105	.089	0.120	.051
Overall	-0.198	.001	0.153	.013

Summary

This study explored the relationship between instructor self-efficacy and student satisfaction levels from end-of-semester student evaluations. Specifically, instructor self-efficacy in online teaching was examined in terms of the instructor's confidence in online teaching pedagogy, use of technology, and subject matter expertise. A significant correlation was found with the Pathway students ($p = .046$), identifying that the more confident an instructor was in his or her technological skills, the lower the Pathway student's satisfaction was with the course. However, it must be noted that the effect size was small.

In addition, Pathway students had a significantly positive response pattern (.01 level). Pathways students, significantly more than one might expect by chance, reported feeling they had learned more from their online course than other courses they had taken (21.1%) and were more satisfied with their online course than other courses they had taken (21.9%). It must be noted that Pathway is a special BYU-I program targeted toward individuals who are not traditional students and who have an opportunity they would not otherwise have expected. It is possible that because they have been excluded from the traditional college path, they value it more highly than traditional students. Overall, the scores of Pathway students for satisfaction have historically been higher than traditional university students (Routson, 2013). Higher satisfaction ratings might also be attributed to the fact that Online Operations purposefully assigned higher-rated instructors to Pathway courses in the past. Finally, Pathway courses are the first experiences many Pathway individuals have with university courses. Pathway students typically do not have as much experience with university courses, and might have lower expectations and hence higher satisfaction with their instructors and courses.

Statistical analysis also revealed a unique response pattern in terms of student satisfaction with respect to class standing. The less higher education experienced, the higher the course satisfaction rating. The more education a student experienced (senior-standing), the less satisfaction with online courses. This is an important piece of information for BYU-I to address.

The analysis also found relatively few satisfaction ratings at either extreme (a great deal less satisfied or a great deal more satisfied) with traditional students (non-Pathway students). This confirmed previous findings by the university noting that in comparison to

on-campus course offerings, online courses experienced fewer extremely high and extremely low satisfaction ratings (Young, 2014).

Correlation results between instructor self-efficacy in online pedagogy and experience teaching online revealed a correlation between the amount of experience an instructor had teaching for BYU-Idaho and his or her confidence in his or her online pedagogical abilities. The longer the instructor had taught for BYU-I, the higher his or her self-efficacy in online pedagogy.

Even stronger correlations were found between instructors' confidence in using online teaching technologies (email, discussion boards, attaching images, creating hyperlinks, sharing video files, etc.) and instructor experience at BYU-Idaho. The longer instructors had taught for BYU-Idaho, the more self-efficacy they reported in these areas.

However, a significant difference was found regarding student satisfaction and instructors' experience teaching at other universities. Remote instructors who only taught at BYU-I had significantly higher student course ratings ($p = .036$) along with perceived learning ($p = .009$) and satisfaction ($p = .012$), with their online course (compared to other courses) than instructors who had experience teaching at other universities.

Statistical analysis of all of the remote instructors teaching at BYU-I for over five semesters were rated significantly lower in their course evaluations than instructors teaching their first semester at BYU-I. ($p = .012$). Moreover, instructors with over three semesters of teaching experience at BYU-I were rated significantly lower than instructors teaching their first semester at BYU-I ($p = .002$). Students perceived they learned significantly less than other courses from instructors with over three semesters of experience at BYU-I and rated

the amount they learned (compared to other courses) from instructors teaching their first semester at BYU-I significantly higher ($p < .001$).

Discussion and Conclusion

Online education is the most rapidly growing area in higher education (Wasilik & Bolliger, 2009). Among these institutions, BYU-Idaho has experienced rapid and continual growth in their online program in recent years. This study explored the relationship between instructor self-efficacy and student satisfaction levels as determined from end-of-semester evaluations. Self-efficacy in online teaching was examined in terms of an instructor's confidence in online teaching pedagogy, use of technology, and subject-matter expertise.

This study revealed that no significant correlations exist at BYU-Idaho between student satisfaction and online instructors' self-efficacy with online pedagogy. Neither were any correlations found between satisfaction and instructors' subject-matter expertise or overall online self-efficacy. Only very small, reverse correlations were identified between instructors' efficacy in teaching technology and student satisfaction ratings. Therefore, this research was unable to support any of the four original hypotheses. This is discrepant to the literature indicating that high teacher self-efficacy correlates with increased student learning and satisfaction (Goddard et al., 2000; Henson, 2001). However, this study did reveal positive correlations between instructor self-efficacy and length of experience teaching online.

Interestingly, this study also indicated that students were less satisfied with their learning experience in courses taught by instructors with experience teaching online at other universities in comparison to instructors who only had experience teaching online for BYU-Idaho. In general, the more experience instructors had teaching, the less satisfied students

were with their learning experience. Accordingly, the longer BYU-I instructors taught for the university, the higher their self-efficacy, but also the lower their students' satisfaction levels. Student satisfaction and perceived learning appeared highest in those courses where instructors had taught only for BYU-Idaho and were in their first semester teaching. A possible explanation for this dynamic could be that training for new instructors has improved. Another explanation could be burnout of some kind among veteran instructors, as well as more enthusiasm and involvement from new instructors. More research is needed in order to uncover the meaning of these relationships and to discover strategies for improving student satisfaction ratings while retaining BYU-I instructor experience.

Another interesting finding revealed that student satisfaction in online courses diminished as students progressed in their education. A possible explanation for this dynamic is that the more classes students have experienced, as in the case of seniors, the higher the satisfaction expectation level becomes for future courses. It could also be due to the maturity of the online program at BYU-I as indicated by the online course list (http://www.byui.edu/online/courses/course-list), indicating that upper division online courses are newer to the program. Seniors and juniors in Fall 2013 might have been the first to encounter new online courses that may yet require additional development to meet the standards expected by students. Another possibility is that seniors at that particular juncture in their education, might need or prefer a different course format than what online courses traditionally offer (i.e. hybrid).

Finally, a significant correlation was found with Pathway students ($p = .046$), identifying that the more confident an instructor was in his or her technological skills, the lower Pathway students' satisfaction was with the course. These findings were significant,

primarily for the Pathway student population. This data could represent a dislike for the course content or the course instruction. It could also represent the possible use of technology by Pathway instructors that is beyond the comfort level of non-matriculated students, since Pathway students represent a population of non-traditional students taking college-preparation courses, rather than traditional university courses. The students may also be surprised at the amount of extra work college courses require compared to high school courses. This study did not corroborate Sahin's studies, which indicated that the higher an online instructor's competence with technology, the better the learning environment they will provide to their students (Sahin, 2007). However, it must be noted that the effect size was small. The correlation was so slight that any relationship between the two data sets should be more rigorously studied before drawing any conclusions or recommending action.

Limitations

This study was conducted at a private, religious, undergraduate, four-year university in the Northwest. The results of this study are limited to this demographic, and can neither be generalized to graduate students and instructors, nor to other institutions. In addition, because 45.5% of instructors did not take the self-efficacy survey, the researchers' ability to correlate with all students was limited. Instructors who chose to respond to the survey might be a more involved population and naturally more self-confident about their online teaching abilities. Limitations could be greatly reduced in a future study by being more sensitive to instructor needs, and taking extra measures to be certain instructors knew their confidentiality would be maintained. For instance, an independent contractor could conduct the self-efficacy survey, rather than an administrator from the online program.

Gender, though noted and reported for students, was not treated as a variable in this study. The gender of remote online instructors was also not treated as a variable, but could possibly affect the satisfaction ratings of students.

Pathway students represented another limitation, due to the unique nature of the program and the students' lack of educational experiences. Pathway students are non-traditional university students, which make results less relatable to other institutions. In addition, the newness of the Pathway program makes Pathway results less reliable. It is difficult to determine whether results relate to the newness of the program or are a realistic expression of Pathway participants. This study attempted to address the Pathway limitation by separating the data into all-student groups, non-Pathway groups, and Pathway-only groups.

Finally, this study was limited to the duration of one semester. Results would prove more reliable over longer periods of time and across a greater sample of online instructors. During Fall 2013, the Pathway program welcomed more new students than in any other semester. These students in particular would have little to no experience with college or college courses.

Validity

Perhaps significant factors other than teacher self-efficacy presented the largest threat to validity in the study. To address this concern, additional variables were also measured and tested using statistical analysis. The following variables were tested:

- Demographics of instructors and students
- Overall teaching experience of the instructor
- Instructor teaching experience online

• Instructor teaching experience online at BYU-I

• Department/subject area of instruction

• Instructor preference for teaching online or face-to-face courses

Another potential threat to validity was the applicability to student populations outside of BYU-I. While the nature of action research is concerned more with solutions to local problems, researchers were careful to structure the survey instruments in a way that other institutions using asynchronous online instruction, could repeat the study in order to increase the validity of the results.

Implications for Practice

The findings of this study indicate online teaching self-efficacy may not be a significant consideration when hiring online instructors. In fact, high self-efficacy, especially in terms of technology, may actually be a negative factor in facilitating online courses. Online learning programs may benefit from looking more at other factors, such as personality, training, and mentoring as indicators of future instructor success.

Another finding that merits consideration is lack of student satisfaction with online courses as students' year in school increases. If higher level courses are newer and therefore of lower quality, then more time needs to be invested in course development, or newer courses should receive more improvement focus than current practice. If students increasingly experience lower satisfaction because they have more courses for comparison, perhaps more experienced students should be engaged to find ways to improve online courses.

The finding that a decrease in student satisfaction also appears to correlate with an increase in instructor experience seems to be the result with the most promise for practice

implications. This finding needs to be confirmed and more deeply understood through additional analysis over multiple semesters. If it is confirmed, it could lead to significant changes in practice. For example, teacher experience may need to be eliminated or even considered as a contra indicator when selecting remote leadership for adjunct instructors. Perhaps more recent training and mentoring offered to less experienced instructors needs to be encouraged or required for more experienced instructors.

Recommendations for Future Research

Though gender was noted and reported, it was not treated as a variable in this study with regard to students or instructors. Future studies should include this variable as part of the analysis to see if gender is a factor relating to student satisfaction with online courses at BYU-Idaho. The gender of the online instructor should also be treated as a possible variable in future studies.

Results of this study suggest further exploration into student perceived learning and student satisfaction levels. A needs assessment to see how the university might obtain improved satisfaction ratings, particularly among more experienced, traditional students may provide helpful information to increase student satisfaction of online courses. In addition, research results merit an examination comparing the variable of online courses and hybrid courses to student satisfaction and learning among senior-level students.

An analysis of Technological Pedagogical Content Knowledge (TPACK) in online courses could also reveal significant differences between instructor knowledge and instructor self-efficacy with regard to student satisfaction and learning. Stronger relationships, for instance, might be found between student satisfaction and instructor knowledge, rather than with instructor self-efficacy.

Finally, future studies exploring the effectiveness of professional development for instructors with respect to student satisfaction would be informative. Since no significant correlations were identified between satisfaction levels and instructor self-efficacy, similar correlations could be done with instructors who received professional development in specific online teaching skills, such as increasing instructor presence and contact with students. Future research may also garner different results if an independent party conducted the self-efficacy surveys rather than an administrator from the online program.

References

Ali, A., & Ahmad, I. (2011). Key factors for determining student satisfaction in distance learning courses: A study of Allama Iqbal Open University. *Contemporary Educational Technology, 2*(2), 118-134.

Allen, I. E., & Seaman, J. (2011). *Going the distance: Online education in the United States, 2011*. Needham, MA: Sloan-C Consortium. Retrieved from http://sloanconsortium.org/publications/survey

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Babson Survey Research Group. Retrieved from http://files.eric.ed.gov/fulltext/ED541571.pdf.

American Psychological Association. (2010). *Ethical standards of psychologists*. Washington, D.C.

Astin, A. W. (1993). *What matters in college? Four critical years revisited.* San Francisco, CA: Jossey-Bass.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Review*, *84*(2), 191-215.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.). *Self-efficacy beliefs of adolescents, (5),* (307-337), Greenwich, CT: Information Age Publishing.

Baran, E., Correia, A. P., & Thompson, A. D. (2013). Tracing successful online teaching in higher education: Voices of exemplary online teachers. *Teachers College Record, 115*(3). Retrieved April 13, 2013 from https://www.tcrecord.org/library/abstract.asp?contentid=16896

Bean, J. P., & Bradley, R. (1986). Untangling the satisfaction-performance relationship for college students. *Journal of Higher Education, 57*(4), 393-412.

Beil, C., & Shope, J. H. (1990). No exit: Predicting student persistence. Paper presented at the Annual Forum of the Association for Institutional Research. Educational Reproduction Services Number ED 321669.

Beltyukova, S. A., & Fox, C. M. (2002). Student satisfaction as a measure of student development: Towards a universal metric. *Journal of College Student Development, 43*(2), 161-169.

Carter, H., Hochstrasser, J., Huber, R., & Yadon, B. (2013). *Improving Student Satisfaction: Correlating Instructor Self-efficacy with the Online Student Experience*. Unpublished manuscript, Department of Education, University of Idaho, Moscow, Idaho.

Chan, S. (2010). Applications of andragogy in multi-disciplined teaching and learning. *Journal of Adult Education*, *39*(2), 25-35.

Clark, K. B. (2005, October). *Inaugural Response*. Brigham Young University-Idaho, Rexburg, Idaho.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publishing

Cuadrado-Garcia, M., Ruiz-Molina, M. E. & Montoro-Pons, J.D. (2010). Are there gender differences in e-learning use and assessment? Evidence from an interuniversity online project in Europe. *Procedia Social and Behavioral Sciences 2*(2), 367-371.

Deubal, P. (2008). *K-12 online teaching endorsements: Are they needed?* Retrieved April 8, 2013 from T.H.E. Journal: http://thejournal.com/articles/2008/01/10/k12-online-teaching-endorsements-are-they-needed.aspx

Donald, J. G., & Denison, D. B. (1996). Evaluating undergraduate education: The use of broad indicators. *Assessment & Evaluation in Higher Education, 21*(1), 23-40.

Goddard, D., Hoy, W.K. & Hoy, A. W. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479-507.

Gonzalez-Gomez, F., Guardiola, J., Rodriquez, O., & Alonso, M. (2012). Gender differences in e-learning satisfaction. *Computers & Education, 58*(1), 283-290.

Harrington, R., & Loffredo, D. A. (2010). MBTI personality type and other factors that relate to preference for online versus face-face instruction. *Internet & Higher Education, 13*(1-2), 89-95.

Henson, R. K. (2001). Teacher Self-efficacy: Substantive implications and measurement dilemmas. *Keynote address given at annual meeting of Educational Research Exchange.* College Station, TX: Texas A&M University.

Hopkins, W. G. (1997). *New view of statistics*. Retrieved August 23, 2002 from http://www.sportsci.org/resource/stats/effectmag.html

Hung, J. L., & Blomeyer, R. (2012, October). The online educator self-efficacy scale (OESES): A research-based tool for assessing online educator performance. Symposium conducted at iNACOL's annual Virtual Schools Symposium. New Orleans, LA.

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, *51*, 1304-1320.

Jackson, L. C., Jones, S. J., & Rodriguez, R. C. (2010). Faculty actions that result in student satisfaction in online courses. *Journal of Asynchronous Learning Network, 14*(4), 78-96.

Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. (1995). Constructivism and computer-mediated communication in distance education. *American Journal of Distance Education*, *9*(2), 7-26.

Katiliute, E., & Kazlauskiene, I. (2010). The model of studies quality dimensions from student's perception. *Economics and Management, 15*, 580-586.

Koehler, J. & Mishra, P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research, 33*. 131-152.

Knowles, M., Holton, E., & Swanson, R. (2012). *The adult learner, the definitive classic in adult education and human resource development.* New York: Routledge.

Kotrlik, J., & Williams, H. (2003). The incorporation of effect size in information technology, learning, and performance research. *Information Technology, Learning and Performance Journal 21*(1), 1-7.

Kuh, G. D. (2003). What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change*, *35*(2), 24-32.

Lee, C. (2003). *Self-efficacy instrument*. Retrieved April 9, 2012 from Pegasus, UCF: http://pegasus.cc.ucf.edu/~coreylee/projects/self_efficacy_instrument.htm

Lee, M. H., & Tsai, C. C. (2010). Exploring teachers' perceived self-efficacy and technological pedagogical content knowledge with respect to educational use of the World Wide Web. *Instructional Science*, *38*, 1-21.

LeNoue, M., Hall T., & Eighmy, M. (2011). Adult education and the social media revolution. *Adult Learning*, *22*(2), 4-12.

Lu, H., & Chiou, M. (2010). The impact of individual differences on e-learning system satisfaction: A contingency approach. *British Journal of Education Technology, 41*(2), 307-323.

Miltiadou, M., & Yu, C. H. (2000). Validation of the online technologies self-efficacy scale (OTSES). Paper presented at the Association of Educational Communications and Technology (AECT) International Convention, Denver CO.

National Survey of Student Engagement (NSSE). (2005). *Student engagement: Exploring different dimensions of student engagement.* Bloomington, IN: Indiana University Center for Postsecondary Research.

Ong, C. S., & Lai, J. Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior, 22*(5), 816-829.

Parker, K., Lenhart, A., & Moore, K. (2011, Apr 28). *The digital revolution and higher education: College presidents, public differ on value of online learning.* Retrieved April 28, 2013 from the Pew Research Center Web: http://pewinternet.org/Reports/2011/College-presidents/Summary.aspx

Paul, J. (2005). *Introduction to the philosophies of research and criticism in education and the social sciences.* Upper River Saddle, NJ: Pearson.

Routson, N. (2013, Sept 16). Personal Interview by Heather Carter.

Sahin, I. (2007). Predicting student satisfaction in distant education and learning environments. *Turkish Online Journal of Distance Education, 8*(2), 1302-6488.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological Pedagogical Content Knowledge (TPACK): The development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education, 42*(2), 123-149.

Schuh, J. H., & Upcraft, M. L. (2002). Measuring student satisfaction and needs. In M. J. Barr, M. K. Desler, & Associates (Eds.). *The handbook of student affairs administration (2ⁿᵈ ed.),* (265-285). San Francisco, CA: Jossey-Bass.

Shazadi, T., Khatoon, S., Aziz, S., & Hassan, H. (2011). Determining factors affecting teachers' self-efficacy at secondary school level. *Language in India, 11*(10), 385-395.

Taylor, L., & Huang, H. (2010). *Student perceptions of face-to-face, hybrid, and online courses and their engagement in online communication.* Paper presented at the International Conference of Web 2.0 and Education, Jhongli City, Taiwan.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL : The University of Chicago Press.

Tschannen-Moran, M. & Woolfolk-Hoy, A.W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education 17*, 783-805.

Wasilik, O., & Bolliger, D. (2009). Faculty satisfaction in the online environment: An institutional study. *The Internet and Higher Education, 12*(3-4), 173-178.

Wright, J. M. (2010). *Effect of Quality Matters™ Training on Faculty's Online Self-efficacy.* M. Clay (Ed.), Distance Learning Administration Annual Conference Proceedings.

Young, A. (2014, Feb. 7). Personal Interview by Heather Carter.

CHAPTER 3: UNDERSTANDING THE WAYS MOBILE DEVICES AND POPULAR WEB-BASED PROGRAMS ARE USED BY UNDERGRADUATE STUDENTS TO ENHANCE THEIR LEARNING EXPERIENCES

(Jeffrey L. Hochstrasser)

Abstract

This multiphase, mixed-method study investigated how mobile devices, such as smart phones and tablets, are used by undergraduate students to enhance learning in a higher education setting. Based on the theory of Connectivism, this study also identified the sources undergraduate students are accessing when searching for information related to their education. Students for the qualitative portion of the research were undergraduate students at a private, religious college in the Northwest, selected through a snowball sampling method, (also known as *network sampling)*. A phenomenological approach was used involving in-depth interviews, which were each transcribed and then coded by topics and themes. Individual textural descriptions were developed for each student and then a composite textural description was developed for the group as a whole. It was discovered that mobile devices are being used for educational purposes to communicate, collaborate, investigate and take notes. Google search engine and organizational websites were the most popular sources used. Texting (Short Message Service or SMS) was indicated as the preferred method of communication.

Three communication classes were involved in the quantitative portion of the study, which tested the perceived effectiveness of instructor-generated text message reminders during the Fall 2013 semester. Remind 101 was the text message management system used. Text message reminders for assignment due dates and examination dates were sent to

students who agreed to receive them. Seventy-two percent of the students (n = 50) agreed to receive the messages with 88.6% of the participants indicating that Remind 101 helped them in their overall course performance and/or grade. Eighty-seven percent of the students said they would participate in the Remind 101 program if offered again. Findings therefore support the hypothesis that text-reminders are helpful for students in their overall course performance.

Keywords: disruptive technologies, mobile learning, m-learning, safe learning, disruptive learning, disruptive teaching, Connectivism, phenomenology, Constructivism, Short Message Service (SMS), text messages, Remind 101

Introduction

Media historians and other observers have declared the Internet to be the fastest growing medium in the history of the world (Arens, Schaefer & Weigold, 2009). It falls under the classification of what Harvard business scholar, Clayton Christensen described as "disruptive technology." This term refers to technologies that are life changing in their effect (Brower & Christensen, 1995). Few can deny that the Internet falls within this category. It has changed the way we do business, communicate, entertain, educate and gain information.

Disruptive technologies bring to the market a very different value proposition than have been available previously. Generally, disruptive technologies underperform established products in mainstream markets. But they have other features that a few fringe (and generally new) customers value. Products based on disruptive technologies are typically cheaper, simpler, smaller and frequently, more convenient to use (Christensen, 2003, p. xviii).

The technological phenomenon known as the Internet has changed pedagogical strategies in education and how students learn. Internet based programs have assisted educators through online management systems such as Blackboard, WebCT or Moodle. These are powerful platforms, but they do not fully support the level of engagement desired by current online students. Existing systems are also often far behind in technology applications and are unable to meet the mobility issues related to online instruction, especially for students who travel a lot and are unable to login often to the online course management system (Revere & Kovach, 2011).

Online instructors are also pressured, more than ever, to be engaged with students. This requires additional time spent checking emails, discussion boards and also answering

questions. Some educators have utilized web-based applications and social media sites to assist in this process. In addition to computers to utilize the Internet, mobile devices such as smart phones and tablets have provided even more potential for reaching students in engaging ways that may enhance the educational process.

If *disruptive technologies* such as smart phones and tablets are used properly, they should create what has been called *disruptive learning*, which leads to what is termed *disruptive teaching*. This refers to teaching utilizing technology in ways that expand beyond current methods and where material is presented in innovative ways, adapted to the means by which students consume media today (Koszalka & Ntloedibe-Kuswani, 2010).

Because of this potential, Revere and Kovach (2011) suggest "incorporating additional communication technologies, web-based applications and handheld/mobile devices within online courses" (p. 115). This potential for mobile learning deserves attention from educators and students alike in both online and traditional classroom settings. The ubiquity and ease of access of mobile devices suggest that the potential use by students and teachers could be valuable. "It provides an unrealised [*sic*] opportunity for the facilitation of observation, critique and sharing activities in the classroom" (Aubusson, Schuck & Burden, 2009, p. 244). Current research provides some insights into mobile learning and suggests that m-learning may be supportive of the teaching and learning process. However, mobile learning research "lacks rigor to draw generalized principles and recommendations" (Koszalka & Ntloedibe-Kuswani, 2010, p.152). New studies are therefore needed with stronger research designs to identify how students currently use mobile devices to enhance their educational experiences. Educators may then be able to develop best practices to effectively incorporate mobile learning into educational pedagogies.

Considering the tremendous impact of the Internet, there are significant questions that arise relating to education. How has disruptive technology been used in academia? Have online educational opportunities changed the way people are educated? What is the role of educational facilitators in bringing their particular philosophy to the traditional or online classroom? How is social media being integrated into the adult education process? Can social media play a significant role in an enhanced educational environment and if so, how? What web-based formats show the greatest potential for the learning process? How can mobile technologies help enhance the educational experience for professors and students alike? What changes in traditional pedagogies must take place to capitalize on these new technologies and the accompanying web-based formats?

Research is needed to explore foundational questions about how and why learners engage with mobile technologies during learning. Inquiries are needed to investigate environmental, personal, and content factors that are most important in what has been referred to as *m-learning* (Koszalka & Ntloedibe-Kuswani, 2010). The purpose of this study is to answer the critical question "How can mobile technologies be best utilized in teaching and learning strategies to enhance learning and support characteristics of the digital native generation while at the same time addressing the diversity of all students?" (Koszalka & Ntloedibe-Kuswani, 2010, p. 153).

Literature Review

Mobile devices are almost ubiquitous with the current generation of college students and will be presumably the same for students entering higher education in the future. Therefore it is necessary here to explore the current generation of students to better understand their unique qualities and characteristics, especially relating to the use of

technology. Next, a brief history of the Internet in regards to education and the state of

current online and face-to-face learning opportunities is reviewed. Scholarly works are cited

to help discover the existing knowledge concerning the current use and potential of the

Internet, social media and web-based applications in combination with mobile technologies

for enhancing educational experiences. Both the traditional classroom setting (safe) and the

possibilities for collaboration and self-directed learning outside the traditional classroom

(disruptive) are explored. Because this study deals with students and how they enhance their

learning with mobile devices, it is more inclined to follow a humanist approach, however, a

new research theory for the digital age known as Connectivism is also explored as a possible

learning theory successor to behaviorism, cognitivism and constructivism (Bell 2011).

Connectivism and the Digital Age

In 2004, through the means of a blog, Siemens (2004) introduced what he labeled as

Connectivism: A Learning Theory for the Digital Age. This proposed learning theory

provides a new looking glass through which educators can view the potential mobile

learning and web-based programs have in higher education.

According to Siemens (2005), prevalent learning theories such as Behaviorism,

Cognitivism and Constructivism have some problems that need to be addressed in this age

of technology and abundance of information. The first issue is the focal point of most

learning theories, namely that learning occurs inside a person, thus not addressing the

learning that takes place outside the person or within organizations or groups of individuals

collectively. Second, learning theories are concerned with the actual process of learning

without considering the value of what is being learned. Third, the rapid increase in the

amount of information available is also a concern. People, therefore need to act by drawing

information outside of their primary knowledge. The ability to synthesize and recognize

connections and patterns from available information is a valuable skill. The following

questions, which challenge traditional learning theories in light of modern technologies and

the associated resources, have been raised:

- How are learning theories impacted when knowledge is no longer acquired in a

  linear manner?

- What adjustments need to be made when technology performs many of the cognitive

  operations previously performed by learners?

- How do learning theories address moments where performance is needed in the

  absence of complete understanding?

- What is the impact of networks and complexity theories on learning?

The concept of *chaos* stresses the need for a new learning theory. Chaos has been

defined as "the breakdown of predictability, evidenced in complicated arrangements that

defy order" (Siemens, 2005, p. 3). The learner's task then is to recognize otherwise hidden

patterns among the chaos.

Networks are connections between entities and all function on the principle that

sources of all kinds (nodes), can be connected to create an integrated whole (Siemens,

2005). Nodes then can be fields, ideas, or communities. Basically, they are the connections

and resources people make to search for and gather information.

In brief, Connectivism can be defined as "the integration of principles explored by

chaos, network and complexity and self-organization theories" (Siemens, 2005, p. 4).

Further, and perhaps more in layman terms, "the starting point of connectivism is the

individual. Personal knowledge is comprised of a network, which feeds into organizations

and institutions, which in turn feed back into the network, and then continue to provide learning to the individual" (Siemens, 2005, p. 5).

Though the validity of information from some sources used by students for academic endeavors can legitimately be questioned at times, the collaborative production of individuals contributing to the whole can nevertheless provide a resource of learning for others. Learners therefore gather information and then become a source of information to others. This is also known as *collective intelligence*, which is "the ability of communities to leverage the combined expertise of their members to solve problems" (Koszalka & Ntloedibe-Kuswani, 2010, p.143).

The main principles of Connectivism are:

- Learning and knowledge rests in diversity of opinions.

- Learning is a process of connecting specialized nodes of information sources.

- Leaning may reside in non-human appliances.

- Capacity to know more is more critical than what is currently known.

- Nurturing and maintaining connections is needed to facilitate continual learning.

- Ability to see connections between fields, ideas, and concepts is a core skill.

- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.

- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through a lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision (Siemens, 2005, p. 4). Figure 3.1 was created to visually illustrate the basic concept of Connectivism.
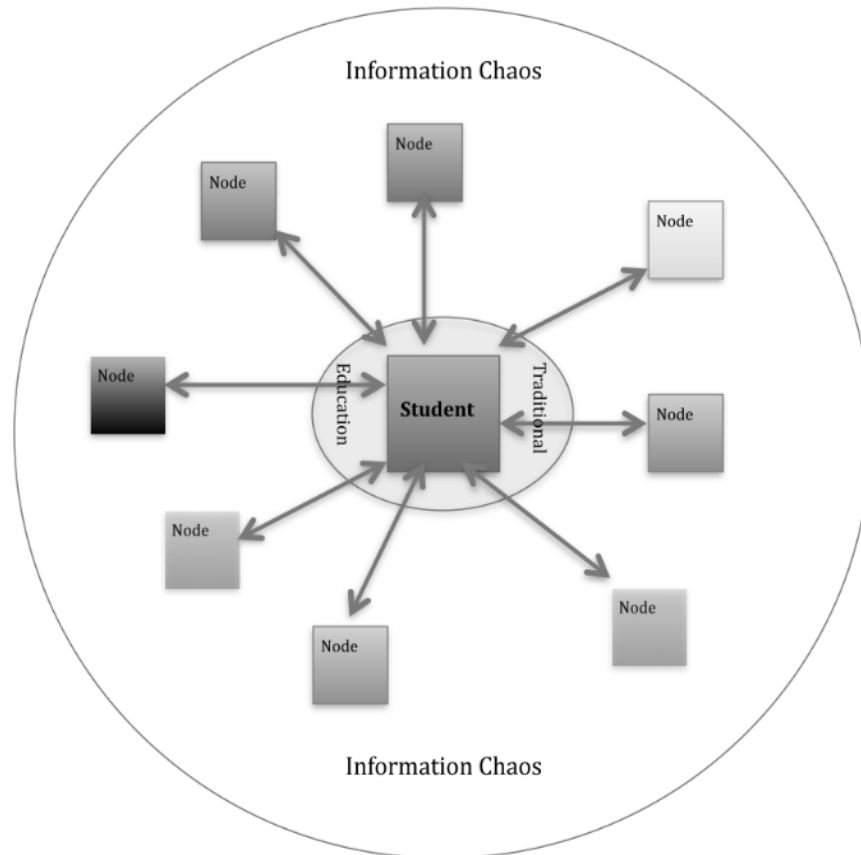
Figure 3.1. Connectivism model that symbolically explains the main elements of the theory. A student within the traditional classroom setting reaches out in the chaos of information to various nodes of knowledge to try and gather desired information. These connections are mediated by the Internet and technology.

     The suggestion of Connectivism as a new learning theory has caused a great deal of conversation since that initial blog post in 2004, resulting in many related articles published in academic journals. The need of a new learning theory for the digital age has been met positively by some researchers. There is almost unanimous agreement that the connectivist concept however, does not rise to that of a learning theory. It has instead been described as a pedagogical view on education (Verhagen, 2006), contributing mainly as a phenomenon (Bell, 2011), a paradigm shift and a new epistemology (Kop & Hill, 2008). It has also been

described as an effective framework for understanding learning in the digital age (Dunaway, 2011).

Regardless of the differing of opinion as to what it is, Connectivism "continues to play an important role in the development and emergence of new pedagogies, where control is shifting from the tutor to an increasingly more autonomous learner" (Kop & Hill, 2008, p. 11). Therefore, studies involving students and their autonomous use of mobile technology to enhance their educational experiences must, at a minimum, seriously consider Connectivism as a framework for understanding what they do and where they connect for knowledge in the digital age. Faculty members need to develop an understanding of these practices and create appropriate strategies that allow them to become better guides and facilitators of learning to this generation of digital natives.

The transition from traditional to technological education

Face-to-face instruction has been utilized for centuries. Among the desirable features of this perennial teaching method are direct contact between the students and the instructor, and an instructional time that allows for interaction and immediate feedback. There is also a defined class time for this interaction and instruction to occur (Milheim, 2011).

Because of these characteristics and advantages of face-to-face instruction, instructors using internet-enabled applications and programs often try to replicate the face-to-face classroom environment. However, online classrooms include indirect contact, usually through discussion boards and forums, which means the feedback is definitely less than immediate with no defined class times. This requires educators to change the way they approach online classrooms versus the traditional methods (Milheim, 2011). One consideration that must be addressed is the tendency of many online instructors to try and

replicate the classroom environment of being the sole authority at the front of the class. Online educators are now expected to mingle with the students, create an online community and facilitate education through virtual peer interaction (Revere & Kovach, 2011). Today's mobile devices can help facilitate this type of immediate and frequent interaction.

The Internet and education. Though the Internet was first developed for national security and communication within the United States Defense Department, educators soon found it useful for the sharing of research findings and other related academic pursuits. Until the development of the World Wide Web by Tim Berners-Lee and the capacity for computers to communicate with one another through such developments as the Uniform Resource Locator (URL) and Hypertext Transfer Protocol (HTTP), it was only an exclusive group that knew about and utilized the Internet. Berners-Lee reflected on his development of the Web by explaining it this way:

> The basic idea of the Web was that of an information space through which people
> can communicate, but communicate in a special way: communicate by sharing
> their knowledge in a pool. The idea was not just that it should be a big browsing
> medium. The idea was that everyone would be putting their ideas in, as well as
> taking them out. This [the internet] is not supposed to be a glorified television
> channel (as cited by Kop, 2007, p.195).

Email was the first internet communication breakthrough. Individuals could communicate with each other almost instantaneously and virtually free. Email today remains a staple means of communication and also a major way in which students and instructors communicate. It however, is not the preferred method of communication from the student

perspective. Studies show that text messaging is the preferred method by students for contacting others (Harley, Winn, Pemberton & Wilcox, 2007).

The Internet, however, has also allowed for the development of support systems for educators in their efforts to communicate with and educate students. This support for online and traditional teaching is usually facilitated through course managements systems such as Blackboard, WebCT or Moodle. These are powerful platforms, but according to Revere and Kovach (2011) they do not fully support the level of engagement desired by current online students. Furthermore, many of the existing systems are often far behind in technology applications. Many of these course management systems are unable to meet the mobility issues related to online instruction, especially for students who travel a lot and are unable to login often to the online course management system. In addition, Instructors face increasing pressures to assist students continuously with much time spent checking emails, discussion boards and answering questions. These management systems also do not allow for different student learning styles. One suggestion is to supplement these course management systems "by incorporating additional communication technologies, web-based applications and handheld/mobile devices within online courses" (Revere & Kovach, 2011, p. 115). It seems that the same recommendations could also be extended to and be beneficial in traditional, face-to-face classroom settings as well.

Web-based applications to improve engagement. Discussion boards, wikis, blogs, group tasks and peer assessments are valuable for facilitating student engagement, but it is suggested that online courses can be taken to a higher level of engagement by integrating free, web-based technologies (Revere & Kovach, 2011). For example, Twitter, a micro blog, can be used by instructors to alert students about course-related assignments and is very

accessible by laptop and mobile devices. Google Calendar, another free, web-based program

is useful for organizing and sharing classroom lesson plans that can be seen by students

immediately without having to login to a management system. Gmail allows a class group to

be formed where students and instructor can communicate simultaneously in real time. This

can result in informal peer mentoring.

Another consideration is the use of the Wimba Collaboration Suite, which has the

ability to create a virtual classroom supporting audio, video and content sharing. Other such

web conferencing tools including PowWowNow and Skype can also be accessed by

handheld/mobile devices for use in visual communication efforts.

There are a number of tools for fostering collaboration, which allow students to work

on projects simultaneously including Google Tasks and Google Docs, Facebook, Ning and

Google Hangout. As a research resource, Google Scholar allows students to find reputable

journal articles and books. TeacherTube, and iTunes U and Khan Academy are examples of

websites providing instructional content. TeacherTube provides a safe, online community

for sharing instructional videos. It is a free resource for teachers, schools and home learners

from elementary through college and university levels. In addition, iTunes U is a free

application allowing teachers to create their own instructional video content specifically for

class members. It also allows access to educational content from leading institutions

including over 500,000 free lectures, videos, books and other resources on thousands of

subjects. Khan Academy is a not-for-profit organization that describes its mission as

providing a free world-class education for anyone, anywhere

(https://www.khanacademy.org/#mission-statement). An estimated 2200 educational videos

are available at that site. Other applications that assist in the creation of online content,

which can help with expert interviews, prerecorded lectures, how-to instructions and so forth include Jing, Cam Studio, ScreenToaster and PodBean.

Useful web-applications currently exist and will continue to grow in number. When properly used, technology can "foster student engagement in the learning process, decrease attrition, enhance learning outcomes and improve student satisfaction" (Revere and Kovach, 2011, p.123). Accordingly, both online and classroom educators need to update their information to integrate these new technologies into their courses.

Short Message Service (Texting) as a potential learning tool. *Short Message Service* (SMS) or text messaging is the technology of choice for undergraduate students (Harley, Winn, Pemberton & Wilcox, 2007). Texting is available on all mobile devices and allows users to send and receive short messages via the device keypads, limited to a maximum of 160 characters per message. In a recent Pew Research Center poll of 2,252 adults 18 and older, 81% of cell phone owners indicated they send or receive text messages. This holds true for both genders, thus making texting "one of the most prevalent cell phone activities of all time" (Duggan, 2013, p. 4). Even more relative to college-aged students, the study found 97% of the 18-29 year olds interviewed (N = 395) send and receive text messages. Thus, great potential exists for educators to communicate with students and enhance educational experiences by utilizing this mobile activity.

Student Messenger was developed and utilized to assess the extent to which carefully designed messages from university staff could help support students in the early stages of their higher education (Harley, et al., 2007). The Student Messenger program for sending text messages allowed students immediate access to messages through their mobile phones and provided a clear advantage over regularly used, web-based communication methods.

Students also picked up a sense of urgency from these text messages that was not apparent through other forms of communication. Results of this study revealed that text messaging is the dominant mode of electronic communication among their university students and that text messaging from university staff is viewed positively if used sensitively and sparingly. Moreover, the students preferred text messaging over voice or email due to: free text messaging with many phone packages, the asynchronous nature of texting allowing for time to reflect before replying, and it being an easier way to deliver a sensitive response (Harley, et al., 2007). Universities should therefore be aware of the social importance of texting and recognize that an engagement with this medium is essential.

> It would be a missed opportunity if universities were to continue to neglect texting as a potential means of supporting first-year students when these very same students are already conducting a substantial part of their lives via this medium (Harley, et al. p. 238).

In a similar study Jones, Edwards and Reid (2009) offered a case study that illuminated the role of mobile SMS or text messaging and issues associated with utilizing it within an academic course of study. The idea was to harness the communication skills of the students using mobile phones and SMS (texting) to "promote greater connectivity between tutor and student, and student and course content" (p. 206). Edutxt, a messaging management system, was used for this study to send the messages. The vast majority of the new students welcomed the text messages with tutors, especially messages connected with their course work. The results showed that students (N = 81) welcomed texts as reminders about study tasks, deadlines, administrative changes and so forth. They also regarded the messages as effective aids to time management and felt that text messages were more

effective than email at gaining attention. The students also liked the personalized nature of texts, acting as "an extrinsic motivator in helping them to study" (Jones, Edwards & Reid, 2009, p. 209). While text messaging has the potential to enhance teaching strategies, "the extensive functionality of today's highly flexible personal communication devices can be seductive, causing us to lose sight of the task at hand; that of providing effective learning experiences for our students" (Jones, Edwards & Reid, 2009, p.214).

Remind 101 is also a free application allowing teachers to connect with students through text messaging, while protecting the privacy of phone numbers for both the students and the instructors alike. It is a one-way messaging system that allows teachers to send text messages to students but students are unable to reply. Remind 101 is designed for both iPhone and Android mobile phone operating systems. A search of scholarly journals shows no research to date involving this text messaging management system. It has primarily been used for teacher to students and parent communication in the K-12 educational systems.

The role of social media and education. "Social media comprises of activities that involve socializing and networking through words, pictures and videos" (Reuben, 2008, p.1). It has also been described as "an aspect of the Internet which allows individuals and groups to create and publish online content, share content, and interact about it" (Lusk, 2010, p.3). Some of the benefits of social media for youth include: (1) providing virtual space to explore interests or problems, (2) strengthen communication skills, (3) the use of online communities for academic assistance and support (such as Dweeber.com) and (4) the development of creativity through content sharing. Therefore, it must be noted that parents, educators and teens need to be open to the possibilities social media and other online networking can offer (Lusk, 2010).

To help with this effort, Reuben (2008) developed a guide for the use of social media in higher education based on a survey of 148 colleges and universities responding to questions about their use of social media to reach students. This Social Media Guide for higher education focuses on the possible uses of Facebook, MySpace, YouTube, Flickr, blogs, Twitter, and del.icio.us for marketing in higher education and can act as a primer for any educator wishing to explore the use of these applications to enhance the educational process. By doing so, they may be able to utilize existing applications and programs to improve their communication with students and effectively supplement current pedagogical designs.

Mobile Technologies

Recent studies conducted by the Pew Research Center show that 79% of all adults, ages 18-24 own smart phones and 33% own a tablet (Smith, 2013; Zickuhr, 2013). Because of the worldwide growth and increased ownership and use of mobile devices, serious consideration must be given to the potential benefits of using mobile technologies to enhance the educational experience. Indeed, "higher education can no longer avoid exploring the educational potential of these tools" (Herrington, Herrington, Olney & Ferry, 2008, p. 425). These mobile devices transcend the boundaries of traditional classrooms and lecture halls, allowing for worldwide learning (El-Hussein & Cronje, 2010). Convenient size, ease of use, portability, prevalence and advanced features of mobile technologies such as voice, display, internet access and interactivity have increased interest in integrating these technologies into the instructional environment (Koszalka & Ntloedibe-Kuswani, 2010). This type of learning on mobile devices is known as mobile learning or *m-learning* (Herrington, et al., 2008; Koszalka & Ntloedibe-Kuswani, 2010). Mobile learning or

m-learning has further been defined as "learning by means of wireless technological devices that can be pocketed and utilised [*sic*] wherever the learner's device is able to receive unbroken transmission signals" (El-Hussein and Cronje, 2010, p.12). As such, one can see a future where mobile learning becomes one of the most effective ways of delivering educational instruction.

Mobile learning can be perceived from two perspectives: *safe learning* and *disruptive learning*. Safe learning deals with traditional technology enhanced instruction, perpetuating the practice of using a computer to search for information, viewing what is found and learning what is proposed. Disruptive learning on the other hand, uses mobile technologies to empower the learner to change from a mere consumer of teacher knowledge to an active participant and contributor (Koszalka & Ntloedibe-Kuswani, 2010). Though the perspectives of safe and disruptive learning working together sounds somewhat contradictory, they work together in a complementary manner. "However, they are complementary when they are interpreted to mean open access to resources (safe) and immersive and collaborative learning (disruptive)" (Koszalka & Ntloedibe-Kuswani, 2010, p. 143).

A recent review of case studies involving mobile technologies concluded that mobile-learning may be supportive of the teaching and learning process. In fact, mobile learning devices can enhance a sense of individuality and community for the learner and enhance the motivation to learn through collaboration, while allowing learners a certain amount of freedom and independence (El-Hussein & Cronje, 2010). In an experimental study with faculty involving the use of mobile technology and associated pedagogies, Herrington, et al. (2008) conclude that "the proliferation of mobile devices has proceeded

throughout society at such a rate that higher education can no longer avoid exploring the educational potential of these tools" (p. 425). It is cautioned, however that m-technologies should be considered "supplemental to learning and contextualized within immersive and collaborative environments" (Koszalka & Ntloedibe-Kuswani, 2010, p. 150).

Current research provides some insight into m-learning, but a lack of research rigor currently exists in the literature reviewed, with studies using weak study designs, a lack of valid and reliable instrumentation and questionable sampling methods. Therefore, the results also lack the power to generalize beyond the samples themselves. Indeed, more scholarly reports on *m-technologies* and *m-learning* are needed. "Longitudinal research is needed to explore foundational questions about how and why learners engage with m-technologies during learning. Inquiries are needed to investigate environmental, personal and content factors that are most important in m-learning" (Koszalka & Ntloedibe-Kuswani, 2010, p. 152).

So what stops such changes from taking place more rapidly and utilizing more technology in the university setting? Hsu and Wang (as cited in Werth & Werth, 2011) cite several items as reasons why teachers are hesitant to change their teaching methods including fear of and unfamiliarity with technology and instructors' unwillingness to change and adopt other methodologies. One way to help facilitate this change is to better understand student-use of these technologies and how they are used to enhance education. Kop (2007) even suggests taking notice of the ways learners use technology outside a formal educational environment as a means of understanding and adapting the way it is used in the institution.

There is a proliferation of mobile technology use among college students in this country. Indeed, by sheer numbers, one might say these devices are becoming ubiquitous

(Abusson, Schuck & Burden, 2009). Many students use their mobile devices for educational purposes. In regards to this rise in the use of mobile technology, the-following questions are raised:

1. What are the living experiences of students who currently use mobile devices to enhance their learning?

2. How can educators benefit from knowing such student experiences with mobile devices?

3. What resources are students reaching out to and connecting with to obtain the information they may be seeking?

4. "How can mobile technologies be best utilized in teaching and learning strategies to enhance learning and support characteristics of the digital native generation, while at the same time addressing the diversity of all students?" (Koszalka & Ntloedibe-Kuswani, 2010, p.153).

The goal of this study was to provide answers to some of these important questions and provide some vital information concerning learners and their use of mobile technologies. It explored the use of disruptive (cutting-edge) technologies within the educational setting. Primarily, this study focused on the growing trend of using mobile technologies such as smart phones and tablets for educational purposes. It explored how this technology is currently used by undergraduate students to enhance their learning experiences. It also investigated the resources students connect with to obtain the information they seek.

RQ$_1$: What are the experiences undergraduate college students are having with mobile technology devices and web-based applications that enhance their educational experiences?

RQ$_2$: Can instructor-generated text-messages be a means of improving overall course performance as perceived by undergraduate students?

Methodology

Research Design

A multi-phased, mixed-method study data was conducted. The qualitative portion of the study took a phenomenological approach to discover how undergraduate students are using mobile technology to enhance their educational experiences. Interviews were conducted with students using open-ended questions in an attempt to understand their educational involvement with mobile technology and web-based applications. The quantitative portion of the study involved testing the perceptions and attitudes of students towards instructor-generated text message reminders sent through the utilization of a program called Remind 101. The results of the quantitative study were used to corroborate some of the findings in the qualitative study.

A Phenomenology Study

Phenomenology is "the study of lived experiences and the ways we understand those experiences to develop a worldview" (Marshall & Rossman, 2011, p.19). Creswell (1998) explains that phenomenology "describes the meaning of their lived experiences of a concept or phenomenon" (p. 57). The intention is to provide a deep understanding of a phenomenon as experienced by several individuals and develop "clusters of meaning" from the statements of participants and develop themes that are common to all. In the case of this study, the

phenomenon that is experienced and under investigation is the personal use of mobile technologies by undergraduate students to enhance their learning experiences. This follows the perspective that "investigating individuals' experiences with established technologies that are seamlessly integrated into their daily lives is especially consistent with phenomenology" (Cilesiz, 2010, p. 493).

The process utilized by phenomenological inquiry frequently involves multiple interviews with several individuals who have experienced the phenomenon. One interview deals with the past experiences of the phenomenon, one with the present experiences and then a possible third that joins the two together to describe the essence of the experience. The researcher's personal experience with the phenomenon is also combined with those that have been interviewed as part of a reflexive stance.

Creswell's (1998) examination of the process suggests six steps to be taken in phenomenological studies.

1. Determine that phenomenology is the best approach to use for the study.

2. Identify the phenomenon of interest.

3. Recognize and specify the broad philosophical assumptions of phenomenology

4. Collection information through in-depth interviews and even multiple interviews with participants.

5. Develop and implement the actual, open-ended questions that will be asked of the participants. In addition, Creswell (1998) strongly encourages asking the following two questions specifically in the interview:

(a) What have you experienced in terms of the phenomenon?

(b) What contexts or situations have typically influenced or affected your

experiences of the phenomenon? (p. 61-62).

The type of problem best suited for phenomenological research is described as:

...one in which it is important to understand several individuals' common or

shared experiences of the phenomenon. It would be important to understand these

common experiences in order to develop practices or policies, or develop a deeper

understanding about the features of the phenomenon" (Creswell, 1998, p. 60).

Because these were the exact objectives of this current study, phenomenology was chosen as

the appropriate research methodology.

Proposed Actions to Ensure Appropriate Levels of Trustworthiness

In an effort to ensure a high level of trustworthiness and to gain a better perspective

on and understanding of the phenomenon examined in this study, a triangulation strategy

was implemented. First, a pilot study was conducted utilizing three volunteer participants

who met the previously mentioned qualifications. Each was interviewed with the proposed

open-ended questions for this portion of the study. Interviews were recorded, reviewed and

coded to find both common and exclusive themes. The guiding questions used for the

interviews in the pilot study were reviewed and adjustments were made where needed before

continuing on to the actual research and the five participants selected for the actual study.

As a second level of trustworthiness for the actual study, a member check was

performed which included all actual participants in the study. This action involved asking

each participant to review the actual transcript of their interview and make any corrections

and/or provide further insights as they deemed appropriate. They also reviewed the

individual textural descriptions developed for each of them, making changes and additions

as they felt were needed. The third procedure involved a peer debriefing where reactions were sought from a colleague of the researcher regarding the case summaries, data collection methods, coding, conclusions and so forth. A reflexivity statement is also included, which discloses any personal involvement of the researcher with the same phenomenon and any other details regarding information that may have a bearing on the credibility and trustworthiness of the study and the final observations and analysis of the research.

Reflexivity Statement

This study is of personal interest to the researcher. As a faculty member and instructor of undergraduate students, personal observations have been made by him of the pervasive nature of mobile devices among this group. There is a desire on the part of the researcher to tap into this resource and discover the potential it holds for enhancing both the teaching and the learning process. As a cell phone owner for some 23 years and a smartphone owner for a good amount of time as well, he has still, barely scratched the surface of the capabilities of these mobile devices. Students, however, know a great deal more concerning them and keep current on applications, and available web-based programs. There is a desire to learn from them and discover how they are using these mobile devices and associated programs and applications for educational purposes. The hope is that by doing so, educators, including the present researcher, can utilize existing student practices to improve teaching strategies and help enhance the education of their college-aged students. The insights gained will also be shared with colleagues of the researcher and other stakeholders of the university.

Remind 101 is a text-messaging program that has been available to students in classes of this researcher since 2012. The outcomes and perceived effectiveness of those efforts however, have never been explored until this present study was conducted.

Limitations and Delimitations

Participants for the qualitative portion of this study were chosen through a snowball sampling method (Onwuegbuezie & Leech, 2007; Trochim & Donnelly, 2008). Gender was noted, but not considered as a variable in the study. Participants' year of school was also noted but not considered, i.e. freshman, sophomore, junior or senior. The differences in specific mobile devices used by participants such as type, make, model and so forth were also noted, but were also not treated as a variable in this study.

As Marshall and Rossman (2011) state, there are no perfect research designs. The qualitative portion of this study, for example, was limited to five undergraduate students at a large, private, northwest university with a religious affiliation and therefore conclusions should not be generalized beyond the undergraduate student status or generalized to students at all universities. The quantitative portion of this study was limited to a survey administered to students enrolled in communication classes at that same university. That being said, valuable information about how students use mobile devices for educational purposes were explored with findings that should be considered when contemplating how mobile technologies may be used for both safe (traditional) and disruptive (non-traditional) learning activities.

Qualitative Pilot Study

Purpose

As a part of the proposed triangulation strategy and to increase the validity of the research, a pilot study was conducted for the qualitative portion of the research. Interviews were recorded and data collected, coded and summarized. The pilot study also tested the Interview Guide itself, to see if the proposed questions on both quantity and quality were sufficient to collect information from students about the phenomena surrounding the use of mobile technologies for enhancing the educational experience.

Participants

A total of three undergraduate students were interviewed. All three were volunteers selected from undergraduate communication classes who identified themselves as students who (a) own mobile technology in the form of smart phones, tablets and other such devices and (b) use them in some way for educational purposes. Two of the students were males and one was a female. Two were seniors in college and one was a junior. Various years of experience with mobile devices were accounted for as well as a variety of devices that were being used. Two of the students were communication majors (1 male, 1 female) and one was majoring in art. No ethnicity was determined for the participants of the pilot study. The aforementioned particular characteristics were noted but not treated as variables. The questions contained in the Interview Guide were as follows:

    What mobile devices do you currently use?
        A. Smart phone
                1. Android
                2. iPhone
                3. Other
        B. Tablet
                1. Type?

Please share with me your experiences using this device (these devices) as part of your educational experience.

What web-based applications do you utilize with these mobile devices for educational purposes?

Have any past or present professors incorporated or encouraged the use of mobile devices in their course(s)?
      A. If yes, please share the details.
      B. If not, do you wish they did?
           1. If so, then how would you suggest they use them?

What other purposes do you use your mobile devices for?

What other feelings or ideas about the use of mobile devices for the purpose of education would you like to share?

See Appendix F for the complete Interview Guide for the Pilot Study.

Informed consent forms were obtained from each participant prior to the interview (see Appendix G). Interviews were recorded and notes were taken for each interview. Interviews for the pilot study were not transcribed verbatim, but rather summarized.

Pilot Study Results

The results of this study concentrated primarily on key words and phrases and common themes found throughout all of the interviews. After reviewing the recordings and related notes, the interviews were coded, resulting in six main themes:

1. Why Mobile Devices and Smart Phones are Preferred

2. Personal and Educational Uses of Mobile Devices

3. Web Applications and Programs Used with their Mobile Devices

4. Possible Negatives Involved

5. Professors' Attitudes & Policies Concerning Mobile Devices

6. Student Recommendations for the Use of Mobile Devices for Education

Why mobile devices and smart phones are preferred. The number one reason for using a mobile device and smart phones in particular was convenience. Each person interviewed mentioned the convenience of mobile phones. Size was a factor relating to this answer as well as the ease of use. All three interviewees mentioned the fact that phones are always there anyway and therefore are a logical and practical choice for use in classrooms. Other reasons included portability, functionality and the timesaving feature mobile phones offer.

Mobile device usage. Mobile devices were being used by all the interviewees for both personal and educational use. The majority of the interviewees (66.67%) used smart phones, one used a tablet (33.3%) and iTouch (33.3%) respectively. It should be noted that Interview 3 had a device with limited capabilities and therefore could not access certain applications and functions.

For personal use, emails were mentioned along with texting, banking, budgeting and calendaring and Netflix. While Facebook was also included, one person indicated that there were not enough frequent changes in his Facebook for him to pay much attention to it (P3).

More pertinent to this study was discovering the use of mobile devices for educational purposes. As mentioned, there are some crossovers from personal use to education. The number one use of mobile devices in a traditional class setting was for taking notes. All the students mentioned it. Though smaller and therefore harder to operate, convenience was the winning factor for all three of the students who use their phones or a similar small device for taking notes. Interview 2 said he preferred his tablet for note taking over a laptop because it was faster. Interview 1 uses the camera function on his phone in a

novel way. He takes photos of what professors write on the whiteboard. It saves him time and allows him to have a record of it to refer to in the future.

Collaboration and communication with classmates and group members was also mentioned by all three of the students interviewed. Interview 1 gave examples of how he could post items for fellow students to review and critique. He mentioned that he could critique their work as well. Email was also an important educational function identified. It allows collaboration and communication with fellow students and with professors.

Other educational uses for mobile devices consisted of making checklists of assignments and things that need to be accomplished (66.67%), following the news, which was pointed out as being very important for certain majors. Frequently, the idea was mentioned of how mobile devices can be used to immediately look up information to make contributing comments during class discussions. Being able to reference the course textbook while in class was also mentioned. Table 3.1 summarizes student uses for mobile devices.

Table 3.1

Qualitative Pilot Study-Mobile Device Use for Education

		P1	**P2**	**P3**	**%**
Use for Education					
	Note-Taking	X	X	X	100%
	Collaboration	X	X	X	100%
	Communication	X	X	X	100%
	Organization & Check Lists	X		X	66.7%

Web applications and programs used with their mobile devices. The web-based programs mentioned most during the interviews were Facebook, Twitter, and a classroom project management system (Basecamp) that is accessible through the use of mobile devices (66.7% each). YouTube was also mentioned more than once, as was some limited use of Google Docs by at least two of the students. This information needs to be interpreted,

keeping in mind, that one student had a device with limited capabilities and therefore could not access certain applications and functions (P3).

From the variety of applications mentioned, it may well be concluded that a student's major is an important factor as to which applications might be most useful or required. The art major for example, mentioned a Kindle application that allowed him to use a "find" feature for taking open-book quizzes. That same student has a color swatch application that allows him to convert CMYK colors to other types. Other students involved in communication, mentioned the importance of news company applications to keep current and up-to-date on what is happening in the world around them. See Table 3.2 for complete analysis of the applications used in education.

Table 3.2

Applications Used for Education

		P1	**P2**	**P3***	**%**
Apps for Education					
	Facebook	X	X		66.7%
	Twitter	X	X		66.7%
	Project Management	X	X		66.7%
	Google Docs	X	X		66.7%
	Kindle	X	X		66.7%
	Dropbox			X	33.3%
	YouTube			X	33.3%
	Color Conversion			X	

* Pilot interview 3 had less mobile technology capabilities than P1 and P2 and than might be expected for students equipped with smartphones.

Other applications mentioned, but not trending with at least two or more of the interviews included Dropbox, YouTube and a CMYK application for converting colors.

One interviewee (P2) identified herself as having ADD and mentioned using Facebook during class to help her pay attention. "If the professor is going say something that I feel I can zone out on for the next 30 seconds, I can check on things and then I'm ready to

zone in again." She said that otherwise she would get bored and fall asleep. Texting was also a common practice for her. She admitted that this idea may find resistance and skepticism from professors, but it works for her.

Possible negatives involved. Though not many negatives were mentioned by students during the interview process, those that were conveyed are noteworthy. One concern about the use of mobile devices in the classroom setting was the possibility of having them become a distraction to both the students using them and the other students in class. As Pilot Interviewee 1 explained, "Sometimes when the material or lecture is repeat material, someone in class gets bored and starts checking their email and Facebook and it can distract others around them."

The second negative mentioned was the possibility of mobile devices and the accompanying applications and programs becoming addictive. Though several mentioned that distinct possibility, the potentiality didn't seem to be a deterrent to any of them for using their devices as much as needed or desired.

Professors' attitudes and policies concerning mobile devices. Professors' attitudes and policies concerning mobile devices seem to vary based on the subject matter. According to the observations of the undergraduate students interviewed for this pilot study, many professors teaching communication courses seem more open to the idea of using mobile devices and the accompanying resources for educational purposes. In fact, many of them encourage their students to know how to use mobile devices and social media effectively for use in future occupations. Professors of other disciplines however, are not quite so tolerant. Many see mobile devices as more of a distraction than a tool. Pilot Interview 1 related an experience where one professor's policy was that students would lose half of a letter grade if

their cell phone went off during class. He feels that the current generation is addicted to electronics and needs to learn to be otherwise. This possibly confirms the Koszalka and Ntloedibe-Kuswani (2010) conjecture that "m-learning designed to engage learners in immersive learning with supportive m-technologies is viewed as disruptive to the traditional instruction..." (p. 144).

Student recommendations for the use of mobile devices for education. There was a consensus from those interviewed that mobile devices should be incorporated somehow into the educational experience more than the limited ways that currently exist. As far as the professors themselves, Pilot Interview 3 said, "I believe that professors are uneducated, for the most part, about the capabilities of certain technologies and how they could apply them to their classroom setting."

Qualitative Pilot Study Summary

Based on the results of this pilot study, additional questions were added to the actual Interview Guide, which provided more information and detail in specific areas, including specific questions relating to the potential use of texting within the educational context and resources used for gathering information. A question was also added requesting ethnicity information.

The Qualitative Study Procedure

Interviews for the actual qualitative study were conducted during the fall semester of 2013. Each interview took place in the office of the researcher at a time convenient for each person being interviewed.

Five students were interviewed for the qualitative portion of this study. An interview guide was developed and utilized to help with the interview process. Informed consent

forms were obtained from each participant prior to the interview. All interviews were recorded and transcribed. A member check was performed by giving copies of the transcriptions to each person interviewed for their review, allowing for corrections and any additional information to be given as they deemed important or necessary. Three of the students interviewed made slight modifications, corrections and additions. Two students returned their transcriptions unchanged. Copies of the individual textural descriptions were also provided to each participant for their review. Changes and additions were allowed and made in the final documents.

Ethical Issues and Considerations

Procedures were incorporated to answer any ethical considerations associated with the study. This research, which involved human subjects, was under the jurisdiction of the Institutional Review Board (IRB) at the University of Idaho who is charged with "the protection of the human subjects in all research under the auspices of that institution" (Marshall and Rossman, 2011, p. 47). See Appendix H for the actual approval letter. Permission was also granted from the university where participants attended, based on the results of the IRB from the University of Idaho (see Appendix I for the actual approval letter). In addition, this research followed the procedures as outlined in the National Institute of Health (NIH) web-based training course "Protecting Human Research Participants." These ethical practices are grounded in the principles of: (1) Respect for persons, including their privacy and anonymity and their right to participate or not as established by free consent, (2) Beneficence, meaning that participants are not harmed by their participation in the study and (3) Justice, which relates to those who benefit and don't benefit from the study in relation to past societal injustices.

Participants were fully informed about the purpose of the study, the possible risks involved, that their participation was voluntary, that their identity is protected and the extent of their commitment to the study (Marshall & Rossman, 2011). Each participant in this study was identified by a number only, in order to protect their anonymity. All notes or recordings made during the interviews for the purpose of accurate data collection were protected and safely secured by the researcher and will eventually be destroyed. Participants also signed a detailed informed consent document for participation in the research project. A copy of the release form appears at the end of this dissertation (see Appendix J).

Data Analysis

Transcriptions were color-coded using a descriptive coding method, which assigns labels to data. This summarizes in a word or short phrase, the basic topic of a passage of qualitative data (Miles, Huberman & Saldana, 2014). All similar coded passages were then combined to construct a narrative concerning those labeled topics. As suggested in phenomenological studies, Individual Textual Descriptions were then developed for each interview concerning their use of mobile technology for enhancing their educational experiences (Moustakas, 1994). A table was then developed that summarizes interviewees' uses of mobile devices, including uses, resources and applications used (see Appendix K). Tables were also developed pertaining to the results of specific questions asked during the interview process. From these tables and the individual textual descriptions, a Composite Textual Description was developed capturing the *essence* of the undergraduate student experience with mobile devices for educational experiences. The Essence, or summary statement is then presented. (Creswell, 1998, 2013; Moustakas, 1994).

Participants

Participants for the qualitative portion of this study were undergraduate students attending a private university with a religious affiliation, located in the Northwest. Students from this educational setting were selected primarily because of their accessibility to the researcher and the ability to work with university personnel to select and interview these individuals.

Potential candidates for this study were students who met the following qualifications: (a) own mobile technology in the form of smart phones, tablets and/or other such devices and (b) use them in some way for educational purposes. Faculty members were asked to suggest names of students who fit the previously mentioned qualifications. One name was selected from those provided and used as the starting point. A snowball sampling method, also known as *network sampling* was then employed where the student first selected and subsequent students recruited other participants by name (Onwuegbuzie & Leech, 2007; Trochim & Donnelly, 2008). Five students were interviewed in all. The small number of participants proposed is consistent with and usually considered appropriate in phenomenological research (Cilesiz, 2010).

It should also be noted that generalized findings are not the objective for phenomenological studies. The goal is to obtain descriptions of experience and therefore having participants that are representative of the general population was not a concern (Cilesiz, 2010).

Interview Questions

The following questions were used to guide each interview with the five undergraduate students who were selected. Four questions were added to the survey (1, 7, 9

B, numbers one and two) after reviewing the results of the pilot study and recognizing that

additional information would be helpful for this research.

1. Will you please share your age & ethnicity with me? (Also note gender)

2. What is your declared major at this time?

3. What year are you in school?

    A. Freshman
    B. Sophomore
    C. Junior
    D. Senior

4. What mobile devices do you currently use?
    A. Smart phone?
        1. Android
        2. iPhone
        3. Other

    B. Tablet
        1. Type?

5. Please share with me your experiences using this device (these devices)
    as part of your educational experience.

6. What web-based applications do you utilize with these mobile devices for
    educational purposes?

7. What sources do you reach out and connect with when you need
    information?

8. What is the best experience you can recall, where mobile technology
    helped you in your education and learning?

9. Have any past or present professors incorporated or encouraged the use
    of mobile devices in their course(s)?
        A. If yes, please share the details.

        B. If not, do you wish they did?
            1. If so, then how would you suggest they use them?
            2. Do you think instructor text-reminders would be helpful?
            3. Could you share with me some of the policies regarding
                mobile devices you have experienced from your professors?

10. What other purposes do you use your mobile devices for?

11. What other feelings or ideas would you like to share about education and mobile devices?

See Appendix L for a complete copy of the Interview Guide.

Qualitative Results

Descriptive Coding Labels

The following words or themes were developed from the transcripts and used as category labels for coding purposes: *Communication, Collaboration, Research, Note-Taking, Social Media, Research/Resources, Scheduling/Organizing* and *Applications*. *Textbooks* was also considered a descriptive label for those who purchase and use digital copies of their various course textbooks.

Individual Textual Descriptions

Interview 1 (I_1)

Interview number one was a 21 year-old, Caucasian female, a senior in college who says she "can't imagine life without a mobile." The convenience it offers is a big thing for her. She has had an iPhone before, but currently has a Galaxy S4 because it is slightly more customizable and runs more applications. She always checks her email on her phone and is notified when a message arrives. She communicates with her professors through email and has even tweeted them during class.

From an educational standpoint, she uses her phone to take notes using the Notepad application and she also uses her device to "look up things." When looking up those items, she reaches out to a number of sources. Google was first on her list, though she feels a government website is more reliable as a source when available. She also explores company websites and has used Google Scholar when seeking more credible journal articles. In the

way of actual use of social media as a part of her education, one professor had students use Twitter and Facebook as part of class assignments. Using the school's iLearn (Brainhoney) course management system, she is also able to check her grades with her smartphone. Basecamp, a project management system for one of her classes, is another application she uses to check on jobs and communicate with classmates working on the same projects.

As a means of communication, email and texting are preferred because of the immediacy, or as she put it, "it's the quickest way of communicating." Texting and tweeting are also used for collaboration. "It's a great way for communicating with your group and having everyone on the same page. " She also has received and appreciated text reminders for exams and assignments from one professor and wishes that more professors would utilize texting or emails.

Looking at mobile use from a personal use perspective, Interview1 says it's a great way to keep in touch with family back home. They exchange text messages, photographs and enjoy Snapchat and FaceTime with each other. "It's a great way for communicating with my family even though I'm a thousand miles away." She says her life has changed so much because of social media and because of the technology available. She is pursuing a career in the field of social media and digital marketing.

Interview 2 (I₂)

Interview 2 was with a 23 year-old, Caucasian male who is a junior in college and uses an iPhone 5. He chose this device because of the ability to integrate the use of Calendar, email, Safari and so on. He has been using a cell phone with texting and calling capabilities since he was 14 or 15 years old. He describes himself as a constant device user,

"but not an annoying device user." He uses his phone professionally and for personal gratification.

Calendaring and scheduling are important uses to Interview 2 and he uses his iPhone as a personal assistant. Homework assignments are also managed through the Reminders application. He loves receiving email directly to his phone as well. Once in a while, he even plays games on his phone, but not often, because he knows it is too much of a time waster. He also mentions using Google Drive, which allows individuals to store documents and the ability to edit them in real time and see people editing them.

His mobile phone is definitely used for academic purposes. Note-taking is one of those uses, utilizing an application called Evernote, a cloud-based program which not only accommodates notes, but also allows a person to search the notes they have created to locate the certain words or topics. He describes that feature as "very useful." Interview 2 also believes that typing something makes it easier to remember than just writing something down, which includes taking notes and even tweeting information through the Twitter application. He also had a class where instructor assignments included creating tweets from their phones as part of the curriculum. Other than that, he has never had a teacher who utilized a smartphone or iPad in class. In fact he mentioned many negative policies of some professors relating to the use of mobile phones in their classroom, including the loss of one whole grade point by one professor and the breaking of a mobile device by another. Would he like to see more professors utilizing technology? Instructor generated text-reminders would be fine, "hands down." He worries, however about misuse of devices by those students that aren't as driven to learn. "I think mobile technology is a powerful platform for learning in the classroom in as much as it can be focused on the educational purposes."

Interview 2 related a personal experience that struck him about the potential of mobile devices. At one point when he was away from school and his computer, he remembered an online quiz he needed to complete within the next five minutes. He took out his mobile phone, took the quiz, submitted it and saw his score. "I just remembered that I needed to do an assignment. I got on my phone and did it." He described the results of this mobile activity as "a great feeling."

The ability to get news from sources like CNN alerts, NPR, Google News and an application called Flipboard allow him to keep up-to-date on current events, which was important to him. In fact, he talked about the ability to check out news stories they were discussing during public relations classes. Google is another resource he reaches out to for information as well as Wikipedia.

From a social media standpoint, Interview 2 tries to stay on Facebook, Twitter, Instagram and even Pinterest for personal gratification. Having a high Klout score is important to him. Being in a long-distance relationship he indicated required his involvement with Facetime, text messaging and lots of phone calls.

Interview 3 (I₃)

Interview 3 was with a 27 year-old, Caucasian male who was a first-semester senior at the time of the interview. He's an experienced cell phone owner, having had one for some 10 years and a smartphone since 2009. At the time of the interview, he didn't have a tablet, but shortly after the interview, as indicated on his transcript review, he purchased an iPad, which has replaced his laptop because "it is lighter and easier to transport." His laptop has now become his "home base" and his iPad has turned into his "mobile office and note-taking

center." He has also used the Kindle Application on his iPad to upload the digital version of his textbooks.

Before the iPad, his smartphone was his organizational and scheduling tool, which also kept track of his homework and such. iCal is the tool he uses for planning out his days and separating his classes by color on the schedule. iCal is also used to set alerts and reminders for his school work. He also indicated that he is "addicted to Gmail and the products that Google offers."

For educational purposes, he uses the internet browser on his phone to access iLearn, the school course management system. For group assignments in classes for his major, Podio is the application he and his peers use. Podio is an online work platform for collaboration and project management in one central place with tasks, calendar, contacts, activity stream and the ability to build Podio applications without any technical skill. He also uses his mobile phone to access all of his documents on his laptop. This synchronization is accomplished through the use of Google Drive. His note-taking application preference is Evernote, which allows the creation of a notebook for each class. Evernote also allows him to search his notes by a keyword or topic and synchronize his phone with his iPad. He can even take a photo of a handout or class document with his phone, send it to his computer screen, and make it a readable document. This document can then also be referenced with Evernote.

As an example of the effective use of mobile devices for assignments, Interview 3 related an experience where he was in a group that had 15 minutes to come up with a 30-second commercial for a toothpaste company. Everyone in their group took out their phones

and visited the toothpaste company website to see product facts and the existing advertising tagline. As he expressed the experience: "I wouldn't have been able to do it in another way."

Other applications being used include Gmail, which he says he uses "about 100 times a day." He also uses the mobile applications for CNN, NPR and Flipboard for news reception. In fact, he indicates that he uses his mobile devices to get all of his news information. For social media use he named Twitter, Facebook and the LinkedIn applications. For a practicum class at school, he uses a project management software (application) called Basecamp. In fact, he says he uses it all of the time.

When reaching out for other sources of information, Wikipedia is mentioned as the first place he goes with a qualification; he goes there and reads, but also goes to the reference section so he can read the original documents. Interview 3 also seeks information online from the library website offered by the university. Company and organizational websites are also visited and their newsroom link if they have one. He is glad he has this technology and can only imagine what his parents had to do for their education before mobile technology came along. "They had to go and check out books in the library."

For communicating and collaborating with group members for class projects, text messaging is the preferred means, even more than email. As a matter of fact, Interview 3 admits to texting a lot, but considers himself as being a moderately high, "but not an insane texter." He even admits sneaking in a text or two during class times. Most of the time text messaging is used for collaboration with co-workers and in group settings. He also subscribes to Remind 101, which allows him to receive instructor-generated text-message reminders from one of his professors. Does he like those reminders? "I wish my other

professors did the same thing. It saves me that step of going to my calendar and putting it in when something is due."

He feels that because almost every student has some mobile device, professors should use what they (the students) have in their hands. "I appreciate professors that welcome us bringing the devices to class. I think it would be to the benefit of the professors to allow students to bring them and use them. All the students want to be on their devices anyway."

Interview 4 (I$_4$)

A 24 year-old, Caucasian male was the individual interviewed for the fourth interview. He is a senior, majoring in communication with an emphasis in advertising and video production with a minor in web design. His mobile devices consist of an iPad 2 and an iPhone 5. He has owned a cell phone since he was about 14 or 15 years old. His iPad 2 is used more than anything and he indicates that he can do anything with it that most students rely on their laptops to do. He is very enthused about his iPad 2 for a number of reasons. First, he feels his MacBook Air is too bulky. Second, his iPhone 5 is very small and is hard to type on except for sending text messages. With the iPad, he can use all 8 main keyboard fingers and type things out fairly quickly. He can easily carry it anywhere and even use it in classrooms pretty well unnoticed by others because of the size.

Interview 4 keeps his textbooks all on his iPad, as long as they can be found on iBooks or Kindle. If not available from those sources, he will resort to buying hardcopy versions of the books. His iPhone is only used to text people or actually call them, but he can also text from his iPad to people who also have an Apple product.

In a brief summary of what he does with his iPad, Interviewee 4 talks about emails, books and research. He also indicates the ability to access Brainhoney, the university's course management system (also known as iLearn), though he also notes that it isn't the best for mobile devices. In spite of that, he can still do quizzes and written assignments from iLearn with his mobile devices. Interview 4 also admits to being a visual learner. As such, he finds watching YouTube videos helpful for learning new things and understanding concepts better.

When he talks about his digital textbooks, he notes the speed and ease of use. If, for example, a teacher gives a quiz and says you can use your book, he is able to use the search feature to find the answers a whole lot faster. He has additional sources for finding answers, however. He says he "googles" everything first and also visits websites to see if it is reputable, based on how it looks and reads. He also uses friends as a resource by posting questions on Facebook and then letting those friends guide him to a website or perhaps even supply the answer. Friends to him are a "big time" resource.

For taking notes, he uses Evernote. He likes the fact that it is cloud-based and he doesn't have to worry about losing his notes or buying paper. For collaboration with groups, the preference for Interview 4 is Google Drive. He can work on projects with others by using his iPad and Google Drive, which allow him to share a document with others, updating, adding and commenting as needed. The documents can be in Excel, Word or even PowerPoint. It too is Cloud-based, meaning you don't have to worry about transferring it to another computer. These documents can be worked on from wherever and printed from wherever as well. He likes the fact that because of these applications and programs, groups don't necessarily ever have to meet in person. It can all be electronically accomplished. If

meetings are needed, Google Hangout can be used to visit together online at the same time, using computers or mobile devices.

Other Google products he uses include Google Docs and Google Analytics. In fact, one 300 level class he attended used Facebook and Google Analytics to track what they were trying to create. He also notes another time he remembers when a big assignment was due. This particular assignment represented a big part of his grade. He found he could do it all using his iPad. "I learned how important my iPad is to me in being able to get certain things done that are so important."

Texting for him is basically a fast way to get things done. It is a way of getting a message to people and not worrying about whether or not they will answer the phone. People don't have to stop what they are doing to get his messages and hopefully they can respond to him immediately. He likes the idea of text-message reminders from instructors. "People, generally Millennials, check their texts more than emails. Getting a text from an instructor will be more helpful in not getting lost."

Interview 4 closed his comments with the recognition that certain students will always use mobile technology in a wrong way, like texting in class or doing other things not related to education. Nevertheless, he feels it should be embraced. "I feel like technology is there to learn a lot of things…I feel that embracing it helps those who use it the right way feel more comfortable when they use it in class."

Interview 5 (I₅)

Interview 5 was with a 21 year-old female, college senior who is Caucasian. She owns an iPhone 4S, which she says is mostly used for organization and being connected. The interview, however, revealed some additional uses as well. Right from the onset, she

mentioned her mobile phone being used for emailing, keeping contact information, texting and Twitter. In fact, she has all of her personal and school email sent to her phone, which she says is nice. She also takes notes in classes using her phone.

Interviewee 5 also thinks "it is nice to be able to look up stuff." Google is the first place she goes for an initial search. She has the Google application on her phone, but it all depends on what the search is for. For public relations assignments, she uses PR Daily. For advertising assignments, she goes to Ad Week. But generally speaking, she finds Google the best and looks at the first few options listed on the search results there.

She has a number of applications on her phone that she finds useful including a mailbox application, a reminder application and texting too. For social media, she uses Instagram, Facebook and Foursquare. For gathering news information, she uses applications from CNN, BuzzFeed and the Associated Press (AP). She mentions having Skype on her phone, a calorie counter, the TV Guide application, Netflix, along with an application with photo editing capabilities. But by far, the "big one" for her is Twitter. One of her public relations classes has students actually tweet in class. She also uses Twitter for connecting with people in the local chapter of Public Relations Student Society of America (PRSSA) by utilizing their organizational hash tag. It allows them to keep track of who is tweeting them. She also actively writes tweets as a part of her internship and feels very familiar with how to use it.

For collaboration purposes, Google Drive is the program of choice. "It's nice because we don't always have time to meet as a group. We can get on Google Drive and have all of our stuff there where we can all work on it at the same time, even if we're not in the same place." She also indicated they have lots of folders including PDF files. "It is nice

to have all of that with me on my phone. If I need it for anything, I can pull it up." She has also increased her use of Basecamp recently. This is a project management application that she uses for deadlines and communication in her work with Soapbox, the student-run advertising agency.

Texting is also important to Interviewee 5. She uses it for keeping in contact with friends and parents and also communicating with her boss when she needs a quicker response and doesn't have time to email. She also thinks that instructor-generated text reminders for assignments would be helpful, especially because sometimes students don't have access to their email or iLearn.

She feels a bit hindered by the fact that most professors discourage the use of mobile devices within the classroom. "Sometimes in a class I feel restricted when I can't pull out my laptop or phone. If I have a question, I want to search it myself, usually. If I feel like I can't do that, then I feel like I'm holding back on what I want to learn. I would say that mobile devices in the classroom would be more positive than negative, especially in a college setting." She also feels that knowing how to use a smartphone or tablet in the college setting helps prepare students for their profession, "because professionals use tablets and smartphones a lot."

Interview Summary

Based on the information gathered from the five interviews with undergraduate students and the Individual Textual Descriptions, a Qualitative Structural Chart was developed (see Appendix K). This chart visually summarizes the mobile devices used by the students along with the various uses for educational and personal use. The applications utilized by each individual are also indicated on the chart. Priority is given to the expressed

educational uses of mobile devices, resources and applications. The following information addresses each important question in the survey relating to the use of mobile devices for educational purposes and uses portions of that Qualitative Structural Chart.

Mobile Devices

The smart phone was the main mode of communication for all of the interviewees. None mentioned the use of a mere cell phone. As one student expressed it, "I think it is essential for me to have a smartphone, especially in the Communication Department" (I_1). In addition 40% of the interviewees were also using a tablet, specifically indicating iPad as their choice. Interview 4 was exceptionally pleased with his. "I know a lot of students use their laptops for doing things. I can do everything that they are doing with my iPad2 and more as well" (I_4). See Table 3.3 for the types of devices owned by the students interviewed for this study.

Table 3.3

Types of Mobile Technology Devices

	I_1	I_2	I_3	I_4	I_5	%
Smart Phone	X	**X**	**X**	**X**	**X**	**100%**
Tablet			**X**	**X**		**40%**

These devices are being used by all interviewees (100%) to communicate through email and text messages. Two (I_1, I_5) are also using Twitter to communicate. Only one person indicated the use of Skype (I_5) and one interviewee using FaceTime (I_2). Only two of those interviewed mentioned using their smartphones to make actual phone calls (I_2 , I_4). Even this came after some prompting from the interviewer, which seems rather interesting, being that a common purpose for a phone is usually for that purpose.

Educational Functions and Uses

In respect to using mobile devices for educational purposes, the interviewees

mention six diverse functions: note-taking (100%), social media (100%), communication

(100%), collaboration (80%), organizing and scheduling (80%), along with accessing their

textbooks (60%). It must be noted that social media was used to facilitate communication

and collaboration with students and instructors.

The most frequently mentioned functions mobile devices were used for in education

were for note-taking (100%) and communication (100%). The second most frequent

function mobile devices were mentioned being used for in education was to collaboration

with other students (80%) and to help with, organization and scheduling (80%). In addition,

60% of the interviewees mentioned their mobile devices for accessing their textbooks. Table

3.4 summarizes the functions used by each interviewee.

Table 3.4

Functions of Mobile Devices for Education

Functions	**Interviewee**					**%**
	I$_1$	**I$_2$**	**I$_3$**	**I$_4$**	**I$_5$**	
Note-taking	X	X	X	X	X	**100**
Social Media	X	X	X	X	X	**100**
Communication	X	X	X	X	X	**100**
Collaboration	X		X	X	X	**80**
Organizing & Scheduling		X	X	X	X	**80**
Textbooks		X	X	X		**60**

Social Media. Though most often associated with personal use, social media is being

used by 100% of those interviewed (n=5) for educational purposes as well. Each of the

students interviewed (n=5) mentioned using Facebook and Twitter as part of an in-class

assignment in one of their communication classes. Facebook was mentioned for education,

especially for the ability to post messages to other students. Communication and

collaboration were the main uses for social media applications. See Table 3.5 for details on social media and applications.

Table 3.5

Social Media Used for Education

Social Media	Interviewee					%
	1	**2**	**3**	**4**	**5**	
Facebook	X	X	X	X	X	100
Twitter	X	X	X	X	X	100

Communication. For the purposes of communication between students, text messaging and e-mail are the most popular in that order. One student explained, "We don't communicate over email as much as we do through texting" (I_3). All five students interviewed use text messaging (SMS). They like it for the immediacy. "I think it is the quickest way to communicate…text messages are the only way for getting to some students" (I_1). Three students (60%) even mentioned receiving text message reminders from their instructor, which they felt were helpful. As one said, "I appreciated the text reminders. That was helpful for our test last week" (I_1). Another student even went so far as to say, "I wish my other professors did the same thing. It saves me that step of going to my calendar and putting in when something is due" (I_3). Email is not ignored, however. "My mailbox app I use a lot. I get my email (school) as well as personal email forwarded directly to that. I always get my email on my phone. It is nice" (I_5). Table 3.6 summarizes the forms of mobile communication used by the students.

Table 3.6

Forms of Mobile Communication

Communication	Interviewee					%
	1	**2**	**3**	**4**	**5**	
Text Messages	X	X	X	X	X	**100**
E-Mails	X	X	X	X	X	**100**
Twitter	X				X	**40**
Skype					X	**20**
Face Time		X				**20**
Phone Calls		X		X		**40**
Text reminders	X		X	X	X	**80**
Basecamp	X		X		X	**60**

Collaboration. To collaborate with other students the students equally mentioned using Google Drive, Basecamp, and Twitter (60% each). More specifically, Google Drive was mentioned because the application has the ability of allowing documents to be worked on together and edited in real time. Interview 4 explains:

Through Google Drive, I can collaborate with other people through my iPad. I share a document with people and they can update stuff and we can add to the document, see what others have written and comment on it. We don't ever have to meet in a group necessarily.

Table 3.7 summarizes the applications the interviewees used for collaboration.

Table 3.7

Applications Used for Collaboration

Applications	Interviewee					%
	1	**2**	**3**	**4**	**5**	
Google Drive		X		X	X	**60**
Twitter	X	X	X			**60**
Basecamp	X		X		X	**60**
Podio			X			**20**
Texting	X		X			**40**

A complete list of social media sites and associated applications is located in Appendix F. The following tables are but a summary of the more important parts of that document. Table 3.8 identifies the most popular applications used for education by the interviewees.

Table 3.8

Most Popular Applications for Education

Applications	Interviewee					%
	1	2	3	4	5	
Evernote		X	X	X		60
Google Drive		X		X	X	60
Twitter	X	X	X			60
Basecamp	X		X		X	60
CNN		X	X		X	60
NPR		X	X			40
Flipboard		X	X			40

Note-taking. While 100% of the interviewees mentioned using mobile devices for taking notes in class not all of them mentioned the note taking application used. In the way of applications for educational purposes, Evernote was the application of choice for taking notes and was mentioned by 60% of the students. Evernote, a cloud-based program which not only accommodates notes, but also allows a person to search the notes they've created to locate the certain words or topics, which one student indicated as "very useful" (I_2). Another student even takes a photo of handouts and class documents with his phone, and then sends it to his computer screen to make it a readable document, which can then be referenced in Evernote (I_3). One student mentioned Notepad as their application of choice for taking notes and one student did not indicate a specific application being used for that purpose. See Table 3.9 for a complete summary of the applications used for taking notes.

Table 3.9

Applications Used for Taking Notes

Applications	Interviewee					%
	1	**2**	**3**	**4**	**5**	
Evernote		X	X	X		60
Notepad	X					20

Organizing and Scheduling. The second most frequent function for education mentioned for mobile devices was the ability to help with personal organization and scheduling (80%). Smart phones (I_3), iPads (I_3) and iPhones (I_2) were all identified as being used to help with organization and scheduling. One student recognized his iPhone as a 'personal assistant' and managed his homework through My To-Do List (I_2). One student mentioned using iCal for planning out his days and separated his classes by color on his schedule (I_3). He also used iCal to set alerts and reminders for his school work (I_3).

Textbooks. It must be noted that 60% of the interviewees mentioned using mobile devices to access their textbooks. More specifically the Kindle application is used to upload digital textbooks (I_3). Another student keeps all his textbooks on his iPad, as long as they can be found on iBooks or Kindle (I_4) because they are easier to use. For example, when a teacher gives a quiz and says you can use your book, he is able to use the search feature to find the answers faster than other students with a traditional textbook (I_4).

Research and Information Sources

Students in this technological age are using their mobile devices to reach out and connect with various sources of information or *nodes* as they are called in Connectivism. With the use of these devices and the Internet, they attempt to gather information for educational purposes. In response to the questions as to what sources they reach out and connect to for finding information, 80% of the students (n=4) identified Google as their first

means of searching for that information. As one student put it, "I have a Google app as well.

Google is the initial place I go…Google is the best bet, usually" (I_5). In response to how

they handle the quantity of information that results from a Google search, Interview 5

continues by saying, "The first hit is usually the best in my opinion. I'll look at the first few

and look around and gather information." Another student (I_3) named Wikipedia as the first

place he goes for information indicating he used the reference section to find the original

documents. Other notable mentions include company and organization websites (60%) and

news sources (60%) such as CNN, NPR and Google News. Additional resources mentioned

by at least one interviewee included searching previous class notes (I_2), looking at trade

publications (I_5), asking friends through Facebook (I_4) and also viewing YouTube (I_4).

Table 3.10 summarizes the internet resources used by the students.

Table 3.10

Preferred Informational Resources Accessed by Mobile Devices

Resources	Interviewee					%
	1	**2**	**3**	**4**	**5**	
Google	X	X		X	X	80
Company/Organization Websites	X		X	X		60
News Sources		X	X		X	60
Wikipedia		X	X			40
Trade Publications					X	20
Friends				X		20
Notes		X				20
YouTube				X		20

Experiences

All students interviewed could easily and instantly recall a time when mobile

technology helped them in their education and learning. In many cases, these were instances

where mobility and portability allowed them to fulfill an assignment or take a quiz that they

otherwise would not have had computer access to complete. Three of the students indicated

a time they would have missed an assignment if they had not had a mobile device. Interview 1 recalled a time when she was participating in a video shoot for the student-run advertising agency, which was set to take place at 4:30 in the morning, but didn't know where to meet. She posted a message with a mobile device on the project management site simply saying, "Where are we to be right now?" Three people responded immediately. She indicated, "it is really convenient to be able to communicate with people in that way" (I_1).

Another time, a quiz that would have been missed had it not been for their mobile device. The student (I_2) took the quiz, submitted it and saw their score, which resulted in what was described as "a great feeling." "I just remembered that I needed to do an assignment. I got on my phone and did it. That is what mobile technology needs" (I_2). For the fourth interviewee it was a big assignment that was almost missed and no laptop computer was available. He did have an iPad, however and found that the assignment could all be done with that mobile device. "I remember as I hit the submit button, I was like 'oh my heck'…I learned how important my iPad is to me in being able to get certain things done that are so important" (I_4).

A few semesters before the research interview, Interview 3 had an in-class assignment to create a 30-second commercial for a toothpaste company. They had 15 minutes to accomplish it. As he reported the event, everyone on his team took out their phones, went to the company website to gather facts about the toothpaste and was able to complete the assignment. As Interview 3 succinctly recalls, "I wouldn't have been able to do that another way" (I_3).

Another student identified the effectiveness of using mobile devices with the student-run advertising agency that works on projects with various clients. All of the projects have

deadlines. She has the mobile application for Basecamp, a project management tool and finds it very helpful in this situation. "My emails are sent directly to me. That helps me know what I need to do, when I need to do it, who is talking to me on Basecamp" (I_5). Obviously, the advantages in these types of situations are the abilities to organize, set priorities, and meet deadlines while communicating with the appropriate individuals.

Needless to say, other examples could have been presented, but the interview time and space were restrictive. Such examples confirm that the mobility, portability and convenience associated with mobile devices and the accompanying applications are indeed assisting students in their various learning and educational activities on a regular basis.

Classroom Acceptance of Mobile Devices

If mobile devices and the accompanying applications are in fact, as helpful as portrayed by the responses of those students interviewed, they must certainly be seriously considered as potential tools in the field of higher education. But how well are they being utilized by colleges instructors as part of their educational pedagogies and strategies? The interviews revealed the answer for this particular university, indicating many of the professors being unreceptive and in some cases antagonistic at this point in time. One student (I_2) made an observation, "I don't think that I've ever had a teacher with a smartphone or an iPad being utilized in the classroom …..Almost every teacher has a phone policy to not have them out" (I_2). In fact, he related a policy of one teacher where if a student's phone is out and they are using it during class, their letter grade for the course is dropped a full point. Rumors also exist on the campus about some extreme situations where an irritated instructor has actually thrown a student's phone across the room. Another

student (I_5) shared her feelings about such policies and sees them as very restrictive to education.

> Sometimes in a class I feel restricted when I can't pull out my laptop or phone. If I have a question, I want to search myself usually. If I can't do that, then I feel I'm holding back on what I want to learn (I_5).

In spite of the perceived heavy-handedness in regards to the use of mobile devices in classroom settings, there are some bright spots and acceptance of the practice in certain classes. Interview 1 revealed some mobile device and application practices incorporated into class activities and assignments. Facebook and Twitter were both mentioned being used. Another student identified how smartphones were used in class to research a company for an assignment and as a reference tool to look up quotes from religious leaders (I_3). Another teacher was the topic of conversation because of their invitation to students. "He said, that whatever piece of technology you have to track stuff, bring it with you" (I_4). That exercise involved Facebook and Google Analytics to track the things the students had created.

Composite Textural Description

Undergraduate students equipped with smartphone technology are finding ways to enhance their education with or without the encouragement or endorsement of educators. They favor mobile technology because of its mobility, portability and convenience in usage. Each can cite an experience where mobile technology has "saved them" or has at least made an assignment easier in some way. Within the classroom, mobile devices are being used for taking notes with the most popular application being Evernote because of its versatility and search capabilities. Organization and scheduling is also important to students and mobile devices have been helpful there as well. Mobile devices also help students keep track of

assignments and homework due dates. The school course management system (*iLearn* also known as *Brainhoney*) was also identified as a useful tool for these purposes, though its format is not currently conducive to mobile devices.

Texting was identified as the preferred method of communicating because of the ease and immediacy. It also facilitates collaboration when groups or individuals are working on projects together. Some have received text-generated reminders from instructors about assignments and examination dates. Those students loved that concept and would welcome such communication from all professors. Email is the next most popular way of communicating, but even Twitter, regularly associated with social media, was used to facilitate communication.

Google products and services are used by all students. For research, they used Google first, but also relied on company and institutional websites. Some even used Google Scholar to look up more credible sources. The students were not afraid to admit that they often used Wikipedia as a starting point for information, especially on new topics, about which they had no prior knowledge. Digital textbooks were the norm for these students. They are less expensive and have a search quality that makes looking up and locating topics easy. The students indicated receiving the latest news and information from CNN, NPR, BuzzFeed, Flipboard and other similar applications. They also have access to specific publications dealing with their particular majors.

For work on group projects, Google Drive was the most popular application. It utilizes the Cloud, which makes documents accessible from anywhere, by anyone. It negates the necessity of meetings when time is of the essence. In addition, PDF files can be added and become part of the searchable documents as well. Anyone in the group can work on the

document in real time, which is very conducive to a collaborative effort. Other Google products used for collaboration are Google Docs and Google Hangout, which is a live, visual and audio conferencing service for multiple people.

Social media was also identified as a part of the educational process. Facebook, and Twitter were used in some class assignments with the results analyzed by using Google Analytics. Social media however, was used most often on a personal basis. Facebook, Twitter, Instagram, Pinterest, Snapshot and more are all mentioned as a part of the personal process of communicating with friends and family members. Taking and sharing photos is also part of their social communication.

These students have learned through experience, that outside of the Communication Department, most professors don't allow the use of mobile devices in their classrooms. In spite of that, the feeling is unanimous that instructors should utilize more technology, especially since all of the students use mobile devices constantly anyway. The students acknowledge that mobile devices, if allowed, will be misused by some students, but feel that the advantages to having them in the classroom is worth it, even above the few distractions caused by a minority of the students. If students already have mobile devices and are using them anyway, why not seek ways to positively incorporate them into the leaning process?

The Essence

The use of mobile devices such as smartphones and tablets by students is ubiquitous. These devices are being used by students in multiple ways and with various web-based applications and programs to enhance their educational experiences. Students welcome the incorporation and practical application of mobile technologies by instructors as a regular part of the educational experience.

Quantitative Study

All five students interviewed (100%) in the qualitative, phenomenological portion of this study mentioned that texting is their preferred form of communication. They were also unanimous in their belief that instructor-generated text-message reminders might positively benefit students' learning and course performance. This supports previous studies, which have indicated this potentiality as well (Harley, Winn, Pemberton & Wilcox, 2007; Jones, Edward & Reid, 2009). Remind 101, an application allowing instructor-generated, text-message reminders to be sent to students, was used for this study as a means of testing the positive implications of such a program. The purpose was to test whether or not such messages were perceived by participating students as being beneficial to their overall course performance and to corroborate information from the phenomenological study.

Quantitative Research Hypothesis

H: Instructor-generated, test message reminders using Remind 101 significantly increase students' perception of their overall course performance.

H_0: Instructor-generated, text message reminders using Remind 101 do not significantly increase students' perception of their overall course performance.

Quantitative Pilot Study

A pilot study was conducted during July of 2013, involving 28 students enrolled in a 200 level, introductory, advertising course. Each student was given the opportunity to receive instructor-generated text message reminders of assignment due dates and examination opening and closing dates. Twenty-three students (82%) voluntarily received text reminders. The free program, Remind 101 was used which allows instructors to send

one-way text messages to students. The privacy of student and instructor cell phone numbers was protected through this program.

Participants

Fifteen of the students were male and 13 were female ranging in ages from 19 to 27 years-old with a mean age of 22.5 years. The class consisted entirely of sophomores, juniors and seniors. Twenty-three of the students (82%) volunteered to receive instructor-generated text message reminders of assignment due dates and opening and closing dates for examinations. A chi square goodness of fit test revealed that significantly more students than one would expect by chance chose to participate in Remind 101, $X^2(1, N = 28) = 9.143, p = .002, w = .327$ (medium).

Methodology

A free, web-based application called Remind 101 was used for the pilot study during the Spring Semester of 2013 to send instructor-generated text message reminders of assignments and examination dates. At the conclusion of the semester, a survey was administered to all students in the course; those who voluntarily received the text reminders ($n = 23, 82\%$) and those who had chosen not to receive them ($n = 5, 18\%$). The survey consisted of qualitative questions designed to discern students' perceptions of the Remind 101 program in relation to course performance and grades. The survey questions were as follows:

1. Did you participate in the Remind 101 texting program?
   a. *If Yes* - Do you think participation in the Remind 101 program helped you to be more successful in the course? Why? Why not?

b. ***If No-*** Do you think you would have done better in the course if you had

participated in this program? Why? Why not?

2. Would you participate in this program if it was offered again? Why? Why not?

Quantitative Pilot Study Results

A chi square goodness of fit test revealed that significantly more students than one

would expect by chance, chose to participate in Remind 101, $X^2(1, N = 28) = 9.143, p =$

.002, $w = .327$ (medium). Guidelines for interpreting Cohen's w (1988) are: .10 for small,

.30 for medium and .50 for a large effect size. See Table 3.11 for the complete statistical

summary.

Table 3.11

Participation in Remind 101 Goodness of Fit

Participate	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	22	78.57	14	8.0	2.138	.05	more
No	6	21.43	14	-8.0	-2.138	.05	less

A chi square goodness of fit test revealed that significantly more students than one

would expect by chance, believe that participation in Remind 101 helped them to be more

successful in the course, $X^2(1, N = 28) = 11.571, p = .001, w = .413$ (medium-large). Table

3.12 summarizes the results of the chi square goodness of fit test.

Table 3.12

Success in the Course Goodness of Fit.

Participation helped	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	23	82.14	14	9.0	2.405	.05	more
No	5	17.86	14	-9.0	-2.405	.05	less

In addition a chi square goodness of fit test revealed that significantly more students than expected by chance, would participate in Remind 101 if offered the chance again, $X^2(1, N = 19) = 15.21$, $p < .001$, $w = .80$ (large). See Table 3.13 for complete statistical report.

Table 3.13

Participate Again Goodness of Fit

Future Participation	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	18	94.74	9.5	8.5	2.76	.01	more
No	1	5.26	9.5	-8.5	-2.76	.01	less

Based on the analysis of data from the pilot study, the following conclusions were drawn:

1. When given the option, a majority of students will choose to participate in the Remind 101 instructor-generated, text reminder program (82%).

2. Students believe that participation in receiving instructor-generated, text message reminders through Remind 101 helps them to be more successful in the course (87%).

The main way the participating students in the pilot study felt Remind 101 helped them was by the reminding function itself (n =13) including as a reminder of assignment and tests (n = 9). This was aptly exemplified by one student who stated, "If for some reason I had forgotten about a test or assignment, an SMS (text message) was sent the day of to remind me." Others commented on how it helped them stay on track (n = 2), kept them prepared (n = 1) and acted as a back up to their own ability to remember (n = 1).

There was some criticism as well pertaining to the occasional inconsistency of the messages and the timing employed for some of the reminders (n = 3). Examples of these comments include the following: "It was helpful when the texts went out, but sometimes there wasn't one sent" and "I thought they could be a little more timely." These criticisms

helped shape and improve the timing and consistency of messages sent during the actual study. See Table 3.14 for comments regarding how Remind 101 helped them.

Table 3.14

How Remind 101 Helped Participants Improve Their Course Performance

Themes	Total Comments
It reminded me	13
Help me remember assignment/tests	9
Helped me stay on track	2
Could have been more consistent/timely	3
Kept me prepared	1
Good back up in case I forgot	1
Digital reminder with sound	1

Most importantly, the students would participate again in the program if it were offered (78%). The most frequent reason cited for participating in Remind 101 again was because the students felt it was helpful (n = 3) with two students expressing their wish that all their instructors would use it. Examples of related comments include statements such as:

- "Because it was useful and free."

- "I definitely would."

- "Having a reminder is always helpful."

Some students took a different approach to the reasoning stating, "It can't hurt and text messages are free." Even some students in the class who hadn't participated in the program, indicated that they would the next time if it were offered again with one student reasoning, "So I wouldn't miss a project." Table 3.15 summarizes the reasons given for participating if it should be offered again.

Table 3.15

Why Students Would Participate in Remind 101 Again

Categories	Total Comments
Helpful	3
Extra reminder is good/to remember	1
Organization	1
Love to have it in every class/nice	2
So I won't miss a project	1
Convenient	1
Text messages are free	1
Need to be more timely/consistent	1

Quantitative Pilot Study Summary of Results

A chi square goodness of fit test revealed that significantly more students (78.6%) than one would expect by chance chose to participate in Remind 101, $X^2(1, N = 28) = 9.143$, $p = .002$, $w = .327$ (medium) with significantly more students (82%) than one would expect by chance to believing that participation in Remind 101 helped them to be more successful in the course, $X^2(1, N = 28) = 11.571$, $p = .001$, $w = .413$ (medium-large). In addition significantly more students (94.7%) than expected by chance, would participate in Remind 101 if offered the chance again, $X^2(1, N = 19) = 15.21$, $p < .001$, $w = .80$ (large).

As a result of the pilot study, slight changes were made to the survey before proceeding to the actual study. Changes included a small format rearrangement to allow for better flow for answering questions and an additional question was asked pertaining to the nationality of those surveyed. See Appendix N for the actual survey. Comments concerning consistency and timing of the messages were noted and adjustments made on the part of the instructor for the actual study.

Methodology-Quantitative Study

For the actual study, text messages were sent throughout the entire fall semester of 2013

from the instructor to students attending three different communication courses. Those

receiving the reminders volunteered to do so. As in the pilot study, these messages were sent

to mobile devices using the program called Remind 101. Each message reminded students of

assignment due dates and the opening and closing dates of examinations. The number of text

messages sent during the semester to each student varied, based on the number of

assignments and exams for each course. Remind 101 kept a record of the number of

messages sent and the content of each. Examples of the text messages sent to students in

both the pilot study and the actual study are found in Figure 3.2. The total number of text

messages sent during Fall Semester 2013 was 53 at an average of 17.7 per class.

Comm 230	Comm 332	Comm 385
Exam #4 opens and closes on Wednesday (tomorrow). Your banner ads are also due tomorrow. See iLearn for instructions. Your positioning statement and big idea are due tomorrow. See you then.	Reminder: Personal project #10 is due tomorrow. See iLearn for details. Exam #3 closes today. Class tomorrow at our regular time. Bring your completed sales report with you. Refreshments will be served. See you then.	Just a short reminder that MFP #6 is due tomorrow at class time. See you then. Exam #4 closes today in the Testing Center. Good Luck.

Figure 3.2. Samples of instructor-generated text message reminders sent to students.

Participants

Participants in the study were undergraduate students at a private university located

in the Northwest. They were all students enrolled and attending various communication

classes in the 200 to 300 course levels during the fall semester of 2013. As part of the

orientation for each course, the web-based application, Remind 101 was explained to the

students with instructions given for involvement in the program. Student participation was

totally voluntary and no grading was associated with their choice to participate or not (see

Appendix M). As previously explained, the program, Remind 101 allows student phone numbers and the instructor phone number to remain private.

The total number of participating students from all three classes was 50 from a possible 69 students enrolled. This represents a 72.4% participation rate. In addition, 62 of the 69 students agreed to take the survey administered at the end of the semester. This represents an 89.9% response rate. Of the 62 students who chose to participate in the survey, 53% were male (n = 33) and 46.8% were female (n = 29). Seniors were the predominant members of the group at 72.6% (n = 45) with juniors next at 24.2% (n = 15) and sophomores representing 3.2% (n = 2) of the participants.

The ages ranged from 19 to 29 years old. The mean age was 22.97 with the median and mode at 23. The mean age tends to be higher for the students at this university than might be expected because many spend 1.5 to 2 years in humanitarian service away from the campus sometime during their undergraduate years, thus resulting in an overall older age at the time of graduation than might be expected.

With respect to ethnicity, the majority was Caucasian at 82.3% (n = 51) with 8.1% identifying as Latino/a (n = 5). Two students were bi-racial at 3.2% (n = 2). The least common were Asian, African-American and Native American, which represented 1.6% of the participants respectively. One student did not identify an ethnicity (1.6%).

Data Collection

A short survey was administered to students in three participating communication classes at the end of the semester. The survey design followed guidelines and suggestions from Dillman, Smyth and Christian (2009). At the end of the semester, all students were asked to voluntarily complete a short survey regarding their experiences with or without

having used Remind 101. The survey questions identified students' participation in the

program or choice for non-participation. It also measured students' perceptions of the

effectiveness of text reminders as it related to improved performance and course outcomes.

Those who did not participate in the program were also included in the survey process and

asked about their perceptions (see Appendix I for the complete survey).

Results

Of those students surveyed, the majority (71%) were those who chose to participate

in the Remind 101 program (n = 44) with 29% choosing not to participate (n = 18). A chi

square goodness of fit test revealed that significantly more students than one would expect

by chance, chose to participate in Remind 101, $X^2(1, N = 62) = 10.903, p = .001, w = .18$

(medium-small). Table 3.16 summarizes the chi square results.

Table 3.16

Participation in Remind 101 Goodness of Fit

Participate	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	44	70.97	31	13	2.33	.05	more
No	18	29.03	31	-13	-2.33	.05	less

An examination of the 44 students participating the Remind 101 who completed the

survey revealed 88.6% (n=39) believed participation in Remind 101 helped them in their

overall course performance and/or grade with only 11% of the students (n = 5) indicating it

was not helpful. A chi square goodness of fit test revealed that significantly more students

than one would expect by chance, believed that participation in Remind 101 helped them to

be more successful in the course, $X^2(1, N = 58) = 27.586, p = <.001, w = .48$ (medium-

large). See Table 3.17 for the complete statistical analysis.

Table 3.17

Participation in Remind 101 and Course Success Goodness of Fit.

Participation helpful	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	49	84.48	29	20	3.71	.01	more
No	9	15.52	29	-20	-3.71	.01	less

The most common benefit cited for participation in Remind 101 was the fact that it reminded them (n = 22). The second most important reason was the ability to remember assignments and tests (n = 7). While not as strong a theme, it was notable that assistance for remaining organized (n = 3) and staying on track (n = 3) were also important themes from student comments. Multiple participants also mentioned the convenience of reminders on their phone as being an important factor (n = 2). Table 3.18 gives a count of some of the common reasons why students felt participation in Remind 101 helped their performance and grade.

Table 3.18

How It Helped Participants Improve Their Course Performance

Categories	Total Comments
It reminded me	22
Help me remember assignment/tests	7
Helped me stay organized	3
Helped me stay on track	3
Phone was always with me	2
Prepared me	1
Less stress	1
Made me confident	1

In must be noted that two participants in the program felt it had not improved their performance or grade. One felt that the text reminders were sent too close to class time. The other individual felt they were already aware of what was going on in the class without the text reminders.

Non-participants. Of the 18 that chose not to participate, only eight responded to the question as to whether participation might have helped them. Of the eight students, two believed participation would have increased their grade with six indicating their belief it would not have improved their grade. Fifty percent (n = 3) of the non-participants indicated their reasoning was that they received too many texts already and the reminders would clutter their text messages. The other two main themes that were identified included the fact that they write it down themselves (33%) or use an alternative source such as iLearn (50%), which is the school's course management system. One student stated "I usually write things down and I have multiple alarms on my phone" (NP1). Although not a theme, one student did mention that text messaging was not a part of their cell phone plan. Table 3.19 summarizes those reasons given.

Table 3.19

Reasons for Not Participating

Reasons	Too many texts	I write it down	Alternative (ILearn)
NP1		X	X
NP2			X
NP3	X	X	
NP4			X
NP5	X		
NP6	X		
Total	**50%**	**33%**	**50%**

Of particular note however, were the nine students who did not participate in the program (NP), who nevertheless felt in retrospect, that receiving instructor-generated text reminders may have helped them improved their overall course performance or grade, particularly because they missed assignments. The most prominent reason the students cited for feeling participation would have been beneficial was so that they wouldn't forget an exam or assignment (33%). One student explained, "I think it would have been nice, because

I forgot an exam one day and didn't study for it" (NP1) and "missing assignments dropped

my grade" (NP2).

In addition, organizational and time management (22%) issues were mentioned as

reasons why students would choose to participate in Remind 101 if it were offered again. "I

am not good at organization and reminders would have helped a lot" (NP4). "It would have

reminded me and given me enough time to study" (NP7). This would enable the students

to have more time to study (22%). For as one student noted, "reminders in general help me

manage my time better" (NP6). See Table 3.20 for theme triangulation comments from

non-participants.

Table 3.20

Remarks from Non-Participants Who Felt It May Have Helped

Non-Participants	Don't forget exams/assignments	Time to study	Help Organization Time Management	Remind in General
NP 1	X	X		
NP 2	X			
NP 3				
NP 4	X			
NP 5		X		
NP 6			X	
NP 7				X
NP 8			X	
NP 9				X
Total	**33%**	**22%**	**22%**	**22%**

Future Participation. When asked if they would participate in Remind 101 if it

were offered again, 87% (n = 54) responded that they would. A chi square goodness of fit

test revealed that significantly more students than expected by chance, would participate in

Remind 101 if offered the chance again, $X^2(1, N = 59) = 40.659, p < .001, w = .69$ (large).

This number includes those who did not participate in the original program, but determined

that doing so may have improved their grades and course performance. Only 8% (n = 5) said

they would not, while five students did not respond to this question (4.8%). Table

3.21includes the results of the chi square analysis.

Table 3.21

Participation in Remind 101 if Offered Again Goodness of Fit

Future Participation	Observed	%	Expected	Residual	Standardized Residual	Significance	
Yes	54	91.525	29.5	24.5	4.51	.01	more
No	5	8.475	29.5	-24.5	-4.51	.01	less

The most common theme as to why students would participate again dealt with the

helpful nature of the text-reminders. As one student put it, "It's helpful and I believe what

the future of academics looks like" (P48). The second most frequently mentioned reason

why students would participate again dealt with their need to be reminded, for "with 16

credits, assignments and due dates get blurred. This was a great reminder" (P6).

Organization was another strong theme that emerged. Students concerned with organization

point out that, "It would help me better organize, but I have to still take responsibility" (P37)

and, "It really made me aware of what I was to do every day for class" (P52). Along those

lines, the ability to get things done (n = 4) using the program was mentioned along with the

easier accessibility that the text reminders offered (n = 2). Overall, students were enthused

about the program indicating, "Love it. Wished each class did it" (P4). See Table 3.22 for

summary of the frequency of the theme comments.

Table 3.22

Why Participate in Remind 101 Again

Categories	Total Comments
Helpful	18
Need Reminders/To Not Forget	13
Organization	7
Loved It	6
Get Things Done	4

Easier Accessibility	2
Less Stress	1
Need to be more timely	1

A chi square goodness of fit test revealed that significantly more students (71%) than one would expect by chance, chose to participate in Remind 101, $X^2(1, N = 62) = 10.903, p = .001, w = .18$ (medium-small), with significantly more students (84.5%) than one would expect by chance, believing that participation in Remind 101 helped them to be more successful in the course, $X^2(1, N = 58) = 27.586, p =<.001, w = .48$ (medium-large). In addition, significantly more students (91.5%) than expected by chance, would participate in Remind 101 if offered the opportunity again, $X^2(1, N = 59) = 40.659, p < .001, w = .69$ (large).

It must be noted that a chi square test of independence revealed no significant difference (than one might expect by chance) between the three classes, that more students believed participation in Remind 101 was helpful, $X^2(2, N = 58) = 2.019, p = .364, \phi = .187$ (medium-small). In addition, there was no significant difference between the three classes (than one might expect by chance) in the students' willingness to participate in Remind 101 if it were offered again, $X^2(2, N = 59) = 2.588, p = .274, \phi = .209$ (medium-small).

Quantitative Research Question

This study sought to identify if instructor-generated text messages (via Remind 101) could be a viable means of improving overall course performance as perceived by undergraduate students. Statistical analysis revealed that significantly more students than one might expect by chance, believed that participation in Remind 101 helped them be successful in their communication course (pilot study: 82%, $p = .001, w = .413$, medium-large; actual study: 79%, $p = .001, w = .18$, medium-small). In addition, significantly more

students than one might expect by chance, would participate in Remind 101 if offered the chance again (pilot study: $94.7\%, p < .001, w = .80$, large; actual study: $87\%, p < .001, w = .69$, large). Therefore, RQ_2 has been answered in the affirmative (RQ_2: Can instructor-generated text-messages be a means of improving overall course performance as perceived by undergraduate students?) and information received from the qualitative study concerning the possible benefits of text-message reminders has been corroborated. Also, based on the results of this quantitative research, we reject the null hypothesis.

Results Summary

The use of mobile devices such as smart phones and tablets by students is ubiquitous. These devices are being used by students in multiple ways and with various web-based applications and programs to enhance their educational experiences. Undergraduate students favor mobile technology because of its mobility, portability and convenience in usage. Each person interviewed cited an experience where, because of their mobile technology, they were able to complete an assignment that couldn't have been completed any other way. The most popular mobile device used by the students to facilitate their education was the smart phone (100%).

The most popular mobile device functions used for education were predominantly those used to facilitate communication (100%) and collaboration amongst students (80%), for taking notes (100%), and organization (80%). Though most often associated with personal use, social media was being used by 100% of those interviewed for educational purposes as well. Each of the students interviewed mentioned using Facebook, and Twitter in some class assignments with the results analyzed by the use of Google Analytics. Facebook was mentioned for education, especially for the ability to post messages to other

students. Communication (100%) and collaboration (80%) were the main uses for social media applications.

Within the classroom, mobile devices were being used for taking notes with the most popular application being Evernote because of its versatility and search capabilities. Organization and scheduling (80%) were also important to students and mobile devices assisted there as well in keeping track of assignments and homework due dates. The school course management system (*iLearn* also known as *Brainhoney*) was also identified as a useful tool for these purposes, though its format is not currently conducive to mobile devices.

For work on group projects, Google Drive was the most popular application. It utilizes the Cloud, which makes documents accessible from anywhere, by anyone. It negates the necessity of meetings when time is of the essence. In addition, PDF files can be added and become part of the searchable documents as well. Anyone in the group can work on the document in real time, which is very conducive to a collaborative effort. Other Google products used for collaboration are Google Docs and Google Hangout, which is a live, visual and audio conferencing service for multiple people.

Google products and services were used by all the students interviewed. For research, they used Google first, but also relied on company and institutional websites. Some even used Google Scholar to look up more credible sources. Digital textbooks were the norm for these students. They were less expensive and have a search quality that makes looking up and locating topics easy. The students indicated receiving the latest news and information from CNN, NPR, BuzzFeed, Flipboard and other similar applications. They also identified using specific publications specific to their particular majors.

Texting was identified as the preferred method of communicating because of the ease and immediacy. It also facilitated group collaborations. Some of the students interviewed received text-generated reminders from instructors about assignments and examination dates. Those students loved that concept and indicated they would welcome such communication from all professors. Email was the next most popular way of communicating, but even Twitter, regularly associated with social media, was used to facilitate communication.

The feeling was unanimous that instructors should utilize more technology, especially since all of the students use mobile devices constantly anyway. The students acknowledged that mobile devices, if allowed, will be misused by some students, but feel that the advantages to having them in the classroom is worth it, even above the few distractions caused by a minority of the students. If students already have mobile devices and are using them anyway, why not seek ways to positively incorporate them into the leaning process? Students welcome the incorporation and practical application of mobile technologies by instructors as a regular part of the educational experience. The challenge for educators will be to find constructive ways of incorporating those mobile devices and the accompanying applications and programs into their teaching strategies.

All five students interviewed (100%) in the qualitative, phenomenological portion of this study mentioned that texting was their preferred form of communication. They were unanimous in their belief that instructor-generated text-message reminders could positively benefit students' learning and course performance and welcomed the idea of instructor-generated, text reminders. All five students interviewed (100%) felt that the concept of instructor-generated, text reminders was a good idea with 60% of the interviewees having

previously participated in a similar program. Remind 101, an application allowing instructor-generated, text-message reminders to be sent to students, was used as a means of testing the positive implications of such a program. One interviewee indicated that "It was helpful, [because] sometimes we don't have access to our emails or iLearn" (I_5).

The results of the quantitative pilot and actual study corroborate this. Students significantly believed that participation in receiving instructor-generated text message reminders through Remind 101 helped them to be more successful in the course and improved their grades. This was predominantly due to the fact that it reminded the students of important upcoming events in class, which helped the students to stay organized and on track. See Table 3.23 for triangulation from all the studies.

Table 3.23

Composite Triangulation

	Want Texts	**Text Help**	**Future Use**
Qualitative Pilot	X	n.s.	n.s.
Qualitative Actual	100%	n.s.	n.s.
Quantitative Pilot	78.6%	82%	94.7%
Quantitative Actual	71%	79%	87%

More importantly, significantly more students than expected by chance, indicated they would participate in Remind 101 if offered the chance again, (pilot study: 94.7%, $p <$ .001, $w = .80$, large; actual study: 87%, $p < .001$, $w = .69$, large). It must be noted that this number includes those who did not participate in the original program, but determined that doing so may have improved their grades and course performance, with only 8% (n = 5) said they would not chose to participate if Remind 101 was offered again. The students perceived text reminders to be beneficial because they found it to be helpful, since they needed to be reminded for "with 16 credits, assignments and due dates get blurred" (P6). Organization

was another strong theme that emerged indicating that while Remind 101 "would help me better organize [sic], but I have to still take responsibility" (P37). Overall, students were enthused about the Remind 101 program indicating, "Love it. Wished each class did it" (P4). As one student stated, "I wish my other professors did it the same" (I$_3$), "It's helpful and I believe what the future of academics looks like" (P48).

Discussion

This study shows that students would welcome additional involvement from their faculty members as it relates to the use of mobile devices. Text messaging is the most common and most popular activity for students with mobile devices. This was proven both qualitatively and quantitatively in all four studies of this research. As such, this means of communication represents an opportunity for professors to interact and reach students effectively when done properly. These messages however, must be both consistent and timely in their execution.

This study found Remind 101 to be an effective and simple means for professors to introduce the use of text messaging and mobile devices for educational purposes into their own teaching strategies. Students overwhelmingly will participate in a program of instructor-generated text reminders for a variety of reasons and perceive such a program as being beneficial to their course performance and related grades and if given the chance, they would participate in it again.

As the students so eloquently stated, "Certain students will always use mobile technology in a wrong way, like texting in class or doing other things not related to education" (I$_4$). However, "I feel like technology is there to learn a lot of things…I feel that embracing it helps those who use it the right way feel more comfortable when they use it in

class" (I$_4$). "I wish my other professors did it the same" (I$_3$). "It's helpful and I believe what the future of academics looks like" (P48).

Limitations

These studies were conducted with undergraduate students attending a large, private, northwest university with a religious affiliation. Students at this university abide by an honor code where each agrees to maintain a certain standard of behavior, which is not typical for students attending other universities. Mean ages at this university tend to skew higher than would otherwise be expected for each grade level. This anomaly is due to an absence of 1.5 to 2 years by many students who provide volunteer humanitarian service before returning to finish their educations. This has the potential to skew the results and limit the generalizability of the results of this study.

The qualitative portion of this study was limited to five students. Each participant was chosen through a snowball sampling method (Onwuegbuezie & Leech, 2007; Trochim & Donnelly, 2008). This method most often results in a small segment of the university, representing a certain type of student, but does not represent the entire student body as a whole. All students, for example were undergraduate students majoring in Communication. Conclusions therefore, should not be generalized to the entire student body population of that university or to other students of other universities. Gender was noted, but not considered as a factor in the study nor considered as a variable. Participants' year of school was also noted but not considered, i.e. freshman, sophomore, junior or senior. The differences in specific mobile devices used by participants such as type, make, model and so forth were also noted, but were also not treated as a variable in this study.

The quantitative portion of this study was limited to a survey administered to students enrolled in communication classes at the same university as the qualitative study. Mean age differences as previously explained also apply to this portion of the study. Age, gender, year in school and nationality were all noted but not treated as variables other than for reporting purposes in the form of total numbers and percentage. In spite of these limitations, valuable information concerning the ways students use their mobile devices for educational purposes was discovered. The results of this research may be helpful to educators contemplating the implementation of mobile technology strategies for enhancing educational experiences.

Qualitative Rigor

In an effort increase the rigor and trustworthiness of this study, methods and procedures were followed as are prescribed and accepted for qualitative research. The procedures include (1) *a pilot study* for the qualitative research, (2) *member checks* for the actual qualitative study, (3) *rich, thick description* allowing readers to make a decision regarding transferability and (4) *peer reviews* (debriefings), resulting in triangulation to provide corroborating evidence for themes, perspective and results.

Effort were also made with the quantitative study to minimize threats to validity by (1) running a pilot study for one entire semester (2) performing the actual study and comparing results to the pilot study and (3) applying appropriate statistical analysis to the results to reveal any significant differences in the frequencies of the findings. Four studies were completed in all with results compared, where warranted, to corroborate the findings and results of all portions of the research.

Pilot Studies

Pilot studies fulfill a number of useful purposes; trying out strategies, providing preliminary data, refining research instruments such as questionnaires and surveys, exposing potential research problems and gaps in data collection and demonstrating a researchers ability to manage qualitative research (Marshall & Rossman, 2011). The pilot studies conducted during this research for both the qualitative and the quantitative portions accomplished all of those purposes and more. By creating preliminary data, it provided material that could be compared with the actual studies to help strengthen trustworthiness and act as a source of corroboration and triangulation.

Member Checks

This technique of soliciting input and views from participants is considered by some researchers to be "the most critical technique for establishing credibility" (Lincoln & Guba, 1985, p. 314, as cited by Creswell, 2013). It involves an examination of the researcher's work by participants to see if the researcher "got it right" (Marshall & Rossman, 2011, p. 221). This current study asked participants to review the transcripts of their interviews, providing corrections and any additions they felt necessary. The final versions of participant-reviewed transcripts were used for coding and analysis. They also reviewed the textural description written about them, making any changes they deemed necessary to reflect a true description of their experiences with their mobile devices.

Rich, Thick Description

In order to help readers determine transferability of the information provided and as a means of increasing validity, Creswell (2013) suggests rich, thick descriptions of participants under study. An investigation of this study reveals that such descriptions have

been supplied as a result of the qualitative study. An individual textual description is given of each participant and a final composite textual description combining all five participants is also provided.

Peer Review or Debriefing

Peer reviews or debriefings provide an external check of the research. A departmental colleague familiar with qualitative studies reviewed the work and gave reactions to the coding, summaries and analytics, acting as 'devil's advocates,' keeping the researcher honest and reducing researcher bias (Creswell, 2013; Lincoln & Guba,1985; Marshall & Rossman, 2011). Adjustments and clarifications were made where necessary according to the results of the review.

Triangulation

Triangulation involves providing corroborating evidence from different sources to shed light on a theme and give accuracy and validity to research findings (Creswell, 2013; Oliver-Hoyo & Allen, 2006). At least three sources are suggested that have different foci and different strengths so they can complement each other (Miles, Huberman & Saldana, 2014). As detailed and explained in this section, triangulation was accomplished in this study through multiple qualitative and quantitative sources.

Significance of the Study

The results of this study provide educators with insights as to how mobile technology is currently being used by undergraduate students to enhance their educational experiences. Further insights were also gained concerning student connectivity and the resources they rely on to gather information for educational purposes. Web-based applications and programs were noted and listed according to popularity and purposes for

each as described by the subjects of this investigation. The popularity of texting (SMS) was confirmed and its usefulness as of source of improving student course performance tested. Remind 101 was the program used to deliver instructor-generated text messages to the students with promising results. By reviewing this information, educators can gain useful insights into ways of utilizing mobile devices and web-based resources within the educational context to enhance learning and course performance for their own students.

Recommendations for Future Research

This research was conducted exclusively with students attending a private religious university. Although students attending this university come from locations all over the United States and many foreign countries, they nevertheless, may not represent all college students, thus not allowing generalization of the findings of this study. It is therefore recommended that similar research in the future be conducted at other universities in different locals, including those with no particular religious affiliation.

Qualitative interviews in the phenomenological study involved only five participants. Although this small number is valid for studies of this type, more students involving multiple interviews may provide more validity for the analysis and provide further insights not captured through the present process.

Snowball sampling, or *network sampling* as utilized in the data collection of the quantitative portion of this study served well for finding individuals with the desire qualities for interviewing purposes. However, such a procedure narrows the pool of students significantly and promotes a type of homogeneity in participants that does not allow the results of the study to be generalized beyond the scope or parameters of the study itself. Future studies should consider a selection process involving random sampling

methods that would provide for a broader generalization of findings. Eligible students in the sample pool should come from a variety colleges and departments at the universities, which would also allow for further generalizations.

Though this present research accommodated information concerning age, gender, year in school and also nationality, these attributes were not treated as research variables, but rather as mere statistics in the way of totals and percentages. Future research could use each of these designations as variables in the study test for significant differences that may exist.

The grades received by participants and non-participants in the Remind 101 study were not noted in an effort to protect anonymity. Though this study revealed a high preponderance towards the benefits of those receiving instructor-generated group reminders relating to overall course performance, a comparison of actual grades received between participants and non-participants would be interesting indeed.

The quantitative portion of this study involved instructor-generated messages to remind students of assignments due and examination dates. Sending these text messages were facilitated through a free application called Remind 101. This program allowed only one-way communication from the instructor to the students who volunteered to receive them. Future studies could test other programs as well that might have other communication capabilities while still protecting instructor and student privacy rights as outlined in the Family Educational Rights and Privacy Act (FERPA).

Because the results of the qualitative study indicated a desire on the part of students for the incorporation of more technology by instructors, future studies could investigate possible ways of doing so that would effectively enhance the learning process.

References

Arens, W., Schaefer, D., & Weigold, M. (2009). *Essentials of contemporary advertising*. New York, NY: McGraw-Hill Irwin.

Aubusson, P., Schuck, S., & Burden, K. (2009). Mobile learning for teacher professional learning: Benefits, obstacles and issues. *Research in Learning Technology, 17*(3), 233-247.

Bell, F. (2011). Connectivism: Its place in theory-information research and innovation in technology-enabled learning. *The International Review of Research in Open and Distance Learning, 12*(3) 1-11.

Black, A. (2010). Gen Y: Who they are and how they learn. *Educational Horizons, 88*(2), 92-101.

Brower, J. & Christensen C. (1995). Disruptive technologies: Catching the wave. *Harvard Business Review, 73*(1), 43-53.

Christensen, Clayton M. (2003). *The innovator's dilemma*. New York, NY: Harper Collins Publishers, Inc.

Cilesiz, S. (2011). A phenomenological approach to experiences with technology: Current state, promise, and future directions for research. *Educational Technology Research and Development*, *59*(4), 487-510.

Corwin, J. & Cintron, R. (2011). Social networking phenomena in the first-year experience. *Journal of College Teaching and Learning, 8*(2), 25-37.

Creswell, J. (1998). *Quality inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. (2013). *Quality inquiry and research design: Choosing among five traditions.* Thousand Oaks, CA: Sage Publications, Inc.

Crotty, M. (1998). *The Foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publishing, Inc.

Dillman, D., Smyth, J., & Christian, L. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method.* Hoboken, NJ: John Wiley & Sons, Inc.

Duggan, M. (2013). Cell phone activities 2013. Retrieved from: http://pewinternet,org/Reports/2013/Cell-Activities.aspx

Dunway, M. K. (2011). Connectivism: Learning theory and pedagogical practice for networked information landscapes. *Reference Services Review, 39*(4), 675-685.

El-Hussein, M. & Cronje, J. (2010). Defining mobile learning in the higher education landscape. *Educational Technology & Society, 13*(3), 12-21.

Herrington, J., Herrington, A., Mantei, J., Olney, I., & Ferry, B. (2009). *New technologies, new pedagogies: Mobile learning in higher education*.

Harley, D., Winn, S., Pemberton, S., & Wilcox, P. (2007). Using texting to support students' transition to university. *Innovations in Education and Teaching International, 44*(3), 229-241.

Jones, G., Edwards, G. & Reid, A. (2009). How can mobile SMS support and enhance a first year undergraduate learning environment? *Research in Learning Technology (17)*3, 201-218.

Kop, R. (2007). Blogs and wikis as disruptive technologies. *The Pedagogy of Lifelong Learning: Understanding Effective Teaching and Learning in Diverse Contexts*, 192-202.

Kop, R. & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the
    past? *International Review of Research in Open and Distance Learning, 9*(3),
    1-13.

Koszalka, T. A., & Ntloedibe-Kuswani, G. S. (2010). Literature on the safe and disruptive
    learning potential of mobile technologies. *Distance Education*, *31*(2), 139-157.

LeNoue, M., Hall, T., & Eighmy, M. (2011). Adult education and the social media
    revolution. *Adult Learning*, *22*(2), 4-12.

Lincoln Y.S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage
    Publishing.

Lusk, B. (2010). Digital natives and social media behaviors: An overview. *The
    Prevention Researcher 17*, Supplement, 3-6.

Marshall, C. & Rossman, G. (2011). *Designing qualitative research*. Thousand Oaks,
    CA: Sage Publications, Inc.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*. Thousand Oaks,
    CA: Sage Publishing, Inc.

Miles, M., & Huberman, A., & Saldana, J. (2014). *Qualitative data analysis*. Thousand
    Oaks, CA: Sage Publishing, Inc.

Milheim, K. L. (2011). The role of adult education philosophy in facilitating the
    online classroom. *Adult Learning*, *22*(2), 24-31.

Moustakas, C. (1994). *Phenomenological research methods.* Thousand Oaks, CA.:Sage
    Publications.

Oliver-Hoy, M., & Allen, D. (2006). The use of triangulation methods in qualitative
    educational research. *Journal of College Science Teaching*, 35(4), 42-46.

Onwuegbuzie, A. J., & Leech, N. L. (2007). A call for qualitative power analysis. *Quality & Quantity 41*, 105-121.

Paul, J. (2005). *Introduction to the philosophies of research and criticism in education and the social sciences.* Upper River Saddle, NJ: Pearson, Merrill, Prentice Hall.

Reuben, R. (2008). *The use of social media in higher education for marketing and communications: An overview.* An independent study research project in the MBA program, SUNY New Paltz.

Revere, L., Kovach, J. (2011). Online technologies for engaged learning: A meaningful synthesis for educators. *Quarterly Review of Distant Learning, 12*(2), 113-124.

Siemens, G. (2004). Connectivism: A learning theory for the digital age. December 12, 2004. *2006-10-28] http://www. elearnspace. org/Articles/connectivism. htm.*

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance learning, 2*(1), 3-10.

Smith, A. (2013). Smartphone ownership-2013. Retrieved from: http://pewinternet.org.Reports/2013/Smartphone-Ownership-2013.aspx

Trochim, W.M. & Donnelly, J.P. (2008). *The research methods knowledge base.* Mason, OH: Atomic Dog, a part of Cengage Learning.

Verhagen, P. (2006). Connectivism: A new learning theory. *Surf e-learning themasite, 11*, 2006.

Werth, E.P, & Werth, L. (2011). Effective training for millennial students. *Adult Learning, 22*(3), 12-19.

Zickuhr, K. (2006). Tablet ownership 2013. Retrieved from:

http://pewinternet.org/Reports/2013/Tablet-Ownership-2013.aspx

CHAPTER 4: STRATEGIES FOR USING MOBILE DEVICES AND POPULAR

WEB-BASED PROGRAMS TO ENHANCE TEACHING AND LEARNING

FOR UNDERGRADUATE STUDENTS

(Jeffrey L. Hochstrasser)

Overview

The Internet is the fasting growing medium in the history of the world (Arens,

Schaefer & Weigold, 2009). It falls into the category of what Harvard educator, Clayton

Christensen has described as *disruptive technology*. This term refers to technologies that are

life changing in their effect (Brower & Christensen, 1995). Few can deny that the Internet

falls within this category. Combined with the development of the World Wide Web, it has

changed, among other things, the way we communicate, collaborate, do business, entertain

and educate.

Over the years, devices have been developed for easier access to the Web, providing

information, entertainment and communication. Desktop computers have transitioned to

more portable laptop models, all of which provide easier access and portals to the resources

available through the Internet. Hand-held mobile devices, such as smartphones and tablets

are a part of the emerging technologies that are now pervasive in our culture; especially with

the younger, college-aged demographic, giving them easier and more convenient access to

information, education, communication and collaboration with an opportunity to enhance

their learning experiences.

Ownership of these devices among the current generation of college students is

almost ubiquitous (Aubusson, Schuck & Burden, 2009). A recent Pew Center study shows

smartphone ownership among the 18 to 24 year olds at 79% and among the 25 to 35 year

olds, the number is slightly higher at 81%. According to that same poll, these individuals are using these devices to: (1) send or receive text messages, (2) access the Internet, (3) send or receive emails, (4) download apps, (5) get directions, recommendations, or other location-based information, (6) listen to music, (7) participate in a video call or video chat and (8) "check in" or share their location (Smith, 2013).

Tablet ownership in the 18-24 year-old demographic is much lower than that of smartphones at 33%, but nevertheless represents a significant number of individuals, especially when combined with the 37% tablet ownership attributed to the 25 to 34 year-old group (Zickuhr, 2013). Truly, they are *digital natives,* meaning they were born in the digital age (Prensky, 2010) and they are the students we engage with every day at our universities.

The question remains however, regarding if and how these undergraduate students are specifically using their mobile devices to enhance their learning experiences. Equipped with answers to this question, educators can potentially tap into those same mobile tools and resources to assist students in their quest for knowledge.

This conceptual paper explores that question, sharing results from recent studies on technology and education. The qualitative portion of the study was conducted utilizing a phenomenological approach to find answers from undergraduate students. The potential of using Short Message Service (SMS), better known as text messaging, as a source to improve overall student performance in college courses was examined in this paper and the results of a semester-long, research project shared. In addition, the relationship between instructor self-efficacy and online teaching experience with course satisfaction is explored.

Background

The Internet and Education

Though the Internet was first developed in the 1960's for national security and communication within the United States Defense Department, educators soon found it useful for sharing research findings and other related academic pursuits. It wasn't until the development of the World Wide Web by Tim Berners-Lee and the ability of computers to communicate with one another through such developments as Uniform Resource Locators (URLs) and Hypertext Transfer Protocol (HTTP) that all individuals were able to tap into its potential. The 1990's changed the way the Internet was utilized as people began reaching out to communicate, collaborate and educate by using the information and resources available there.

Over the years, the Internet has also allowed for the development of support systems for educators in their efforts to communicate with and educate students. This support for online and traditional teaching is usually facilitated through course managements systems such as Blackboard, WebCT or Moodle. These are powerful platforms, but according to Revere and Kovach (2011) they don't fully support the level of engagement desired by current online students. Furthermore, many of the existing systems are often far behind in technology applications and unable to meet the mobility issues related to online instruction, especially for students who travel and are unable to login often to the online course management system. In addition, instructors face increasing pressures to assist students continuously with much time spent checking emails, discussion boards and answering questions. These management systems also do not allow for different student learning styles. One suggestion is to supplement these course management systems "by incorporating

additional communication technologies, web-based applications and handheld, mobile devices within online courses" (Revere & Kovach, 2011, p. 115). It seems that the same recommendations could be extended to and be beneficial in traditional, face-to-face classroom settings as well.

Mobile Technologies

Recent polls conducted by Pew Research Center show that 79 percent of all adults, ages 18-24 own smart phones and 33 percent own a tablet (Smith, 2013; Zickuhr, 2013). Because of the worldwide growth, increased ownership and use of mobile devices, serious consideration must be given to the potential benefits of using mobile technologies to enhance educational experiences (Herrington, Herrington, Mantei, Olney & Ferry, 2009). These mobile devices transcend the boundaries of the traditional classrooms and lecture halls, allowing for worldwide learning (El-Hussein & Cronje, 2010). Convenient size, ease of use, portability, prevalence and advanced features of mobile technologies such as voice, display, internet access and interactivity have increased interest in integrating these technologies into the instructional environment (Koszalka & Ntloedibe-Kuswani, 2010).

This type of learning on mobile devices is known as mobile learning or *m-learning* (Herrington, et al., 2008; Koszalka & Ntloedibe-Kuswani, 2010). Mobile learning or *m-learning* has further been defined as "learning by means of wireless technological devices that can be pocketed and utilised [*sic*] wherever the learner's device is able to receive unbroken transmission signals" (El-Hussein and Cronje, 2010, p.12). As such, one can see a future where mobile learning becomes one of the most effective ways of delivering educational instruction.

Mobile learning can be perceived from two perspectives: *safe learning* and *disruptive learning*. Safe learning deals with traditional technology-enhanced instruction, perpetuating the practice of using a computer to search for information, viewing what is found and learning what is proposed. Disruptive learning on the other hand, uses mobile technologies to empower the learner to change from a mere consumer of teacher knowledge to an active participant and contributor (Koszalka & Ntloedibe-Kuswani, 2010).

A recent review of case studies involving mobile technologies concluded that mobile-learning may be supportive of the teaching and learning process. In fact, mobile learning devices can enhance a sense of individuality and community for the learner, and increase motivation to learn through collaboration, while allowing learners a certain amount of freedom and independence (El-Hussein & Cronje, 2010). In their experimental study with faculty involving mobile utilization and associated pedagogies, Herrington, et al. (2008) concluded that, "the proliferation of mobile devices has proceeded throughout society at such a rate that higher education can no longer avoid exploring the educational potential of these tools" (p. 425). Not only has the technology itself demanded such an exploration, but the sheer number of students who have become accustomed to such technology also warrants it, having unlimited information available in the palm of their hands.

A Digital Generation

Because they are the primary students at our universities, educators must learn the dynamics of generational groups of today, to more effectively facilitate classroom instruction. Therefore, instructors need to research their current teaching practices and consider altering them to better meet the needs of these students.

One item that separates this generation from its older counterparts is the digital divide. Although the digital divide originally referred to access to technology based on economic status and financial ability to pay for it, a new meaning has evolved. The new digital divide refers to the differences between those who were born in the digital age and members of older generations, who have been referred to by one author as "digital immigrants" (Black, 2010). This digital divide should be addressed. Students of the digital generation want to participate in the learning process and are looking for greater connectivity and socio-experiential learning. They are used to staggering amounts of content and knowledge being available, instantaneously at their fingertips. Therefore, pedagogies specializing in Digital Mediated Learning (DML) environments where instructors take the role as guides, context providers and quality controllers are necessary.

Because of the increasing ability of today's students to reach out and connect with staggering amounts of content and knowledge, some believe a new learning theory is needed; one that addresses our changing world of technology.

Connectivism

Connectivism is a learning theory that was first proposed in 2004 (Siemens, 2004). This learning theory provides a new looking glass through which, educators can view the potential place mobile learning and web-based programs have in higher education. In brief, Connectivism can be defined as "the integration of principles explored by chaos, network and complexity and self-organization theories" (Siemens, 2005, p. 4). Further, and perhaps more in layman terms: "the starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which

in turn feed back into the network, and then continue to provide learning to the individual" (Siemens, 2005, p. 5).

Though information from some sources used by students for academic endeavors, like Wikipedia, can be legitimately challenged, the concept of a collaboration of individuals contributing to the whole is intriguing and does in fact, provide a resource of information for others. Learners therefore gather information and then become a source of that information to others. This is also known as *collective intelligence*, which is "the ability of communities to leverage the combined expertise of their members to solve problems" (Koszalka & Ntloedibe-Kuswani, 2010, p.143).

The main principles of the theory of Connectivism include:

- Learning and knowledge rests in diversity of opinions.

- Learning is a process of connecting specialized nodes of information sources.

- Leaning may reside in non-human appliances.

- Capacity to know more is more critical than what is currently known.

- Nurturing and maintaining connections is needed to facilitate continual learning.

- Ability to see connections between fields, ideas, and concepts is a core skill.

- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.

Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through a lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision (Siemens, 2005, p. 4). Figure 4.1 was created by the researcher to represent the basic concept of Connectivism.
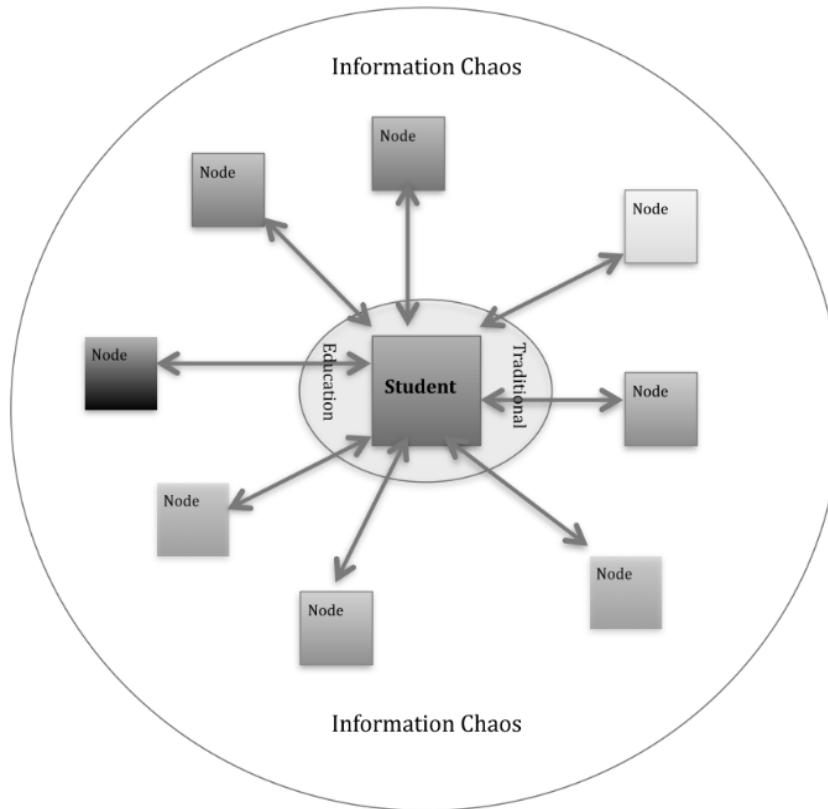
Figure 4.1. Connectivism model that symbolically explains the main elements of the theory. A student within the traditional classroom setting reaches out in the chaos of information to various nodes of knowledge to try and gather desired information. These connections are mediated by the Internet and technology. Knowing where to find this information and how to organize it and form it into knowledge is an essential part of learning.

Though not accepted universally as a new learning theory, Connectivism "continues to play an important role in the development and emergence of new pedagogies, where control is shifting from the tutor to an increasingly more autonomous learner" (Kop & Hill, 2008, p. 11). Therefore, studies involving students and their autonomous use of mobile technology to enhance their own educational experiences must, at a minimum, seriously consider Connectivism as a framework for understanding what they do and where they connect for knowledge in the digital age. Faculty members need to develop

an understanding of these practices and create appropriate strategies that allow them as teachers, to become better guides and facilitators of learning to this generation of digital natives.

Studies in Mobile Technology

Numerous journal articles on the subject of mobile technology and m-learning have called for further studies to investigate the potential it has for enhancing education. Koszalka & Ntloedibe-Kuswani (2010) in their review of studies on mobile learning, conclude that "inquiries are needed to investigate environmental, personal and content factors that are most important in m-learning" (p. 152). As a means of doing so, one must explore the following questions:

1) What are the living experiences of students who currently use mobile devices to enhance their learning?

2) What resources are students reaching out to and connecting with to obtain the information they may be seeking?

3) "How can mobile technologies be best utilized in teaching and learning strategies to enhance learning and support characteristics of the digital native generation, while at the same time addressing the diversity of all students?" (Koszalka & Ntloedibe-Kuswani, 2010, p.153).

During Fall Semester 2013, a multiphase, mixed-method study was conducted among groups of undergraduate students in an attempt to answer some of these questions. A qualitative, phenomenological approach was used for one part of the research and a quantitative ex post facto survey for another. As such, the methods of undergraduate learning through the utilization of mobile devices were examined and the related

experiences recorded. Of particular interest was the use of mobile technology to facilitate and enhance their learning experiences. Understanding student practices involving the educational use of web-based applications, social media, instructor-generated text messages and other possible resources can stimulate further considerations, not only for learning, but also for the potential development of new teaching methods and strategies.

As part of the quantitative portion of this research, the effectiveness and potential use of Remind 101 as a text messaging management system for higher education was tested. This application allows educators to conveniently text their students to communicate course-related messages and reminders while protecting the privacy of phone numbers for both instructors and students.

Qualitative Results

Using a snowball sampling approach also known as *network sampling*, five undergraduate students were interviewed concerning their use of mobile devices for educational purposes (Onwuegbuzie & Leech, 2007; Trochim & Donnelly, 2008). Questions were opened-ended in nature allowing students to give responses of any length as they desired and felt to be sufficient (see Appendix L for the Interview Guide). Each interview was transcribed and coded for main themes (Miles, Huberman & Saldana, 2014), then converted into individual textual descriptions, which are a narrative, describing each individual's experience with their mobile device. A member check was performed on the interview transcriptions themselves and then on the individual textual descriptions to verify that those descriptions were accurate (Creswell, 2013; Marshall & Rossman, 2011). Each student interviewed was allowed to make any changes or additions they felt necessary. A peer debriefing also took place with a colleague of the researcher, who was familiar with

qualitative research procedures (Creswell, 2013; Lincoln & Guba,1985; Marshall & Rossman, 2011). These steps along with the pilot study performed previously, helped create triangulation and increase the trustworthiness of the results. In the end, a composite textural description of all five was composed and the essence of the phenomenon developed (Moustakas, 1994).

The composite textual description is included as Appendix O to provide the reader with a better understanding and description of undergraduate students and their relationship with their mobile devices and related web-based applications and programs. Readers are strongly urged to review that document.

The Essence

In the end, the essence of the interviews suggests the recognition that the use of mobile devices such as smartphones and tablets by students is ubiquitous. Students are using these devices in multiple ways, accessing various web-based applications and programs to enhance their educational experiences. While the interviewed students recognized that there would be some misuse of mobile devices within the classroom setting if such devices were allowed, they felt the advantage of having them as a resource in class would outweigh the disadvantages and potential distractions. They would welcome more integration of such technology by instructors. A full accounting of their mobile use as discovered by this research is contained in Appendix K.

<div align="center">

Qualitative Summary

</div>

Use of mobile devices such as smart phones and tablets are pervasive among students today. These devices are being used in multiple ways and with various web-based applications and programs, some of which facilitate educational experiences. Undergraduate

students favor mobile technology because of its mobility, portability and convenience in usage. Each person interviewed cited an experience when, because of mobile technology, they were able to complete an assignment that otherwise couldn't have been completed. The most popular mobile device used by the students in education was the smart phone (100%).

The most popular functions or uses of mobile devises for educational purposes were facilitating communication (100%) and collaboration among students (80%), taking notes (100%), and organizing (80%). Of particular interest was the use of social media for educational purposes by 100% of the students interviewed. All of the students interviewed identified using Facebook and Twitter in class assignments. Facebook was especially used for the ability to post messages to other students. Social media applications were predominantly used for communication (100%) and collaboration (80%).

Within the classroom, mobile devices were identified as being used for taking notes. Evernote was the most frequently used for that purpose, because of its versatility and search capabilities. Mobile devices were also identified as being helpful in organizing and scheduling (80%) as it helped the students keep track of assignments and homework due dates. The school course management system (*iLearn*) was also identified as a useful tool; however, its format is not currently conducive to mobile devices.

Google Drive was the most popular application for work on group projects because it utilizes the Cloud, which makes documents easily accessible to everyone, anywhere. This enables anyone in the group to work on the document in real time, which is very conducive to a collaborative effort. Other Google products identified being used for collaboration were Google Docs and Google Hangout (a live, visual and audio conferencing service for multiple people).

In respects to research, students indicated they used Google first, but also relied on company and institutional websites. Some even used Google Scholar to look up more credible sources. Digital textbooks were preferred since they were less expensive and easier for looking up information and locating topics.

Texting was identified as the preferred method of communication for many reasons. Most prominently, it was preferred because of its convenience, ease of use and ability to communicate instantly. It also facilitates group collaboration. The second most popular way to communicate was via email. It must be noted that Twitter was also identified as being used to facilitate communication amongst students.

The interviewees unanimously agreed that instructors should utilize more technology, especially since all of the students use mobile devices constantly anyway. While acknowledging that some students may misuse mobile devices in the classroom, they felt that the advantages to having them in the classroom outweighed the negative. Since students already have mobile devices and are using them, positive ways to incorporate them into the leaning process is essential. The students interviewed all welcomed the incorporation and practical application of mobile technologies by instructors as a regular part of the educational experience.

All five students interviewed (100%) were unanimous in their belief that instructor-generated text-message reminders could positively benefit students' learning and course performance and welcomed the idea of instructor-generated, text reminders. Remind 101, an application allowing instructor-generated, text-message reminders to be sent to students, was used to test the positive implications of such a program. The results of the study corroborate the interviews. Students significantly believed that participation in receiving instructor-

generated text message reminders through Remind 101 helped them to be more successful in the course and improved their grades. This was mainly due to the fact that it reminded the students of important upcoming events in class, which helped the students to stay organized and on track.

The Quantitative Study

The popularity of text messaging. Before explaining the details of the more quantitative portion of the study, a discussion of Short Message Service (SMS), more commonly known as text messaging or texting, would be appropriate. Texting is available on all mobile devices and allows users to send and receive short messages via the device keypads, limited to a maximum of 160 characters per message. In a recent Pew Research Center poll of the 2,252 adults 18 and older, 81% said they send or receive text messages. This holds true for both genders, thus making texting "one of the most prevalent cell phone activities of all time" (Duggan, 2013, p. 4). Even more relative to this generation of college-aged students, the study found 97 percent of 18-29 year-olds (N = 395) send and receive text messages. It is the technology of choice for undergraduate students (Harley, Winn, Pemberton & Wilcox, 2007). Thus, great potential exists for educators to communicate with students and enhance educational experiences by utilizing this mobile activity.

The quantitative portion of this study explored the potential benefits of sending instructor-generated text reminders to students concerning assignments due dates and examination openings and closings. Remind 101, a free program with a web-based application was used to deliver these text reminders. It allows one-way text message communication from instructor to students, while protecting the privacy of cell phone numbers for all.

The potential of text messaging for education. Previous studies have been conducted centering on the use of text messaging in higher education, but not just as reminders. Harley, et al. (2007), for example, assessed the extent to which carefully designed messages from university staff could help support students in the early stages of their degree. As a part of the process, a computer application called Student Messenger was used. Of those students who received the text messages (n = 285), results of the study showed that students preferred text messaging over voice or email. Students also picked up a sense of urgency from the text messages that was not apparent through other communication forms. In short, their findings identified text messaging as the dominant mode of electronic communication among their student sample and that text messaging from university staff was viewed positively if used sensitively and sparingly.

In a similar study, Jones, Edwards and Reid (2009) offered a case study that illuminated the role of mobile SMS (text messaging) and issues associated with utilizing it within an academic course of study. The idea was to harness the communication skills of the students using mobile phones and SMS (texting) to "promote greater connectivity between tutor and student, and student and course content" (p. 206). Edutxt, a messaging management system, was used for this study to send the messages. The vast majority of the new students welcomed the text messages with tutors, especially messages connected with their course work. The results also indicated that students welcomed text messages as reminders about study tasks, deadlines, administrative changes and so forth. They regarded the messages as effective aids to time management and felt that text messages were more effective than email at gaining attention. In addition, students also liked the personalized nature of texts, acting as "an extrinsic motivator in helping them to study" (p. 209).

Remind 101

For the quantitative study, one main research question was in mind; whether instructor-generated text messages could be a means of course and grade improvement as perceived by undergraduate students. To explore this question, text messages were sent throughout the entire fall semester of 2013 from the instructor to students attending three different communication courses, one at the 200 level and two at the 300 level. Those receiving the reminders volunteered to do so. These messages were sent to mobile devices using the program called Remind 101. Each message reminded students of assignment due dates or the opening and closing dates of examinations. The number of text messages sent during the semester to each student varied, based on the number of assignments and exams for each course. Remind 101 kept a record of the number of messages sent and the content of each. Examples of the text messages sent to students in both the pilot study and the actual study are found in Figure 4.2. The total number of text messages sent during fall semester 2013 was 53 at an average of 17.7 per class.

Comm 230	Comm 332	Comm 385
Exam #4 opens and closes on Wednesday (tomorrow). Your banner ads are also due tomorrow. See iLearn for instructions. Your positioning statement and big idea are due tomorrow. See you then.	Reminder: Personal project #10 is due tomorrow. See iLearn for details. Exam #3 closes today. Class tomorrow at our regular time. Bring your completed sales report with you. Refreshments will be served. See you then.	Just a short reminder that MFP #6 is due tomorrow at class time. See you then. Exam #4 closes today in the Testing Center. Good Luck.

Figure 4.2. Samples of instructor-generated, text-message reminders sent to students.

The total number of participating students for Remind 101 from all three classes was 50 from a possible 69 students enrolled (72.4%). Over 89% of all the students agreed to take the survey administered at the end of the semester. Of the students who chose to participate in the survey (N=62), 53% were male and 46.8% were female. Seniors were the predominant members of the group at 72.6% with juniors next at 24.2% and sophomores representing 3.2% of the participants. The ages ranged from 19 to 29 years old with the mean age of 22.97, the median at 23 and the mode also at 23. In regards to ethnicity, the majority was Caucasian at 82.3% with the next largest group being Latino at 8.1%. Two students were bi-racial at 3.2%. The least common were Asian, African-American and Native American, which represented 1.6% each. One student did not identify an ethnicity, also representing 1.6%.

Data Collection

At the end of the Fall 2013 Semester, students in three participating communication classes were asked to voluntarily complete a short survey regarding their experiences with or without having used Remind 101. Questions confirmed students' participation in the program or choice for non-participation. It also measured students' perceptions of the effectiveness of text reminders as it related to improved performance and course outcomes. Students were also questioned as to their desire to participate in the Remind 101 program in the future, should the instructor-generated reminders be offered again. Those who did not participate in the program were also included in the survey process and asked about their perceptions. Their answers were also included as part of the results. A copy of the survey is included in Appendix N.

Quantitative Results

Just over 72% of the students who were offered instructor-generated text reminders decided to participate in Remind 101. Of those who participated in the survey, 88.6% believe the text reminders improved their overall course performance. More importantly, significantly more students than expected by chance, indicated they would participate in Remind 101 if offered the chance again, (pilot study: 94.7%, $p < .001$, $w = .80$, large; actual study: 87%, $p < .001$, $w = .69$, large). The students indicated that the text reminders were beneficial because "with 16 credits, assignments and due dates get blurred" (P6). Organization was another strong theme that emerged with one student indicating that while Remind 101 "would help me better organize [sic], but I have to still take responsibility" (P37). Overall, students were appreciative of the Remind 101 program indicating, "Love it. Wished each class did it" (P4). "It's helpful and I believe what the future of academics looks like" (P48).

This study revealed that students would welcome the increased use of mobile devices in higher education. This was proven both qualitatively and quantitatively in this research. Since text messaging is the most common activity on mobile devices, it represents a rich and useful medium for professors to use for interacting with and reaching students. However, these messages must be both consistent and timely in their execution.

This study found Remind 101 to be an effective and simple means for professors to introduce the use of text messaging and mobile devices for educational purposes into their own teaching strategies. Students overwhelmingly will choose to participate in a program of instructor-generated text reminders for a variety of reasons and will also perceive such a

program as being beneficial to their course performance and related grades. What's more, if given the chance, they would participate in it again.

As the students so eloquently stated, "certain students will always use mobile technology in a wrong way, like texting in class or doing other things not related to education" (I_4). However, "I feel like technology is there to learn a lot of things…I feel that embracing it helps those who use it the right way feel more comfortable when they use it in class" (I_4). "I wish my other professors did it the same" (I_3), "it's helpful and I believe what the future of academics looks like" (P48).

Summary

The results of the qualitative phenomenological portion of this study resulted in a composite textual description of an undergraduate student and the use of their mobile devices. It comprehensively revealed the living experiences of students who currently use mobile devices to enhance their learning. The interviews revealed that:

1. Students are using their mobile devices for educational purposes, sometimes sanctioned by instructors, but most often on their own volition. Mobile devices are favored because of the convenience and portability they offer.

2. Each student using a mobile device can cite an experience where mobile technology has "saved them" grade-wise in some way or has at least made an assignment easier to complete.

3. Students use their mobile devices in class most often to take notes. Evernote is the program of choice for doing so.

4. Students prefer a digital version of their textbook on their mobile devices.

5. Students also use their mobile devices for scheduling and organizing.

6. Students prefer text messaging as their primary form of communication. Some have received text reminders from instructors and like that concept.

    a. The results from the research using Remind 101 confirmed this.

7. Students are reaching out with their mobile devices and connecting with preferred sources that provide them with the information they need.

8. Students use their mobile devices to collaborate on projects with other students. Google Drive is the application of choice for doing so, but texting and email are also used for collaborative purposes. Other collaborative tools include Google Docs, Google Hangout and Podio.

9. Social media can be used by students for educational purposes, but is most often used for personal gratification. Facebook and Twitter have been used as part of class assignments with Google Analytics measuring the response.

As indicated by 100% of the students interviewed, students want instructors to incorporate more technology in their teaching strategies. Understanding the students' mobile experiences and the resources available can help teachers become more facilitators and guides to information and encourage collaboration on projects. Utilizing mobile technology and the accompanying programs and applications will engage students, using tools they are already very familiar with. It can also increase the communication opportunities between faculty and students and improve student retention and satisfaction (Fozdar & Kumar, 2007).

As results from the current study show, students are using their mobile devices to enhance their learning, with or without the encouragement of their instructors. This study gives readers some insight as to which resources or nodes undergraduate students are

reaching out to for the information they need. As learned from the interviews with the undergraduate students, Google is primarily the first tool used to search for information. Company and institutional websites are also popular sources as well as Wikipedia and news sources such as CNN, NPR, BuzzFeed and Flipboard. Google Scholar was a choice by one of the student for finding more credible sources. One student mentioned posting questions on Facebook and allowing his friends to help him.

The representation of Connectivism originally presented in Figure 4.1 is modified here to represent the findings of the qualitative study (see Figure 4.3).
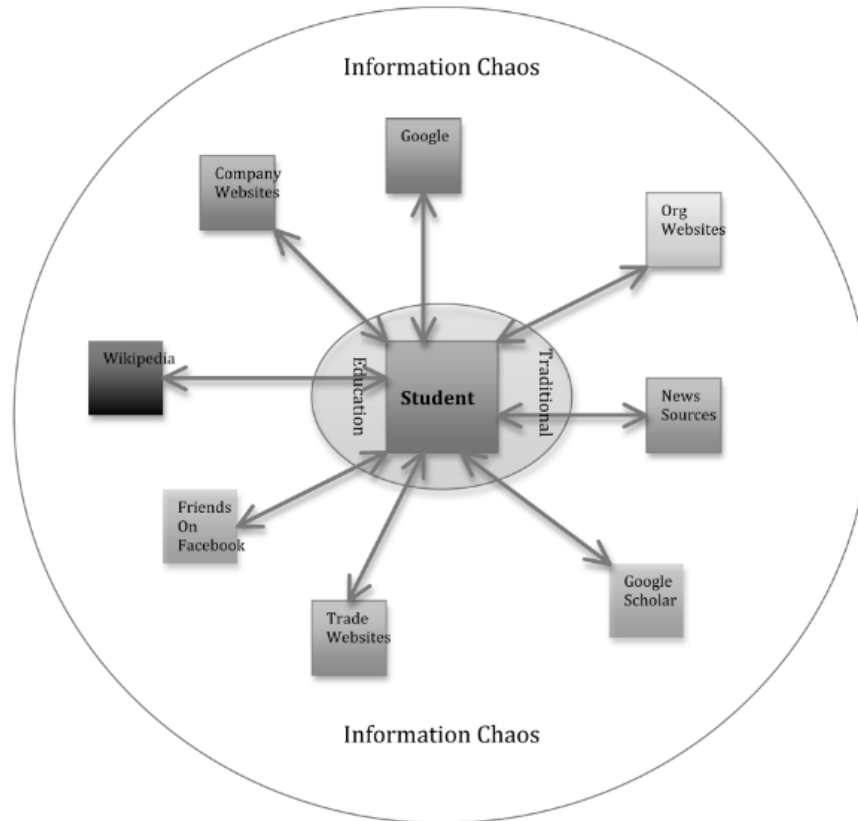
Figure 4.3. Connectivism model with study results. These are the sources the undergraduate participants are reaching out to and connecting with for information.

Faculty Recommendations

The answer to the Koszalka & Ntloedibe-Kuswani's (2010) question (Q3) leads to the actual recommendations provided here for faculty members, as a result of this mixed-method study. These recommendations are made based on the knowledge that: (1) the students being taught are digital natives, (2) the overwhelming majority of them own mobile devices such as smartphones and tablets, (3) they are using these devices for educational purposes and (4) they are using these devices to reach out and connect with various sources for the information they seek, (5) they prefer text messaging and email for communication and (6) collaborate on group projects using popular software, applications and social media sites.

Since research indicated that significantly fewer (.01 level) freshmen, sophomores, juniors, and seniors at BYU-I than one might expect by chance, indicated that they were satisfied with their online course as compared to other courses or had learned 'a great deal more' in their online class than in other classes they had taken. Perhaps using Remind 101 will help to change this by providing more interaction between instructors and students.

Recommendations for instructors include:

1. Become familiar with mobile devices such as smartphones and tablets. It's a huge mistake to think you must master the technology before giving students access to it (Prensky, 2010).

2. Explore the education, communication, and collaboration applications available and share your knowledge with the students. More importantly, learn from your students. Let the students teach each other and be prepared to

learn as well. New applications and technologies are developed on a regular

basis. Remember, this is a continuous process.

3. Consider ways of incorporating the use of mobile technology in your

classroom setting. The students want it and are using it. Why not reach them

through a means they are already utilizing? It can be used to supplement whatever

you are currently doing. Students recognize that there will be potential distractions

and misuse of the devices by some, but feel the advantages offered, offset the

potential negatives. At minimum, let students take notes, using their devices.

Here are some other suggestions:

• Become a facilitator, guide, and a resource to your students. Since they are already

reaching out and connecting with various sources of information, why not provide

them with the credible sources they need and ones that are recognized within the

discipline you teach? Currently they are exploring the chaos and trying to make

sense of it on their own. Give them some assistance.

• Encourage collaboration between students working together on group projects.

More specifically, encourage them to do so using their mobile devices along with

helpful tools such as Google Drive, Google Hangout, Google Docs and Podio. Be

familiar with these tools yourself so you can explain how they work and the main

features of each.

• Because texting is their preferred way of communicating, why not utilize this mode

of communication in a way students will accept and appreciate? As a small start,

consider using a text messaging management system such as Remind 101. As this

study showed, the majority of the students will opt-in for the service and feel that

your reminders help them in their overall course performance. (Complete information is available at https://www.remind101.com.) Remember however, these text reminders should be short in content, consistent in timing, and used sparingly to not overwhelm the students. Because a text message is limited in the number of characters that can be used in each, consider using the text messages to direct students to the course management system when more details are needed. Practices like these will help ensure greater success for text-reminder programs.

• After deciding on a mobile device policy, be sure and disclose it in your course syllabus. Make sure students are clear on when and how they are allowed to use them.

Conclusion

Teachers involved with higher education today are what one author describes as *digital immigrants*, or those not born into the digital age (Black, 2010). The challenge comes when we, as digital immigrants, try to educate the digital natives who are used to having information at their fingertips. The fact is, even more students currently enrolled in K-12 education, who have technology integrated into their educational process, will soon be entering the world of higher education. They learn in a different way and will expect technology to be a part of the learning process in higher education.

We, as educators, naturally want to provide the best education possible to current and future students. Therefore, changes must be made to our current practices. We must become more familiar with technology and the associated web-based programs and applications that can reach our students effectively and enhance the educational process. More importantly, we must also use it. At a minimum, educators need to utilize available mobile technology to

supplement current practices and take advantage of the potential it offers to enhance

teaching and learning in higher education.

References

Arens, W., Schaefer, D., & Weigold, M. (2009). *Essentials of contemporary advertising.*

New York, NY: McGraw-Hill Irwin.

Aubusson, P., Schuck, S., & Burden, K. (2009). Mobile learning for teacher professional

learning: Benefits, obstacles and issues. *Research in Learning Technology, 17*(3),

233-247.

Black, A. (2010). Gen Y: Who they are and how they learn. *Educational Horizons,*

88(2), 92-101.

Brower, J. & Christensen C. (1995). Disruptive technologies: Catching the wave.

Harvard Business Review, 73(1), 43-53.

Creswell, J. (1998). *Quality inquiry and research design: Choosing among five traditions.*

Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. (2013). *Quality inquiry and research design: Choosing among five traditions.*

Thousand Oaks, CA: Sage Publications, Inc.

Dillman, D., Smyth, J., & Christian, L. (2009). *Internet, mail, and mixed-mode surveys:*

The tailored design method. Hoboken, NJ: John Wiley & Sons, Inc.

Duggan, M. (2013). Cell phone activities 2013. Retrieved from:

http://pewinternet,org/Reports/2013/Cell-Activities.aspx

El-Hussein, M. & Cronje, J. (2010). Defining mobile learning in the higher education

landscape. *Educational Technology & Society, 13*(3), 12-21.

Fozdar, B. & Kumar, L., (2007). Mobile learning and student retention. International

Review of Research in Open and Distance Learning, 8(2), p. 1-18.

Harley, D., Winn, S., Pemberton, S., & Wilcox, P. (2007). Using texting to support students' transition to university. *Innovations in Education and Teaching International, 44*(3), 229-241.

Jones, G., Edwards, G. & Reid, A. (2009). How can mobile SMS support and enhance a first year undergraduate learning environment? *Research in Learning Technology (17)*3, 201-218.

Kop, R. & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *International Review of Research in Open and Distance Learning, 9*(3), 1-13.

Koszalka, T. A., & Ntloedibe-Kuswani, G. S. (2010). Literature on the safe and disruptive learning potential of mobile technologies. *Distance Education*, *31*(2), 139-157.

Lincoln Y.S., & Guba, E. G. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage Publishing.

Marshall, C. & Rossman, G. (2011). *Designing qualitative research*. Thousand Oaks, CA: Sage Publications, Inc.

Moustakas, C. (1994). *Phenomenological research methods.* Thousand Oaks, CA: Sage Publications.

Onwuegbuzie, A. J., & Leech, N. L. (2007). A call for qualitative power analysis. *Quality & Quantity 41*, 105-121.

Prensky, M. (2010). *Teaching digital natives.* Thousand Oaks, CA: Corwin.

Revere, L., Kovach, J. (2011). Online technologies for engaged learning: A meaningful synthesis for educators. *Quarterly Review of Distant Learning*, *12*(2), 113-124.

Siemens, G. (2004). Connectivism: A learning theory for the digital age. December

12, 2004. *2006-10-28] http://www. elearnspace. org/Articles/connectivism. htm*.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International*

Journal of Instructional Technology and Distance learning, 2(1), 3-10.

Smith, A. (2013). Smartphone ownership-2013. Retrieved from:

http://pewinternet.org.Reports/2013/Smartphone-Ownership-2013.aspx

Trochim, W.M. & Donnelly, J.P. (2008). *The research methods knowledge base*.

Mason, OH: Atomic Dog, a part of Cengage Learning.

Zickuhr, K. (2006). Tablet ownership 2013. Retrieved from:

http://pewinternet.org/Reports/2013/Tablet-Ownership-2013.aspx

CHAPTER 5: CONCLUSION

"Mobile technology is a powerful platform for learning in the classroom as much of it can be focused on educational purposes" (I_2).

This dissertation explored the relationship between online instructor self-efficacy and student course satisfaction along with how students are using mobile technology to enhance their education. The first study identified that significantly fewer (.01 level) freshmen, sophomores, juniors, and seniors at BYU-I than one might expect by chance, were satisfied with their online course as compared to other courses. This means that BYU-I freshmen, sophomores, juniors, and seniors believe they learn much more and were much more satisfied in their other classes compared to their online classes. The results of the mixed methods study suggest a potential reason and solution for this. The mixed method study revealed that students are truly reaching out to access sources of information outside the classroom and to connect and collaborate one with one another for educational purposes. Mobile devices, especially smart phones and tablets, utilizing web-based resources and capabilities, have made such connectivity immediate and convenient. This act of reaching out to networks or nodes, i.e. fields, ideas or communities by students in the study, is in accordance to what Siemens (2004, 2005) calls Connectivism. These mobile devices also facilitate the call for incorporating additional communication technology, web-based applications and hand-held devices within online courses (Revere & Kovach, 2011). Mobile devices may also improve student satisfaction as shown in other studies, by improving interaction and the frequency of that interaction between instructors and students (Ali & Ahmad, 2011; Astin, 1993; Jackson, Jones, & Rodriguez, 2010; Kuh, 2003; NSSE, 2005; Sahin, 2007).

The qualitative portion of this study was designed to discover how undergraduate students are currently using mobile devices, associated applications and web-based programs to enhance their learning. Using the theoretical framework of Connectivism as the guide, this study sought to understand the web-based resources students reach out to and connect with in search of information when required to do so. The questions of how mobiles devices are used and what sources are accessed were both answered through a phenomenological approach with open-ended questions being employed, which allowed the five students interviewed to reveal and expand on topics as they so desired.

From the interview analysis in this qualitative, phenomenological study, the most popular resource or *node* as Siemens (2004, 2005) calls them, is Google's search engine. Four out of the five students interviewed (80%) named it as the first source they go to for information. Company and organizational websites were also named as popular resources (60%) as well as news sources such as CNN and others with Wikipedia (2 out of 5 or 40%). The results of this study correlate with the observation that current students are used to "instant connectivity and easy access to the staggering amounts of content and knowledge available at their fingertips" (LeNoue, Hall & Eighmy, 2011, p. 6).

The fact that one student (I_4) mentioned friends as a resource for information ties in with another important aspect of Connectivism which states that once an individual learner gathers information from various sources, they then have the potential to become a source of information for others. While some continue to debate the merits of Connectivism as an actual learning theory, educators must, at a minimum, accept the fact that students are reaching out with their mobile devices to various sources for information. Educators have the opportunity to facilitate this process by encouraging and participating in it. This study

showed that all five students interviewed enthusiastically support the idea of professors incorporating more technology as a part of their teaching strategies.

Collaboration is also an example of the principle of *collective intelligence* as communities of individuals combine together "to leverage the combined expertise of their members to solve problems" (Koszalka & Ntloedibe-Kuswani, 2010, p.143). Each undergraduate student who was interviewed falls within this category, because each identified collaboration as a part of his or her m-learning experience in one way or another. The opportunity to collaborate in both synchronous and asynchronous settings is a great strength of these mobile devices and with so many beneficial applications available to facilitate the process, students are doing it, with or without the participation of educators. As Lamb (2004) expressed it, "change is happening. What remains unknown is whether educators, institutions, and developers will join (or coexist with) the revolutionary forces or whether they'll stand their ground and simply be overrun" (as cited by Kop, 2007, p. 200).

In this present study, Twitter was mentioned by 3 of the 5 students (60%) in the qualitative study interviews, but Google Hangout, Google Scholar, Google Docs, Google Analytics and Skype were each mentioned by only one student. Google Drive was the application of choice in respect to collaboration. Three out of 5 students (60%) not only said they used Google Drive for collaboration, but also expounded on the positive features and capabilities of the program. Though only mentioned once, by one student (I_3) in this study, Podio is another collaboration tool that was not found in any of the other studies. It is an online work platform that allows a great deal of customization based on the needs of the collaboration group. Because of the positive implications of these tools for collaboration in educational settings and because students are utilizing them anyway, teachers in higher

education settings should investigate and understand these tools and consider ways of utilizing them for the benefit of their students. Revere and Kovach (2011) presented many applications and web-based programs that can be used for collaboration and communication. Among those presented, five are the same as mentioned in the results of the current study; Twitter, Skype, Google Docs and Google Hangout along with Google Scholar.

For communication, Short Message Service (SMS), also known as text messages or texting, is the technology of choice. All the students interviewed (100%) used text messaging and preferred it to email or actual phone calls for communication. Emails, though not the preferred method of communication with mobile devices, was nevertheless quite popular, being use by 100% of those interviewed. This concurs with the findings of Harley, et al. (2007) who also found SMS or text messaging, the technology of choice for undergraduate students. In fact, with 81% of all adults 18 and older sending or receiving text messages, it truly is as Duggan (2013) declared, "one of the most prevalent cell phone activities of all time" (p. 4).

The quantitative portion of the study tested the potential of utilizing this popular form of communication in combination with mobile technology for educational purposes. Although previous studies exist testing various aspects of text messages as a means of communicating with students, no known studies have utilized Remind 101 in the setting of higher education. Like the findings of Jones, Edwards and Reid (2009), this study found students overwhelmingly willing to accept text messages for educational purposes. In this study, 72.4% of all students enrolled in the three classes chose to receive text reminders. This study also supports previous findings, which found the SMS messages from educators

useful and helpful (Harley, et al., 2007; Jones, et al., 2009). Significantly more students than one would expect by chance, chose to participate in the program, believing it helped them to be more successful in class, and also willing to participate in the program if it were offered again. In fact 88.6% of the students surveyed who participated in Remind 101 believed the text reminders helped them in their overall course performance. The findings of this study indicated the medium of text messaging as being beneficial in education, which concurs with the conclusion of Harley, et al. (2007) which stated that not using it as a potential means of support to students would be a mistake.

Significance of the Study

The results of this study provide educators with insights as to how mobile technology is currently being used by undergraduate students to enhance their educational experiences. Further insights were also gained concerning student connectivity and the resources they rely on to gather information for educational purposes. Web-based applications and programs were noted and listed according to popularity and purposes for each as described by the subjects of this investigation. The popularity of texting (SMS) was confirmed and its usefulness as of source of improving student course performance tested. Remind 101 was the program used to deliver instructor-generated text messages to the students with promising results. By reviewing this information, educators can gain useful insights into ways of utilizing mobile devices and web-based resources within the educational context to enhance learning and course performance for their own students.

Recommendations for Future Research

This research was conducted exclusively with students attending a private religious university. Although students attending this university come from locations all over the

United States and many foreign countries, they nevertheless, may not represent all college students, thus not allowing generalization of the findings of this study. It is therefore recommended that similar research in the future be conducted at other universities in different locals, including those with no particular religious affiliation.

The study of teacher self-efficacy in relation to student course satisfaction found that the more self-efficacy online teachers had in the area the use of technology, the less satisfied students were with the course. More investigation is needed to determine what technology is being used by the instructors, and if the use of mobile devices would facilitate more interaction between teachers and students, this possibly increasing student satisfaction.

Qualitative interviews in the phenomenological study involved only five participants. Although this small number is valid for studies of this type, more students involving multiple interviews may provide more validity for the analysis and provide further insights not captured through the present process.

Snowball sampling, or *network sampling* as utilized in the data collection of this study served well for finding individuals with the desire qualities for interviewing purposes. However, such a procedure narrows the pool of students significantly and promotes a type of homogeneity in participants that does not allow the results of the study to be generalized beyond the scope or parameters of the study itself. Future studies should consider a selection process involving random sampling methods that would provide for a broader generalization of findings. Eligible students in the sample pool should come from a variety colleges and departments at the universities, which would also allow for further generalizations.

Though this present research accommodated information concerning age, gender, year in school and also nationality, these attributes were not treated as research variables, but rather as mere statistics in the way of totals and percentages. Future research could use each of these designations as variables in the study, testing for significant differences that may exist.

The grades received by participants and non-participants in the Remind 101 study were not noted in an effort to protect anonymity. Though this study revealed a high preponderance towards the benefits of those receiving instructor-generated group reminders relating to overall course performance, a comparison of actual grades received between participants and non-participants would be interesting indeed.

The quantitative portion of this study involved instructor-generated messages to remind students of assignments due and examination dates. Sending these text messages was facilitated through a free application called Remind 101, found at www.remind101.com. This free program allowed only one-way communication from the instructor to the students who volunteered to receive them. Future studies could test other programs as well that might have other communication capabilities while still protecting instructor and student privacy rights as outlined through FERPA.

References

Ali, A. & Ahmad, I. (2011). Key factors for determining student satisfaction in distance

    learning courses: A study of Allama Iqbal Open University. *Contemporary*

    Educational Technology, 2(2): 118-134.

Astin, A. W. (1993). *What matters in college? Four critical years revisited.* San Francisco,

    CA: Jossey-Bass.

Creswell, J. (2013). *Quality inquiry and research design: Choosing among five traditions.*

    Thousand Oaks, CA: Sage Publications, Inc.

Duggan, M. (2013). Cell phone activities 2013. Retrieved from:

    http://pewinternet,org/Reports/2013/Cell-Activities.aspx

Harley, D., Winn, S., Pemberton, S., & Wilcox, P. (2007). Using texting to support

    students' transition to university. *Innovations in Education and Teaching*

    International, 44(3), 229-241.

Jackson, L. C., Jones, S. J., & Rodriguez, R. C. (2010). Faculty actions that result in student

    satisfaction in online courses. *Journal of Asynchronous Learning Network, 14*(4),

    78-96.

Jones, G., Edwards, G. & Reid, A. (2009). How can mobile SMS support and enhance a

    first year undergraduate learning environment? *Research in Learning Technology*

    *(17)*3, 201-218.

Kop, R. & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the

    past? *International Review of Research in Open and Distance Learning, 9*(3),

    1-13.

Koszalka, T. A., & Ntloedibe-Kuswani, G. S. (2010). Literature on the safe and disruptive learning potential of mobile technologies. *Distance Education*, *31*(2), 139-157.

Kuh, G. D. (2003). What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change*, *35*(2), 24-32.

LeNoue, M., Hall T, & Eighmy, M. (2011). Adult education and the social media revolution. *Adult Learning*, *22*(2), 4-12.

Lincoln Y.S., & Guba, E. G. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage Publishing.

Marshall, C. & Rossman, G. (2011). *Designing qualitative research*. Thousand Oaks, CA: Sage Publications, Inc.

Miles, M., & Huberman, A., & Saldana, J. (2014). *Qualitative data analysis*. Thousand Oaks, CA: Sage Publishing, Inc.

Oliver-Hoy, M., & Allen, D. (2006). The use of triangulation methods in qualitative educational research. *Journal of College Science Teaching*, 35(4), 42-46.

Onwuegbuzie, A. J., & Leech, N. L. (2007). A call for qualitative power analysis. *Quality & Quantity 41*, 105-121.

Revere, L., Kovach, J. (2011). Online technologies for engaged learning: A meaningful synthesis for educators. *Quarterly Review of Distant Learning*, *12*(2), 113-124.

Sahin, I. (2007). Predicting student satisfaction in distant education and learning environments. *Turkish Online Journal of Distance Education, 8*(2), 1302-6488.

Siemens, G. (2004). Connectivism: A Learning Theory for the Digital Age. December 12, 2004. *2006-10-28] http://www. elearnspace. org/Articles/connectivism. htm*.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International*

Journal of Instructional Technology and Distance learning, 2(1), 3-10.

Appendix A

Demographic Information

Demographic Information

Directions: Please answer the following questions as they relate to your current teaching situation.

I am a:
- ○ Male (1)
- ○ Female (2)

Age:
- ○ less than 25 (1)
- ○ 25-34 (2)
- ○ 35-44 (3)
- ○ 45-54 (4)
- ○ 55-64 (5)
- ○ 65+ (6)

How long have you taught online for BYU-Idaho?
- ○ less than one semester (1)
- ○ 1-2 semesters (2)
- ○ 3-5 semesters (3)
- ○ over 5 semesters (4)

Have you ever taught online for other universities?
- ○ Yes (9)
- ○ No (10)

Answer If Have you ever taught online for other universities? Yes Is Selected

Q54 For which other university(ies) have you taught online?

Answer If Have you ever taught online for other universities? Yes Is Selected

How long have you taught online for other universities?
- ○ less than one semester (1)
- ○ 1-2 semesters (2)
- ○ 3-5 semesters (3)
- ○ over 5 semesters (4)

In what department/subject area do you teach?
- ○ Art (1)
- ○ Biology (2)
- ○ Business (3)
- ○ Communications (4)
- ○ English (5)
- ○ Foundations (6)
- ○ Home and Family (7)
- ○ Language (8)
- ○ Math (9)
- ○ Pathway (10)
- ○ Religious Education (11)
- ○ Science (12)
- ○ Sociology/Psychology (13)

How were you prepared to teach? Check all that apply.

- ❑ Undergraduate teacher education program (teacher certification) (1)
- ❑ Graduate program of one year beyond bachelor's degree (2)
- ❑ Combined undergraduate and graduate programs (3)
- ❑ Doctorate level program (4)
- ❑ Online teacher training program (5)
- ❑ Other specialized trainings (6)

Would you be willing to participate in a confidential focus group discussing your teaching group experience?

- ❍ Yes (9)
- ❍ No (10)

Appendix B

Online Teacher Self-efficacy Survey

Online Teacher Self-efficacy Survey

adapted from the Online Educator Self-Efficacy Scale (OESES), the Online Technologies Self-Efficacy Sale (OTSES), Lee's Self-efficacy Instrument, and Tschannen-Moran & Hoy's Teacher Efficacy Construct.

This assessment is divided into two sections. Section I includes information about the survey and asks for your willingness to participate. Section II contains items designed to assess the self-efficacy of online teachers' pedagogical skills, technical skills, and subject matter expertise.

SECTION I: Informed Consent

You are invited to participate in a survey. The goal of this research study is to identify self-efficacy of instructors in online learning at BYU-Idaho. This study is being conducted by Heather (Bosworth) Carter, Jeffrey Hochstrasser, Rachel Huber, and Brett Yadon, in association with the University of Idaho. In order to participate in this study you need to be an online learning instructor at BYU-Idaho. Participation in this study is voluntary. If you agree to participate in this study, you would be asked to complete a short survey. The survey includes questions about your demographics, perception of your teaching in terms of use of technology, subject matter expertise, and online instruction pedagogy. Participating in this study may not benefit you directly, but it will help us learn how to improve instructor training and professional development for online education. You may skip any questions you don't want to answer and you may end the survey at any time. The information you will share with us if you participate in this study will be kept completely confidential to the full extent of the law. Your information will be assigned a code number that is unique to this study. When the study is completed and the data have been analyzed, the list linking participant's names to study numbers will be destroyed. Study findings will be presented only in summary form and your name would not be used in any report. If you have any questions about this study, please contact us. If you have questions about your rights as a research participant, please contact University of Idaho IRB. YOU WILL BE GIVEN A COPY OF THIS FORM WHETHER OR NOT YOU AGREE TO PARTICIPATE.

Your responses will be kept confidential. Thank you for completing this survey.

Do you agree to participate in this survey?
❍ Yes (9)
❍ No (10)

SECTION II:

Online Instructor Self-efficacy Survey

Directions: For each of the following topics, select the box that best indicates your level of confidence in performing the described teaching task.

Pedagogical skill: Assess your level of confidence in accomplishing the following pedagogical techniques online.

Q11 Addressing the diverse needs of students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q61 Responding promptly to student questions and concerns
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q12 Successfully teaching difficult students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q13 Exerting a positive influence on the personal development of my students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q63 Exerting a positive influence on the academic development of my students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q22 Crafting critical questions for students (questions that require analytical thinking)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q62 Developing critical thinking skills in my students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q23 Preparing students for the workforce
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q15 Requiring my students to think beyond content toward application and discovery
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q14 Supporting student interaction in asynchronous online discussions (forums or discussion boards)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q59 Supporting student interaction in synchronous class settings (Adobe Connect or Skype)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q16 Building a community where students interact with and learn from each other
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q64 What has had the biggest impact in your feelings of confidence in teaching online?

Technological skill: Assess your level of confidence in performing the following technical skills online.

Q28 Copying and pasting content
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q26 Bookmarking a website
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q27 Creating a hyperlink and sharing the hyperlink with students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q29 Downloading (saving) an image from a web site to your computer
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q30 Uploading or attaching an image to classroom notes or announcements
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q31 Chatting live via a synchronous chat system such as Adobe Connect or Skype
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q32 Reading messages from one or more members of the synchronous chat system (Adobe Connect/Skype)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q33 Answering a message or starting my own message in a synchronous chat system (Adobe Connect/Skype)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q34 Using video and microphones in a synchronous chat system (Adobe Connect/Skype)
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q36 Logging on and off the myBYUI email system
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q37 Sending an email message to more than one person at the same time using the mail system in I-Learn
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q38 Attaching a file to an email message
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q45 Updating course notes and announcements
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q39 Creating a new thread in an online discussion board
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q41 Replying to students' discussion board messages and questions
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q42 Uploading a file to a discussion board thread
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q44 Creating a screencast or podcast
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q46 Sharing video and audio files with students
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q65 What task do you feel most confident about executing in terms of using technology to teach online?

Q66 What task do you feel least confident about executing in terms of using technology to teach online?

Knowledge of subject matter: Assess your level of confidence in understanding the subject you teach.

Q51 Answering students' questions about the subject outside the textbook or course materials
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q56 Providing an alternative explanation or example when students are confused
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q57 Teaching students about the subject in simple yet engaging ways
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q49 Understanding the subject well enough to effectively teach both high-performing and struggling students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q58 Increasing my content knowledge and expertise outside of the classroom
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q47 Being aware of new discoveries in my field of study
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q48 Sharing new discoveries in my field with my students
- ○ Very Confident (1)
- ○ Somewhat Confident (2)
- ○ Not Very Confident (3)
- ○ Not Confident At All (4)

Q52 Presenting practical, work-related knowledge of the subject to my students
❍ Very Confident (1)
❍ Somewhat Confident (2)
❍ Not Very Confident (3)
❍ Not Confident At All (4)

Q67 What do you feel has the biggest impact on your ability to teach your subject of expertise online?

Appendix C

BYU-Idaho End of Semester Course Evaluation by Students

BYU-IDAHO COURSE EVALUATION

Please evaluate the following instructor and course. When you are finished, click on the SUBMIT button at the bottom of the page. Your identity is completely anonymous. Please be as thorough and as accurate as possible. Your feedback is highly valued. It is used by your instructor and the school's administration to improve teaching.

Instructor:	**CHECKETTS MAX L**
Course :	**REL 233** **CHURCH HISTORY**
Section:	**9**

Items about Your Performance in this Class: CHECKETTS MAX L -- REL 233

		not applicable	strongly disagree	disagree	somewhat disagree	somewhat agree	agree	strongly agree	very strongly agree
1.	I was prepared for each class.	○	○	○	○	○	○	○	○
2.	I arrived at class on time.	○	○	○	○	○	○	○	○
3.	I was an active participant in online or face-to-face class discussions.	○	○	○	○	○	○	○	○
4.	I sought opportunities to share my learning with others outside of class.	○	○	○	○	○	○	○	○
5	I worked hard to meet the requirements of this class.	○	○	○	○	○	○	○	○
6.	I sought opportunities to reflect on what I had learned in the class.	○	○	○	○	○	○	○	○
7.	I feel that I made important contributions to the learning and growth of fellow classmates.	○	○	○	○	○	○	○	○
8.	The course as a whole has produced new knowledge, skills, and awareness in me.	○	○	○	○	○	○	○	○

Items about the Course: CHECKETTS MAX L -- REL 233

		not applicable	strongly disagree	disagree	somewhat disagree	somewhat agree	agree	strongly agree	very strongly agree
1.	Course objectives were clear.	○	○	○	○	○	○	○	○
2.	Course was well-organized.	○	○	○	○	○	○	○	○
3.	Student responsibilities and expectations were clearly defined.	○	○	○	○	○	○	○	○
4.	Instructional resources – textbook(s), course guide(s), online material, etc – were useful and helped me to achieve course objectives.	○	○	○	○	○	○	○	○
5	Assessment activities – exams, quizzes, papers, hands-on demonstrations, presentations, etc. – accurately and fairly measured the knowledge and abilities I acquired from the course.	○	○	○	○	○	○	○	○
6.	Class assignments contributed to my learning and growth.	○	○	○	○	○	○	○	○
7.	The course provided opportunities to learn from and teach other students.	○	○	○	○	○	○	○	○
8.	Group work, if assigned, was beneficial and meaningful.	○	○	○	○	○	○	○	○
9.	Students were actively involved in this class through discussions, group work, and teaching.	○	○	○	○	○	○	○	○

Items about the Instructor: CHECKETTS MAX L -- REL 233

		not applicable	strongly disagree	disagree	somewhat disagree	somewhat agree	agree	strongly agree	very strongly agree
1.	The instructor effectively modeled problem-solving and application of subject matter.	○	○	○	○	○	○	○	○
2.	The instructor made good use of class time.	○	○	○	○	○	○	○	○
3.	When given, examples and explanations were clear.	○	○	○	○	○	○	○	○
4.	The instructor gave helpful feedback of my work.	○	○	○	○	○	○	○	○
5	The instructor responded respectfully and constructively to student questions and viewpoints.	○	○	○	○	○	○	○	○
6.	The instructor was available to me when I requested assistance, in class or outside of class.	○	○	○	○	○	○	○	○
7.	The instructor motivated me by his/her enthusiasm to want to learn about the subject.	○	○	○	○	○	○	○	○
8.	The instructor starts/dismisses class at scheduled times.	○	○	○	○	○	○	○	○
9.	The instructor held me accountable for coming to each class prepared.	○	○	○	○	○	○	○	○
10.	The instructor provided appropriate opportunities to be an active participant in the class.	○	○	○	○	○	○	○	○
11.	The instructor provided opportunities to reflect upon my learning and experiences in the class.	○	○	○	○	○	○	○	○

Items about Core Values: CHECKETTS MAX L -- REL 233

		not applicable	strongly disagree	disagree	somewhat disagree	somewhat agree	agree	strongly agree	very strongly agree
1.	Appropriately brings Gospel insights and values into	○	○	○	○	○	○	○	○

	secular subjects.							
2.	Inspires students to develop good character.	○	○	○	○	○	○	○	○
3.	Helps students prepare to live effectively in society.	○	○	○	○	○	○	○	○
4.	Is spiritually inspiring insofar as the subject matter permits.	○	○	○	○	○	○	○	○

Overall Rating: CHECKETTS MAX L -- REL 233

		very poor	poor	fair	good	very good	excellent	exceptional
1.	What is your overall rating of this **instructor**.	○	○	○	○	○	○	○
2.	What is your overall rating of this **course**.	○	○	○	○	○	○	○

Other Information: CHECKETTS MAX L -- REL 233

		a great deal less	a little less	about the same	a little more	a great deal more
1.	Compared to other college courses you have taken, would you say that you have **learned** . . .	○	○	○	○	○
2.	Compared to other college courses you have taken, would you say that your **satisfaction** is . . .	○	○	○	○	○
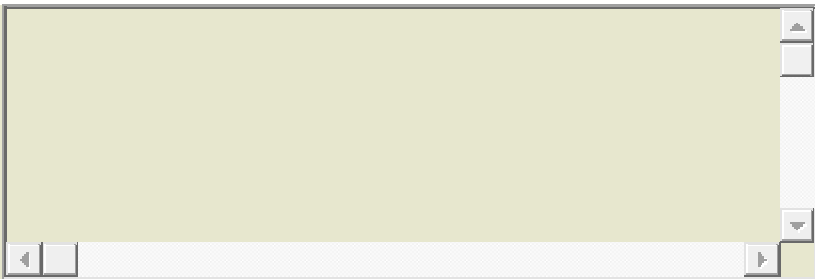
	1	2	3	4	5	6	7	8	9	9+
The approximate number of hours per week that I have spent in outside preparation for this class is . . .	○	○	○	○	○	○	○	○	○	○

	90% to 100%	75% to 90%	50% to 75%	less than 50%	never attended
My class attendance has been . . .	○	○	○	○	○
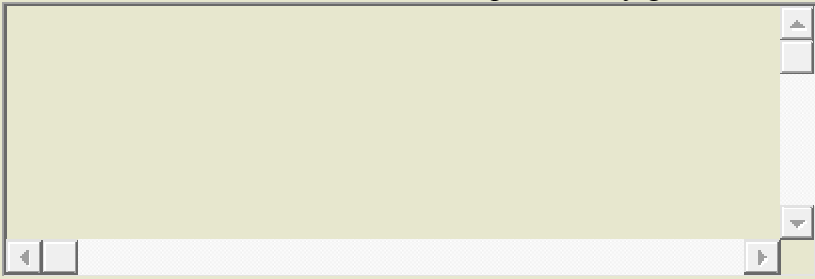
	major	minor	GE/ Foundations	elective	other
This course fills requirements for my . . .	○	○	○	○	○

	A	B	C	D	F	Other
The grade I expect from this course. . .	○	○	○	○	○	○

What could be done to improve this course to help you learn more?

Is there anything about this course and/or instructor that was particularly good? If so, what?

Appendix D

BYU-Idaho IRB Approval

BYU
IDAHO

October 21, 2013

Dear Heather,

Your request to use human subjects for the study entitled *Assessment of Online Learning and Technologies in Higher Education* is approved for 12 months from the date of this letter.

Please notify the IRB if you intend to make any significant modifications to the study's design or implementation.

Good luck with your study.

Regards,

Scott J. Bergstrom, Ph.D.
Chair, BYU-Idaho Institutional Review Board

Appendix E

University of Idaho IRB Approval

University *of* Idaho

September 19, 2013

To: Linda Taylor

Cc: Heather Carter, Jeffrey Hochstrasser, Rachel Huber & Brett Yadon

From: Traci Craig, PhD
Chair, University of Idaho Institutional Review Board
University Research Office
Moscow, ID 83844-3010

Title: 'Assessment of Online Learning and Technologies in Higher Education
        Project: 13-201

        Approved: 09/19/13
        Expires: 09/18/14

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for the above-named research project is approved as offering no significant risk to human subjects.

This approval is valid for one year from the date of this memo. Should there be significant changes in the protocol for this project, it will be necessary for you to resubmit the protocol for review by the Committee.

Traci Craig

Traci Craig

University of Idaho Institutional Review Board: IRB00000843, FWA00005639

Appendix F

Interview Guide- Pilot Study

Interview Guide

1. What is your declared major at this time?

2. What year are you in school?
    E. Freshman
    F. Sophomore
    G. Junior
    H. Senior

3. What mobile devices do you currently use?
    A. Smart phone
        1. Android
        2. iPhone
        3. Other
    B. Tablet
        1. Type?

4. Please share with me your experiences using this device (these devices) as part of your educational experience.

5. What web-based applications do you utilize with these mobile devices for educational purposes?

6. Have any past or present professors incorporated or encouraged the use of mobile devices in their course(s)?
    A. If yes, please share the details.
    B. If not, do you wish they did?
        1. If so, then how would you suggest they use them?

7. What other purposes do you use your mobile devices for?

8. What other feeling or ideas about the use of mobile devices for the purpose of education would you like to share?

Thank you for your time.

Appendix G

Participant Consent Form-Pilot Study

Dear Mobile Device User,

       I am a graduate student in the College of Education at the University of Idaho. I would like to invite you to participate in a research project about the use of mobile devices (smart phones and tablets) by undergraduate students for the purpose of enhancing their educational experiences. I am interested in investigating how these individuals are currently using these devices and what web applications they may be using.

       Your participation will include being interview three times for approximately 30 minutes each. All three interviews will be recorded so I can produce a transcript and increase accuracy and proper review. These recordings will not be released to others and will be secured using suggested and appropriate security measures. You will be provided a hardcopy of each transcript for your review. You may make any changes that you want.

       I will do everything I can to protect your anonymity and your privacy by using a pseudonym for your actual name and by not revealing the name of the university you attend. You have the right to withdraw from the study up until September 30, 2013. At that point, I will be in the final stages of the writing process and will not be able to remove quotations from the document.

       This study will be shared with members of my dissertation committee and other appropriate members of the University of Idaho community. The dissertation that results will be published in hardcopy and microfiche and will be housed in the library on the campus of the University of Idaho.

       Let me express my appreciation in advance for giving your time to this study, which will help me learn more about the use of mobile devices by undergraduates to enhance their educational experience, which, in turn, will help educators better understand how they might utilize these tools in their teaching methods.

       If you have any questions, please feel free to call me at (208) 496-3706. You may also contact my committee chairperson, Dr. Bryan Maughan at the University of Idaho, Idaho Falls location.

Thank you.

Jeffrey L. Hochstrasser

Please sign below if you are willing to participate in the dissertation research project outlined above.

Signature _____

Print name_____

Date _____

Appendix H

IRB Approval-University of Idaho

University of Idaho

August 30, 2013

Office of Research Assurances
Institutional Review Board
875 Perimeter Drive, MS 3010
Moscow ID 83844-3010

Phone: 208-885-6162
Fax: 208-885-5752
irb@uidaho.edu

To: Linda Taylor
Cc: Jeffrey Hochstrasser

From: Traci Craig, PhD
          Chair, University of Idaho Institutional Review Board
          University Research Office
          Moscow, ID 83844-3010

Title: 'Understanding the Ways Mobile Devices and Popular Web-based
          Programs are Used by Undergraduate Students To Enhance Their
          Learning Experiences. '

Project: 13-197

Approved: 08/29/13
Expires: 08/28/14

On behalf of the Institutional Review Board at the University of Idaho, I am
pleased to inform you that the protocol for the above-named research project is
approved as offering no significant risk to human subjects.

This approval is valid for one year from the date of this memo. Should there be
significant changes in the protocol for this project, it will be necessary for you to
resubmit the protocol for review by the Committee.

Traci Craig

Traci Craig

University of Idaho Institutional Review Board: IRB00000843, FWA00005639

Appendix I

BYU-Idaho Approval Letter

BYU
IDAHO

Academic Administration

Brigham Young University–Idaho • 210 Kimball Building • Rexburg, ID • 83460-1690

August 12, 2013

Dear Jeff,

Your proposal to use human subjects from the BYU-Idaho student body for the study entitled *Understanding the Ways Mobile Devices and Popular Web-based Programs are Used by Undergraduate Students To Enhance Their Learning Experiences* is approved for 12 months from the date of this letter. Please notify the IRB if you intend to make any significant modifications to the study's design or implementation.

Good luck with your study.

Regards,

Scott J. Bergstrom, Ph.D.
Chair, BYU-Idaho Institutional Review Board

Scott J. Bergstrom, Ph.D.   Institutional Review Board | Phone: (208) 496-1136 | Fax: (208) 496-1104 | bergstroms@byui.edu

Appendix J

Consent Form-Qualitative Study

University *of* Idaho

Consent Form

Study: Understanding the Ways Mobile Devices and Popular Web-based Programs Are Used by Undergraduate Students to Enhance Their Learning Experiences
Researchers: Jeff Hochstrasser; Dr. Linda Taylor

The University of Idaho Institutional Review Board has approved this project.
Institutional Review Board, University of Idaho, P.O. Box 443010, Moscow, Idaho 83844-3010,
irb@uidaho.edu

Purpose of this study:
The purpose of this study is to discover how undergraduate studies are using mobile technologies to enhance their educational experiences. The results may provide information for online and classroom instructors as to how they may incorporate the use of mobile technologies and web-based resources into their teaching strategies.

Procedure & Risks:
You will be asked to complete an in-depth interview involving your current mobile technology practices, including the resources you use to access information on the Web. Your participation is voluntary. If you experience any discomfort during this study, you may stop participation at any time without any penalty.

Benefits:
This study may provide critical information that will help online learning and classroom instructors better understand how mobile technology devices are being utilized by undergraduate students. It will also provide information as to the web resources that are being accessed by students for educational purposes. Instructors will then have a better understanding of the use of mobile technologies and can develop appropriate strategies to enhance teaching and learning.

Anonymity & Confidentiality:
All information provided and interview transcriptions will be kept secure in locked files, accessible only to the researchers participating in this study. No identifying information will be on any questionnaire.

If you have questions about the study you can ask the investigators at any time.

Investigator   Faculty Sponsor
Jeff Hochstrasser   Linda Taylor, Ph.D.
University of Idaho, College of Education   University of Idaho, College of Education
Professional Practices Doctorate Program   Counseling & School Psychology
                                                                        Moscow, ID 83844-3083

(253) 381-6365
jhochstrasser1@gmail.com   lindat@uidaho.edu

During the course of this study, you may stop at any time with no penalty.
All you need to say is: "I no longer wish to participate"
****

I HAVE RECEIVED & READ THIS CONSENT FORM & UNDERSTAND & AGREE WITH ITS CONTENTS.

Student's Name: _____ Date_____

Researcher: _____ Date_____

Appendix K

Uses for Mobile Devices

Categories		I$_1$	I$_2$	I$_3$	I$_4$	I$_5$
Technology	Cell Phone					
	Smart Phone	X	X	X	X	X
	Tablet			X	X	
Communication						
	Text Messages	X	X	X	X	X
	Email	X	X	X	X	X
	Twitter	X				X
	Skype					X
	FaceTime		X			
	Phone Calls		X		X	
Education						
	Note-taking	X	X	X	X	X
	Textbooks		X	X	X	
	Social Media	X	X			X
	Collaboration	X				
	Organizing & Scheduling		X	X		X
	Video				X	
	Text Reminders	X		X	X	X
Resources/Search						
	Google	X	X		X	X
	Company Websites	X		X	X	
	Univ. Library Website			X		
	Wikipedia		X	X		
	News Websites		X	X		X
	Friends				X	
	Notes		X			
	YouTube				X	
Social Media						
	Facebook	X	X	X	X	X
	Twitter	X	X	X	X	X
	LinkedIn			X		
	Instagram		X			X
	Four Square					X
	Pinterest		X			
	FaceTime	X	X			
	Snapchat	X				
	Tumblr	X				
Apps & Programs						
	Evernote		X	X	X	
	Notepad	X				
	Google		X			X
	Google Drive		X		X	X

	Google Docs				X	
	Google Analytics				X	
	Google News		X			
	Google Scholar	X				
	Google Hangout				X	
	Twitter	X	X	X		
	Podio		X			
	CNN		X	X		X
	NPR		X	X		
	BuzzFeed					X
	Flipboard		X	X		
	Associated Press					X
	iLearn (Brainhoney)	X			X	
	Basecamp	X		X		X
	Remind 101			X		
	Games	X				
	Kindle			X		
	iBook				X	
	iCal			X		
	TV Guide					X
	Photo Editing					X

Appendix L

Interview Guide- Qualitative Study

Interview Guide

1. Will you please share your age & ethnicity with me? (Also note gender)

2. What is your declared major at this time?

3. What year are you in school?
> A. Freshman
> B. Sophomore
> C. Junior
> D. Senior

4. What mobile devices do you currently use?
> A. Smart phone?
>> 1. Android
>> 2. iPhone
>> 3. Other
>
> B. Tablet
>> 1. Type?

5. Please share with me your experiences using this device (these devices) as part of your educational experience.

6. What web-based applications do you utilize with these mobile devices for educational purposes?

7. What sources do you reach out and connect with when you need information?

8.   What is the best experience you can recall, where mobile technology helped you in your education and learning?

9. Have any past or present professors incorporated or encouraged the use of mobile devices in their course(s)?
> A. If yes, please share the details.
>
> B. If not, do you wish they did?
>> 1. If so, then how would you suggest they use them?
>> 2. Could you share with me some of the policies regarding mobile devices you have experienced from your professors?

10. What other purposes do you use your mobile devices for?

11. What other feelings or ideas would you like to share about education and mobile devices?

Appendix M

Participant Consent Form-Quantitative Study

University of Idaho

Consent Form

Study: The Effectiveness of Instructor-Generated Text Messaging as a Means of Course and Grade Improvement as Perceived by Undergraduate Students
Researchers: Jeff Hochstrasser; Dr. Linda Taylor

The University of Idaho Institutional Review Board has approved this project.
Institutional Review Board, University of Idaho, P.O. Box 443010, Moscow, Idaho 83844-3010,
irb@uidaho.edu

Purpose of this study:
The purpose of this study is to test the perceived effectiveness of instructor-generated text message reminders to voluntary undergraduate students enrolled in selected communication classes at a Brigham Young University-Idaho.

Procedure & Risks:
Students who volunteer for this study will have the opportunity to receive (or not) periodical text messages from the class instructor through a web-based program called Remind 101. These text messages will be reminders of assignment due dates and opening and closing dates for examinations. A short survey will also be administered at the end of the semester to all students (those receiving text message and those not receiving text messages) to measure the perceived effectiveness of the text message program. All phone numbers will remain anonymous to both students and the instructor. If any participant should feel uncomfortable or wish to discontinue participation the program during the semester, they may do so without risk or penalty of any kind.

Benefits:
This study may provide important information as to the potential benefits of instructor-generated text message reminders to students. Should the results prove positive in nature, other instructors may wish to incorporate this program or similar programs into their teaching strategies.

Anonymity & Confidentiality:
Your anonymity as a participant will be protected. All information provided and surveys will be kept secure in locked files, accessible only to the researchers participating in this study. All surveys will eventually be destroyed and the names of individuals participating in Remind 101 will be deleted at the end of the study.

If you have questions about the study you can ask the investigators at any time.

Investigator   Faculty Sponsor
Jeff Hochstrasser   Linda Taylor, Ph.D.
University of Idaho, College of Education   University of Idaho, College of Education
Professional Practices Doctorate Program   Counseling & School Psychology
                                                        Moscow, ID 83844-3083

(253) 381-6365
jhochstrasser1@gmail.com   lindat@uidaho.edu

During the course of this study, you may stop at any time with no penalty.
All you need to say is: "I no longer wish to participate"
****

I HAVE RECEIVED & READ THIS CONSENT FORM & UNDERSTAND & AGREE WITH ITS CONTENTS.
Student's Name: _____Date_____

Researcher _____ Date_____

Appendix N

Remind 101 Study Survey

Did you participate in the Remind 101 texting program?

_____ *Yes* _____ *No (answer questions below based in your answer to this*

question.)

If Yes - Do you think participation in the Remind 101 program helped you to be

more successful in the course? ___ Yes ___ No

Why? Or Why not?

If No- Do you think you would have done better in the course if you

had participated in this program? ___Yes ___ No

Why? Why not?

Would you participate in this program if it was offered again?

___Yes ___ No

Why? Why not?

Mark all the appropriate categories:

Male ____ Female ____

Freshman ___ Sophomore ____ Junior ____ Senior ____

Please share your age in years: _____ years old.

Which group of people do you identify with?
(please identify the specific group also by circling or writing the group in the space provided):
A) Caucasian
B) Asian American (Chinese, Japanese, Korean, etc.)_____
C) African American
D) American Indian (Nez Perce, Coeur d'Alene, Shoshone, Bannock, etc.)_____
E) Pacific Islander (Hawaiian, Samoan, Guamanian, etc.)_____
F) Alaskan Native (Inuit, Klinguit, etc.)_____
G) Latino (Mexican, Cuban, Puerto Rican, Nicaraguan, etc.)_____
H) Other _____

Appendix O

Composite Textural Description

Composite Textural Description

Undergraduate students equipped with smartphone technology are finding ways to enhance their education with or without the encouragement or endorsement of educators. They favor mobile technology because of its mobility, portability and convenience in usage. Each can cite an experience where mobile technology has "saved them" or has at least made an assignment easier in some way. Within the classroom, mobile devices are being used for taking notes with the most popular application being Evernote because of its versatility and search capabilities. Organization and scheduling is also important to students and mobile devices have been helpful there as well. Mobile devices also helps students keep track of assignments and homework due dates. The school course management system (*iLearn* also known as *Brainhoney*) was also identified as a useful tool for these purposes, though its format is not currently conducive to mobile devices.

 Texting was identified as the preferred method of communicating because of the ease and immediacy. It also facilitates collaboration when groups or individuals are working on projects together. Some have received text-generated reminders from instructors about assignments and examination dates. Those students loved that concept and would welcome such communication from all professors. Email is the next most popular way of communicating, but even Twitter, regularly associated with social media, was used to facilitate communication.

Google products and services are used by all students. For research, they used Google first, but also relied on company and institutional websites. Some even used Google Scholar to look up more credible sources. The students were not afraid to admit that they often used Wikipedia as a starting point for information, especially on new topics, about which they had no prior knowledge. Digital textbooks were the norm for these students. They are less expensive and have a search quality that makes looking up and locating topics easy. The students indicated receiving the latest news and information from CNN, NPR, BuzzFeed, Flipboard and other similar applications. They also have access to specific publications dealing with their particular majors.

For work on group projects, Google Drive was the most popular application. It utilizes the Cloud, which makes documents accessible from anywhere, by anyone. It negates the necessity of meetings when time is of the essence. In addition, PDF files can be added and become part of the searchable documents as well. Anyone in the group can work on the document in real time, which is very conducive to a collaborative effort. Other Google products used for collaboration are Google Docs and Google Hangout, which is a live, visual and audio conferencing service for multiple people.

Social media was also identified as a part of the educational process. Facebook, and Twitter were used in some class assignments with the results analyzed by using Google Analytics. Social media however was used most often on a personal basis. Facebook, Twitter, Instagram, Pinterest, Snapshot and more are all mentioned as a part of the personal process of communicating with friends and family members. Taking and sharing photos is also part of their social communication.

These students have learned through experience that outside of the Communication Department, most professors don't allow the use of mobile devices in their classrooms. In spite of that, the feeling is unanimous that instructors should utilize more technology, especially since all of the students use mobile devices constantly anyway. The students acknowledge that mobile devices, if allowed, will be misused by some students, but feel that the advantages to having them in the classroom is worth it, even above the few distractions caused by a minority of the students. If students already have mobile devices and are using them anyway, why not seek ways to positively incorporate them into the leaning process?