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MULTI TOUCH BOOKS IN HIGHER EDUCATION

A Study of *Educational Leadership and Policy* for Schools of education

Executive Summary

Submitted to the Faculty of Lynn University

College of Education

In Fulfillment of

The Requirements for the Degree of Doctor of Education

By

Jason M. Cascio

December 4, 2019

ABSTRACT

JASON CASCIO: Multi-touch Books in Higher Education

A Study of *Educational Leadership and Policy* for Schools of education

Technology points to gaps in higher education adoption of learning technologies where decisions are based on a digital tool's efficacy and unique capabilities, rather than the role they play in effective teaching and learning (Grush, 2019). Higher Education institutions and their faculty postpone technical decision-making. This results in an educational system ill-equipped to meet the needs of students, faculty, and sufficient digital fluency of graduates and the workforce. By integrating current, interactive tools into teaching materials, such as multi-touch books, or iBooks, faculty can meet their students' learning needs, thereby improving competencies and ability to track their assessment and engagement throughout a program. This Dissertation-in-practice (DiP) appraises an interactive multi-touch book, *Educational Leadership and Policy*, as an effective delivery tool for faculty in Schools of education in order to improve student engagement and success. The study examines the adoption of *iBook* by faculty and their students at a higher education institution in the Southeastern United States to understand what relationship exist with multi-touch books and student success. Given that new technologies within higher education are relatively recent, this study is relevant and may add to the evidence available on this emerging topic.

Key terms: *Multi-touch books, iBooks, digital literacy, student engagement, technology, Educational Leadership*

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providing guidance, expertise, time, and patience.

Special thanks to: Dr. James Guthrie, Dr. Vin Capone,

Dr. Frankie Mendez, Dr. Jennifer Lesh, and

Dr. Kathy Weigel

DEDICATION

I dedicate this project to those who have believed in me most. Without your love and support, this would not have been possible. Thank you,

Bradley Wolf, Nana,

Aunt Gloria, and My Sweet Coach.

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CHAPTER I

The Problem

Introduction

The purpose of this dissertation was to appraise the instructional effectiveness of multi-touch textbooks in schools of education. As part of the dissertation-in-practice, a product was developed alongside the study, a multi-touch book, *Educational Leadership and Policy*. Multi-touch books rely upon digital coding embedded in mobile computing devices to access interactive content whereby readers have an interactive experience with the book content. The purpose of multi-touch books with interactive content is to expose readers to selected areas of knowledge, concepts, facts, and analytic techniques that might otherwise be difficult to capture in a conventional textbook (Mills, 2016). The qualitative research proposed here sought to appraise the effectiveness of multi-touch books, relative to conventional textbooks, in facilitating reader understanding of and interest in a subject. This appraisal relied principally upon structured audio-recorded interviews of multi-touch textbook users, including both students and their instructors. The interviews utilized a particular response that sought feedback of potential students and faculty in Schools of education. The respondent sample of necessity was small. Nevertheless, the results may shape subsequent and larger studies of multi-touch books in higher education.

Statement of the Problem

College students have grown up in an increasingly digital world where post-modern learning is supported by independent activities, self-learning environments, along with experimental learning opportunities and practical training (Greene, 2018; Makani, Easter, & Easter, 2019; Raynard, 2017; Sanches, 2016). These learning styles support contemporary students and the pedagogical role of faculty facilitating improvement in their students' cognitive

skills as related to the content (Da Luz Dias, & Sales, 2017). Conversely, university faculty are less likely to integrate digital tools and media into the classroom, particularly when faced with barriers to implementation (Morris & Lambe, 2017; Pierard et al., 2019; Qazi, Raza, & Shah, 2018). Institutions of higher education have a responsibility to provide students with interventions, resources, services, and tools for students' access to learning, success, and retention (Harkins, 2016).

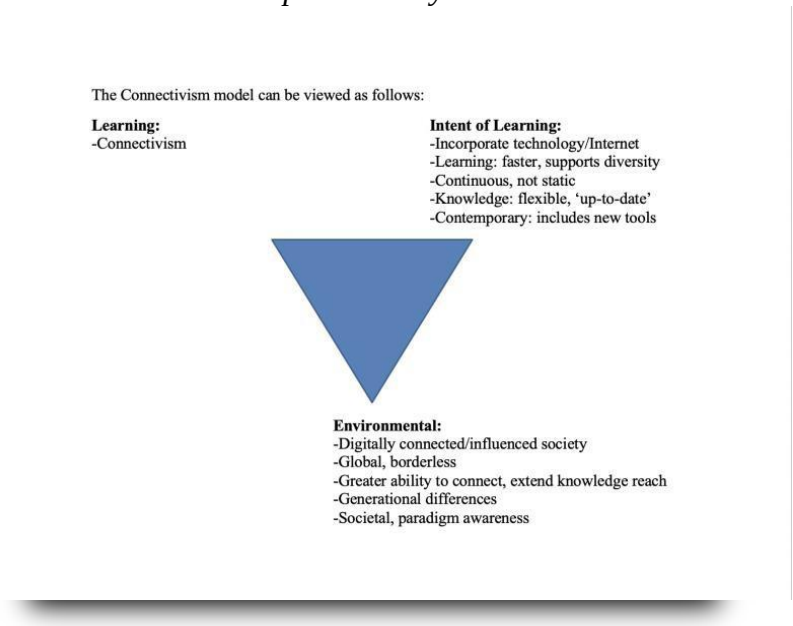
Equally, students enter secondary education with expectations of learning that include the use of modern technologies and techniques (Axelrod, 2017; Casselden & Pears, 2019; Ferguson, 2016; Howard, Serpanchy, & Lewin, 2018; JISC, 2017; Sanches, 2016; Wood et al., 2017). For example, the 2018 Educause Center for Analysis and Education (ECAR) found that college students value the use and relevance of technology in their scholastic success and see the two as significant and positively correlated. Earlier studies show that 98% of college students own two or more internet-connected devices (Pomerantz, 2017). In other words, today's college students possess baseline digital literacy skills and digital tools needed to facilitate personal and professional development.

Conversely, university faculty are less likely to integrate digital tools and media into their classrooms, particularly when faced with barriers to implementation (Morris & Lambe, 2017; Pierard et al., 2019; Qazi et al., 2018). Scholars like Haras (2018) attribute slower technical adoption by faculty to paradigms among higher education institutions where faculty are considered experts, requiring autonomy, and academic freedom (2018). Other studies point to structural and bureaucratic gaps created by the academy (Grush, 2019). For example, Kyle Bowen, Penn State's Director of Education Technology, pointed to gaps in higher education adoption of learning technologies where decisions are based on a digital tool's efficacy and

unique capabilities rather than the role they play in effective teaching and learning (Grush, 2019). Bowen explained that institutions postpone technical decision-making in anticipation of newer tools possessing greater capabilities for their campus (Grush, 2019). This results in an educational system ill-equipped to meet the needs of students, faculty, and sufficient digital fluency of graduates and the workforce. Faculty and their students share the goal that higher education is measured by student achievement and correlates to the following:

Research Questions

1. How useful does the multi-touch book, *Educational Leadership and Policy* serve as an instructional resource for faculty at Schools of education?
2. In what ways do students share views of the efficacy of the multi-touch book, *Educational Leadership and Policy*?



Theoretical Framework

The theoretical framework to be used in this study was based on the consideration of interactive, multi-touch books as technologies in higher education that presume modern learning theories. Therefore, the three theories used to frame this study were Connectivism (e.g. Siemens, 2004), Systems Theory (e.g. Bateson, 1972; Khan et al., 2018; Manturana, 1991), and Postmodernism in the Information Age (e.g. Senge, 2006).

Conceptual Framework

- Student expectations of technology and content consumption
- Student expectations of technology and content creation in learning
- Student expectations of technology beyond digital literacy to that of fluency and workforce readiness faculty expectations of technology and content consumption
- Faculty expectations of technology and content creation
- Faculty expectation to support student's digital fluency and workforce readiness

Purpose of the Study

A goal of higher education is to prepare students with future-ready skills needed in the modern workforce (Da Luz Dias & Sales, 2017). Student success impacts enrollment, retention, persistence, graduation rates, and career readiness. These are areas that higher education leadership thinks about every day. Today's students expect information on demand, and the user experience is important to them. Students today expect the same experience on campus that they have in their personal lives (Dziuban, Morgan, & Walker, 2013).

Integrating technology into curricula impact the experience students have on campus and student success allows for meaningful conversations. This makes it about the student and not

about faculty having to change the way they teach, which is challenging. The below Educause Center for Analysis and Education (ECAR) infographic illustrates the disparate views of students and their faculty as it relates to their engagement with technology (2011).

Figure 1:

Engaging Students with Technology

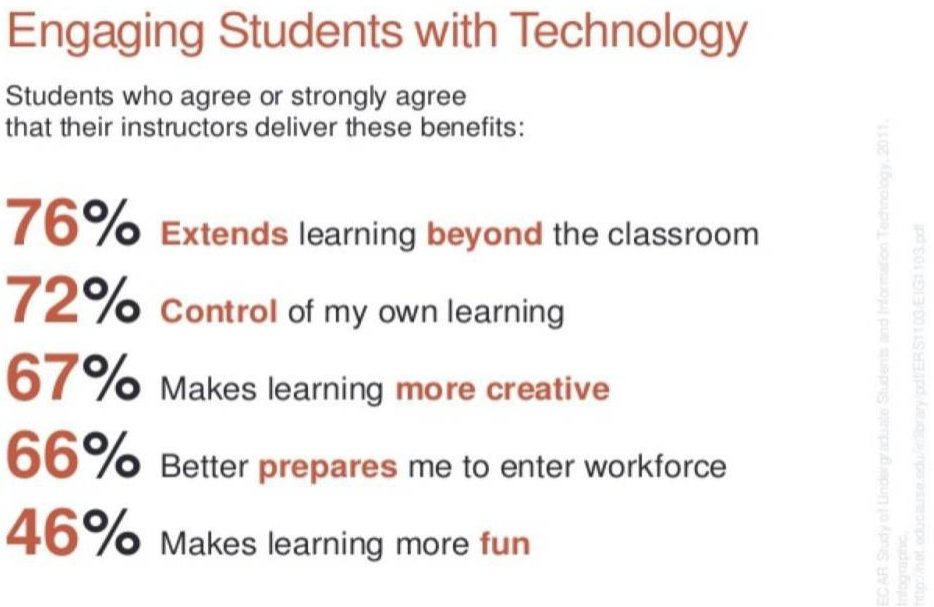


Figure 1. Engaging Students with Technology [from Educause Center for Analysis and Education, 2011.

Significance of the Study

The significance of this Dissertation-in-practice (DiP) was to appraise an interactive multi-touch book, *Educational Leadership and Policy,* as an effective delivery tool for faculty in Schools of education in order to improve student engagement and success. This study examined the adoption of *Educational Leadership and Policy* by faculty and their students at a higher education institution in the southeastern united states to understand what relationship may exist with multi-touch books and student success. Technology points to gaps in higher education

adoption of learning technologies where decisions are based on a digital tool's efficacy and unique capabilities rather than the role they play in effective teaching and learning (Grush, 2019). Higher Education institutions and their faculty postpone technical decision-making. This results in an educational system ill-equipped to meet the needs of students, faculty, and sufficient digital fluency of graduates and the workforce. By integrating current, interactive tools into teaching materials, such as multi-touch books, faculty can meet their students' learning needs, thereby improving competencies and ability to track their assessment and engagement throughout a program.

Rationale of the Study

Determine if faculty at a higher education institution in the South-eastern United States and their School of education would use the multi-touch book, *Educational Leadership and Policy,* in their teaching. Determine if students of the same faculty would use the multi-touch book, *Educational Leadership and Policy,* over paper text delivery of the material. Examine the relationship between multi-touch books in Schools of education and the learner's cognitive skills as related to course assessments. Validate the efficacy of *Educational Leadership and Policy* as an effective tool for Colleges of Education.

Assumptions

- The multi-touch book, *Educational Leadership and Policy is* an efficient tool for Schools of education and student success.
- Faculty and their students will differ in the efficacy of this multi-touch book as a content delivery tool in Schools of education
- Faculty may look at this eBook as an opportunity to promote student achievement but may find it limiting due to resources, competencies, and burdens on the classroom

- Students of the faculty may find this an engaging and relevant tool in their learning and workforce-readiness

Limitations

Limiting factors to this study include:

- The post-modern era yields incrementally greater access to digital tools and media than previous cohort generations. Increased access to digital resources has shifted from learning 'what' to learning 'how and where' teachers and learners consume, curate, create and acquire knowledge.
- This study will yield a current baseline of data on interactive multi-touch books in teaching and learning vis-à-vis conflicting studies that lacked current functionality for specific populations.
- Multi-touch books are replicable beyond schools of education.

Delimitations

This was not a study on the content or quality of the multi-touch book, *Educational Leadership and Policy,* nor did the study appraise multi-touch books beyond schools of education. The rationale for excluding other university divisions was to understand what, if any, relationships exist between the teaching and learning of educators and the use of multi-touch books. The focus of other departments or non-higher education institutions was beyond the scope of this research. The study consisted of qualitative research that was be conducted through the use of interviews and observations.

Role of the Researcher

The idea of this study grew out of the scholar-practitioner's role in education technology. It is here that the researcher sought to understand relationships at the intersection of technology

and education. With these understandings, the researcher wanted to examine to what extent they might contribute to an ever-changing body of knowledge. Just as the qualitative researcher is considered an *instrument* of data collection, data are consciously mediated by this *human instrument* rather than objective processes (Denzin & Lincoln, 2005).

The researcher recognizes the position in the study as 'emic,' or as an insider, relating to knowledge of digital media (such as multi-touch books) as well as administration and operations of higher education institutions. As a scholar-practitioner, the researcher is also a consumer of the intended analysis. Peter Jarvis (1999) suggested that for "*practitioner-researchers,* case studies are both about the process of learning about and researching the specific phenomenon under investigation and about the product of that learning and research." As such, the researcher takes a constructionist approach to explore the study participants' unique meaning from their own experiences (Alhammad, & Ku 2019), while recognizing the role as 'co-producer' of knowledge, requiring a need for reflexivity and critical awareness of language (King & Horrocks, 2010).

Organization of The Study

This dissertation-in-practice consists of a five-chapter research study with guided interviews questions as it pertains to the product: A multi-touch book called *Educational Leadership and Policy.* In Chapter I, the researcher will introduce the study of multi- touch books in higher education and provide background information on the problem of higher education institutions that are ill-equipped to meet the goal of student success. In Chapter II, the topics are discussed including, integration of digital technologies such as multi-touch books/eBooks as a way to increase the student success. Chapter III discusses the data collection and analysis procedure for a qualitative dynamic narrative analysis that the study will present.

Definition of the Terms

- *Schools of education, Colleges of Education, Ed School* are synonymous terms used to describe divisions within a university that is devoted to the scholarship in the field of education which is an interdisciplinary branch of the social sciences (Wikipedia, 2019).

- *Multi-touch, multi-touch books, and tactile books* are a technology that enables a tactile surface to recognize the presence of one or more than one point of contact with the surface. The interface of the technology may include either a trackpad or touchscreen. Multi-touch books allow authors to share knowledge and convey understanding through new ways where the process of reading is an interactive experience (Multi-touch, 2019).

- *iBooks, Apple Book* is an Apple application first introduced with the iPad in January 2010 used to read ePub and PDF content such as books and magazines (iBooks, 2017).

- *eBook* is short for 'electronic book, or eBook, which is a book published in an electronic format. It allows for instant access to a book by downloading it from the internet (eBook, 2019).

- *Epub* refers to a digital form of 'electronic publication', is a free and open-source standard created by the International Digital Publishing Forum which utilized a file extension of .epub (ePUB, 2017).

- *Digital Rights Management* or *DRM* refers to a technology designed to help protect copyrighted material from being used, read, or shared without proper rights. DRM is achieved through the use of digital watermarks and/or encryption of digital content (DRM, 2019).

- *PDF* refers to the abbreviated Portable Document Format which is a file format and file extension developed by Adobe to enable users to capture the native appearance of a document. Adobe's PDF format enables documents to be viewed and printed in the same way regardless of the device used to open the file (PDF, 2018).

- *Digital Literacy* refers to an individual's ability to find, evaluate, and compose clear information through writing and other mediums on various digital platforms. Digital literacy focuses on the digital skills used to access the internet, social media, and mobile devices (Digital Literacy, 2018). Core Education further defines digital literacy as acquiring skills to make and create meaning along with selecting technologies (2018).

- *Digital fluency* combines digital proficiency and literacy where one understands, select and use the technologies and technological systems, with cognitive or intellectual competencies, in order to read, create, evaluate and critically think and apply technical skills as a social competence, or dispositional knowledge to relate to others and communicate effectively (Digital Fluency, 2018).

- *Connectivism* is a contemporary learning theory that explains how learning occurs in a decentralized, informal, technology-enabled and mobile world (Siemens, 2004). It also combines elements of learning theories, social structures, and modern technology to create a theoretical construct for learning (Perrin, 2005).

- *Knowledge Acquisition* is a method of learning, and the process of extracting, structuring, and organizing knowledge from external sources. Aristotle's seminal work 'Organon' suggests that the mind at birth is a blank slate, containing no knowledge of the objective, the universe, nor itself (Knowledge Acquisition, 2019).

- *Purposive Sampling* is a sampling technique in which a researcher relies on their own judgment when choosing members of the population to participate in a study. It is a non-probability sampling method and occurs when elements selected for the sample are chosen by the judgment of the researcher. Researchers believe that they can obtain a representative sample by using a sound judgment, which results in saving time and or money (Purposive Sampling, 2019).
- *Educational Technology* is the use of technology, such as computers, or mobile devices within education, to aid in the learning process (Educational Technology, 2019).

Summary

Multi-touch books contain interactive, tactile interfaces to media, gestures, and tools that help students and faculty realize the process of knowledge construction beyond the classroom. Knowledge acquisition occurs alongside the learning objectives of the instructor and relative to the content (Da Luz Dias, & Sales, 2017). The interactivity nature of multi-touch books becomes a powerful tool in the teaching and learning process of the modern student. In addition to interactive media, multi-touch assessments are constructed to gauge a student's level of understanding. This study will appraise the effectiveness of an interactive multi-touch book, *Educational Leadership and Policy,* as an effective delivery tool for faculty in Colleges of Education in order to improve student engagement and success. The multi-touch book *Educational Leadership and Policy*

CHAPTER II

Literature Review

The purpose of this dissertation was to appraise the instructional effectiveness of multi-touch textbooks in schools of education. Multi-touch books rely upon digital coding embedded in mobile computing devices to access interactive content whereby readers have an interactive experience with the book content. The purpose of multi-touch books with interactive content is to expose readers to selected areas of knowledge, concepts, facts, and analytic techniques that might otherwise be difficult to capture in a conventional textbook (Raynard, 2017). The qualitative research proposed here seeks to appraise the effectiveness of multi-touch books, relative to conventional textbooks, in facilitating reader understanding of and interest in a subject. This appraisal will rely principally upon structured audio-recorded interviews of multi-touch textbook users, including students and instructors. The interviews will utilize a particular response seeking feedback of potential students and faculty in schools of education. The respondent sample of necessity will be small. Nevertheless, the results may shape subsequent and larger studies of multi-touch books in higher education. Describing existing evidence related to this topic will provide background for the present study, which will focus on the adoption of the interactive multi-touch book by faculty and their students at a higher education institution in the south-eastern United States.

The main aim of the present study was to understand correlations to multi-touch books and student success in the institution of study. Specifically, research in the present study focused on the content of a multi-touch book *Educational Leadership and Policy* through the use of multimedia interviews to gain a deeper understanding of the problem and possible solutions. The organization of this literature review will first include a presentation of the theoretical framework

and conceptual framework for the present study. Next, relevant articles identified from database searches will be presented.

The organization of the evidence presented will begin with broad themes and progressing into more specific topics. The specific categories to be presented in this review of the literature are a) multi-touch books and eBooks; b) teacher/educator perspectives of multi-touch books/eBooks; c) multi-touch books/eBooks and student engagement; d) multi-touch books/eBooks and knowledge acquisition; e) adoption of multi-touch/eBooks in education settings; and f) use of multi-touch books/eBooks in higher education. This chapter will end with a summary section and conclusion, which will provide an overview of key findings and identified gaps in the literature. In the section below, the theoretical framework for this study will be further described.

Theoretical Framework

As mentioned in Chapter I, the underpinnings of this study, which form the theoretical framework, are contextualized as post-modern. In the post-modern framing, interactive, multi-touch books in higher education presume the learning theories of Connectivism (e.g. Siemens, 2004) and the Connectivist Learning Model (Figures 1 & 2), Systems Theory (e.g. Bateson, 1972; Khan et al., 2018; Manturana, 1991), and Postmodernism in the Information Age (e.g. Senge, 2006). Each of these theories is further described in the subsections to follow as well as a justification for the use of each of these theories.

Connectivism and the connectivist learning model. Primary theorists, George Siemens and Stephen Downes (2009) presented the theory of connectivism.

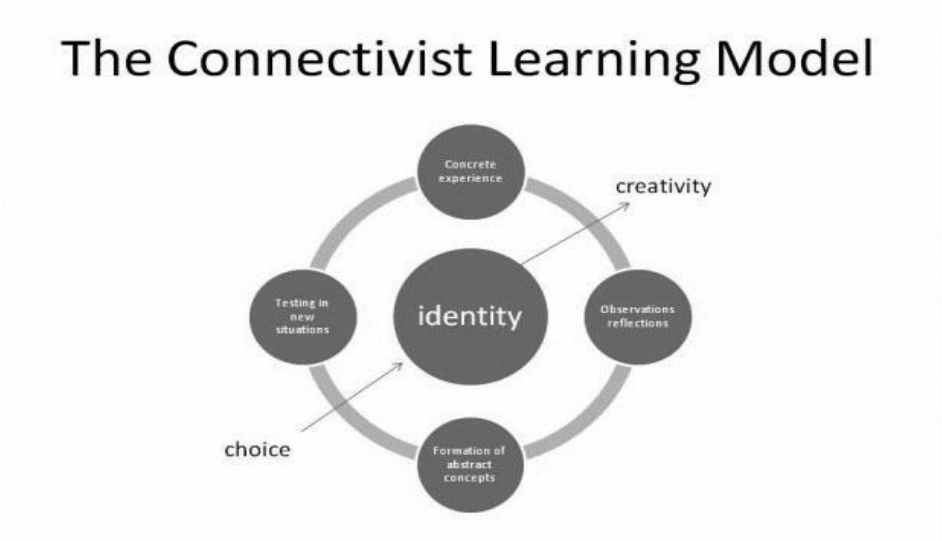
Connectivism is a contemporary learning theory that explains how learning occurs in a decentralized, informal, technology-enabled, and mobile world (Downes, 2008; Siemens, 2004;

Siemens & Downes, 2009). The theory combines elements of learning theories, social structures, and modern technology to create a theoretical construct for learning (Perrin, 2005).

According to Downes (2008), knowledge is distributed across "connections" and is created when information is sent from one connection or entity, to another. Learning, therefore, becomes the capacity to construct these connections and/or the capacity to traverse them (Downes, 2008). Similarly, knowledge is not acquired nor is it a specific 'thing'; rather it is the growth and/or development of connections that elicit a change within the entity or entities (Downes, 2008).

Figure 2.

The Connectivist Learning Model



1 Figure 2 adapted from Steven Downes' video lecture to Kuopio, November 22, 2007

For Connectivists, anything that has the ability to connect can be thought of as a learning 'thing' or a 'node' (Downes, 2008; Perrin, 2005; Siemens, 2004; Siemens & Downs, 2009). For example, a person's mind would be considered a *learning node*, as might a computer or society (Downes, 2008; Perrin, 2005; Siemens, 2004). Connectivists find evidence of this in a society's,

individual's, and computer's ability to 'learn'. As demonstrated in the table below (*Figure 3*), connectivism is a key theory associated with learning domains (Siemens, 2005; Wilson, 1997).

Figure 3.

Learning Domains with Associated Theories.

Table 1: Learning Domains with Associated Theories

Learning Domain	Associated Theories	Traits	Percent of learning over a lifetime contributed by the domain
Transmission: Learning as instructor led courses, lectures, demonstrations	Behaviorism & Cognitivism	High organizational control over content and structure; Learning is mastering pre-determined objectives; developmental and formative learning occurs; formal learning	about 10%
Emergence: Learning as reflection and cognition	Cognitivism & Constructivism	High personal control over content and structure; Learning is learner constructed; personal learning and innovation occur; informal learning	about 1-2%
Acquisition: Learning as self-selected (e.g., exploring, experimenting, self-instruction, inquiry, satisfying a curiosity)	Constructivism & Connectivism	High personal control over content with some personal control over structure. Learning is learner motivated, collaborative; involves a variety of sources; group and needs-based learning occurs; informal learning	about 20%
Accretion: Learning as continual/embedded process; often subliminal or unconscious (e.g., accounting for learning of language, culture, habits, prejudices, social rules, behaviors)	Connectivism	High personal control over content with high organizational control over structure; Learning in a network; knowing-where to find information is valued; connection-making; informal learning	about 70%

Sources for content and percentages adapted from:

Siemens, G. (2005). *Learning development model: Bridging learning design and modern knowledge needs*. Elearnspace. Retrieved July 24, 2007 from http://www.elearnspace.org/Articles/ldc.htm

Wilson, L. O., (1997). *Types of learning*. Retrieved July 24, 2007 from http://www.uwsp.edu/education/lwilson/learning/typesofl.htm

For this reason, connectivism has been selected to frame the present study as it will help to understand the specific learning domains of acquisition and accretion through the use of multi-touch books in higher education institutions. In other words, the theory of connectivism will help to understand the efficacy of multi-touch books by understanding how they contribute to the student learning domains of acquisition and accretion, which account for about 20% and 70%, respectively, of learning over a lifetime (Siemens, 2005; Wilson, 1997). To provide a deeper understanding of connectivism, the Principles of Connectivism presented by Siemens (2004) are as follows:

- Learning and knowledge rest in diversity of opinions
- Learning is a process of connecting nodes or information sources
- Learning 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
- Accurate, up-to-date knowledge is the intent of all learning activities

Connectivists hold that decision-making is a learning process. It is a process by which choosing what to learn and the meaning of incoming information is perceived through the 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.

George Siemens (2004, 2009) asserted that modern technologies have been a change agent for the 'democratization of knowledge' (Siemens & Downes, 2009). Therefore, multi-touch textbooks, as a modern technology, are included within the scope of the 'democratization of knowledge' described by Siemens (2009). It is important to note that Connectivists do not limit learning to formal settings, rather they subscribe to the idea of lifelong, informal learning. People learn "through communities of practice, personal networks, and through completion of work-related tasks" in an environment in which "know-how and know-what is being supplemented with know-where – or the understanding of where to find knowledge needed" (Downes, 2008; Perrin, 2005; Siemens, 2004). Thus, Connectivists view making connections, not content, as the beginning point for the learning process itself (Downes, 2008; Perrin, 2005; Siemens, 2004). Based on this understanding of connectivism, in this dissertation-in-practice (DiP), learning through the use of multi-touch books must be understood in the consideration of how they facilitate the learning process by allowing the student to make connections.

Systems Theory. General systems theories of organizations focus on the structures, relationships, and interdependence between elements (Amagoh, 2016). This specific study will

focus on the systems theory of Bateson (1972, 1979), as it is specific to the aspects related to the human as a system. Systems theory, particularly Bateson's (1972, 1979) works with the relationship between epistemology and knowledge focuses on the epistemology of main as a holistic organism, or system, that functions within a determined environment (Wasik, 2016).

Within epistemology, knowledge about reality is attained or communicated (Bateson, 1972; Bateson, 1979; Wasik 2016). This knowledge is personal to the individual (Bateson, 1972; Bateson, 1979; Wasik 2016). Based on Bateson's (1972, 1979) work, humans are systems and knowledge is a personal process within the individual where the individual is able to base their reality (Bateson, 1972; Bateson, 1979; Wasik 2016). Bateson's theories have been applied by researchers such as Kaiser (2018) to understand the process of individual learning. Specifically, researchers have found that Bateson's theory can be used to describe the integration of learning from past experiences and learning from future experiences (Kaiser, 2018).

Building on the findings of Bateson (1972, 1979), Mantura (2012) presented the issue of uncertainty within a system due to the epistemological subjectivism of the information that is generated through cognition (Joanna, Marek, & Władysław, 2019; Mierzwiak, Xie, & Nowak, 2018). Related to the concept of uncertainty, Khan et al. (2018) added to the concept of systems by introducing the concept of complexity.

Because systems are complex, the nature of the system must be understood in order to stimulate changes and transformations (Khan et al., 2018). In other words, uncertainty, such as the uncertainty associated with implementing new technology, must be embraced in order to bring about transformation to the system. Therefore, as relevant to the present study, learning and knowledge acquisition must be understood as a complex personal experience that occurs within

the “system” of each individual. Because this process is personal, it requires understanding knowledge acquisition from the perspective of the individual.

Postmodernism in the information age. Senge (2006) addressed the concept of the learning organization within the context of postmodernism and the rise of technology. In the information age, learning institutions are faced with the challenges and opportunities associated with implementing new technologies to facilitate learning (Greene, 2018; Sanches, 2016). The five disciplines of learning organizations presented by Senge (2006) are:

1. Building a shared vision
2. Systems thinking
3. Mental models
4. Team learning
5. Personal mastery.

In Senge’s (2006) theory, the concept of systems thinking, as presented in the previous section, has been integrated as key for the success and development of learning organizations. These five disciplines will be key in the present study to contextualize responses to technology within the higher education system. With these three theories in mind, the section to follow will begin the review of relevant literature related to this topic of study.

Review of Relevant Literature

Multi-touch books and eBooks. Due to the developments in technology, digital expectations in education have increased due to the integration of new technologies into the classroom (Greene, 2018; Sanches, 2016). Similarly, access to web-based information has increased due to advancements in network transmission (Sun & Wu, 2016). Libraries in higher education have therefore responded to the demand for new technologies by providing students

with access to eBooks and multi-touch technologies. This is particularly true with eBooks as they provide students with 24/7 access to information (Axelrod, 2017; Casselden & Pears, 2019; Ferguson, 2016; Howard, et a., 2018; JISC, 2017; Machovech, 2017; Sanches, 2016; Wood et al., 2017). However, different teaching methods impact learning achievement (Sun & Wu, 2016). For this reason, new technologies may similarly affect learning achievement. As related to the present study, therefore, it is important to consider the potential impact of multi-touch books and eBooks on learning achievement and outcomes.

Multi-touch interfaces have been found to be beneficial because they allow for direct and simultaneous input by learners and allow for hands-on learning experiences (Schmitt & Weinberger, 2018). Multi-touch technologies, such as multi-touch books/eBooks available on multi-touch devices, are not only enjoyable for most learners but also allows for collaborative learning (Schmitt & Weinberger, 2018). Convenience has also been identified as a key benefit of eBooks (Casselden & Pears, 2019; Enis, 2018).

Users of the multi-touch eText reported a significantly more interactive and engaging experience with their text than the other eText users. The experiment also revealed that students overwhelmingly prefer a free, customized open-access text for use in their course, no matter what eText format is used (Grush, 2019).

As described in Chapter I, there are various types of multi-touch books, including iBooks, pdfs, eBooks, and ePub. iBook structure will be described in the subsection below as the education material in this study is in the form of an iBook.

iBooks. In this study, the researcher will be investigating the use and adoption of the iBook *Educational Leadership and Policy* in higher education. For this reason, this subsection will provide an overview of iBooks as a multi-touch book/eBook platform. In order to create a

multi-touch iBook, the researcher defines, designs, and deploys techniques to incorporate interactive content for textbooks (Apple, 2019; iBooks, 2017). In this initial phase, the researcher examined the structure of multi-touch books with instructional guides on how to write and publish digital content using Apple's iBook platform (Apple, 2019). It is important to highlight that iBooks are a specific product of Apple, which produces iBooks as interactive media (Apple, 2019; iBooks, 2017). The specificity of this product over other available multi-touch/eBook platforms may be important to consider in this study. Apple and its iBook creative resources provide a framework that authors produce digital textbooks with interactive media and incorporated in an iBook by using Apple's iBooks platform (Apple, 2019; iBooks, 2017). The multi-touch book used in this study, which is also called an iBook, was coauthored by Apple Education and recognized leaders in higher education for their use of technology in the classroom. The iBook looks at the efficacy of multi-touch books, specifically the interactive nature of delivering content, as a tool for other educators (Apple, 2019).

Researchers have found that leveraging learning tools, like iBooks, are interactive for knowledge consumption are beneficial in various fields of study (Grush, 2019). As a result, interactive multi-touch books encourage students to reflect more deeply on coursework, to think critically of existing concepts and how to choose to integrate or discard the new information (Grush, 2019). This concept of student interaction with content will be analyzed in the present study within the framing of the three theories of Connectivism (e.g. Siemens) and the Connectivist Learning Model (*Figures 1 & 2*), Systems Theory (e.g. Bateson, Khan, Mantura), and Postmodernism in the Information Age (e.g. Senge) because student interaction with multi-touch/eBook products may impact their knowledge acquisition.

iBooks Author provides the researcher with the legacy publishing tool to create multi-touch books, or iBooks, on the Apple platform. *iBooks Author* is the most robust tool for developing an iBook to include widgets for inserting image galleries, videos, interactive images, 3D media, and Keynote presentations (Apple, 2019). The researcher also mentioned the use of Apple's *Pages* application. Apple's *Pages* application is a legacy word processor with an easy-to-use interface that now includes enhanced iBook publishing functionality for interactive media, mobile tools (e.g. Apple Pencil, iPads, etc.), mobile access of multi-touch books (Apple, 2019).

Teacher/educator perspectives of multi-touch books/eBooks. In considering the use of multi-touch books/eBooks, it is important to consider teacher perceptions of integrating the use of this new technology. Specifically, student, and educator attitudes towards the use of technologies are key in determining whether or not they are ready to use new technologies such as mobile technologies (Al-Emran, Elsherif, & Shaalan, 2016). With increasing digital expectations, introducing new technologies into the classrooms presents new challenges (Greene, 2018).

Greene (2018) explained that increased digital expectations require teachers to develop and teach new digital literacy skills. Greene (2018) explained that digital literacy requires teachers to either focus on instructional experiences that integrate new tools, platforms, and devices, or on developing digital literacy knowledge to allow them to move between various tools, platforms, and devices. Therefore, developing and teaching digital literacy requires an increased digital capacity of the teacher, classroom, and school. This can be difficult due to the personal capacities and the restrictions placed on the teacher by the school and/or classroom (Greene, 2018).

In a separate study, Makani et al. (2019) explained that when instructors have a positive attitude about the use of technology as an instructional tool, they are more likely to achieve a

higher degree of successful learning outcomes. Therefore, the challenges, capacities, and attitudes of educators are important to consider related to potential outcomes from the use of digital technologies such as multi- touch books/eBooks as instructional tools.

Teacher/educator perspectives of multi-touch books/eBooks in primary and secondary education (K-12). Building on the considerations and perspectives of teachers, Pedro (2017) explained that although multimedia labs and active learning spaces have gained prominence in education research, many studies lack input from teachers and students. Pedro (2017) noted that many of the developments in educational research focus on developments in higher education institutions. However, as demonstrated thus far in this review, there is a lack of evidence related to the outcomes implementing digital technologies in higher education institutions. The results obtained from the teacher perspective of the 82 teacher participants in the Pedro (2017) study revealed that teachers in primary and secondary schools are interested in improving the autonomy available in the classroom through the redevelopment of the learning spaces and organization of the classroom.

The teachers noted the use of technologies such as tablets and interactive/ multi-touch technologies to be particularly beneficial in future classrooms (Pedro, 2017). Although these findings are distinct from the focus of the present study, they reflect the importance of considering teacher and student needs when understanding the context in which digital technologies are implemented. In other words, there may be other needs expressed by teachers and students that take priority over the introduction of new technologies, such as the use of multi-touch books/eBooks in the present study. The following section will transition to considerations of student engagement related to the use of multi-touch/eBooks.

Multi-touch books/eBooks and student engagement. Student engagement is a key aspect of student achievement, particularly in the higher education setting (Makani et al., 2019). Researchers have suggested that digital technologies may be useful in improving student engagement in higher education (Makani et al., 2019; Mills, 2016). Students' preferences for interactive media in learning has been explored by researchers, including graduate students' perceptions of the use of multi- touch books (Mills, 2016; Elkhateeb, Shehab, and El-bakry, 2019; Van Middlesworth, 2019).

In a recent study done in Egypt by Elkhateeb et al. (2019) on mobile learning system approaches for public universities explained that the use of mobile learning systems, including formats such as PDFs, eBooks, and videos, can help to meet students' needs, provide improved access to higher education materials, and may increase communication and collaboration between students and teachers. A separate article by De Freitas et al. (2017) also noted the importance of multi-touch technologies as an interactive tool due to its ability to support collaborative awareness and reflection. Therefore, evidence suggests that multi-touch books/eBooks may be a useful tool to increase student engagement in the proposed study as a potential means of improving student outcomes.

Student perspectives of multi-touch/eBooks. In another recent study, Dabbagh et al. (2019) investigated student perspectives of technology use for learning in higher education in the United States. The researchers found that students primarily used laptops, which revealed the need for mobile and portable devices and technologies for learning (Dabbagh et al., 2019). The specific tools used by students for learning were search engines, file-sharing tools, digital libraries, videos, and wikis (Dabbagh et al., 2019). Among graduate students specifically, eBooks were rated as one of the most commonly used software for learning (Dabbagh et al., 2019). There

was also evidence that students use self-directed approaches to their learning and considered collaboration tools to be the most important for learning (Dabbagh et al., 2019).

Based on these findings, Dabbagh et al. (2019) urged the need for the integration of web technologies into teaching and learning practices. The use of multi- touch/eBooks in teaching and learning practices may be one way to increase the integration of web technologies in higher education. Dabbagh et al. (2019) also noted that differences exist between undergraduate and graduate students in their preferences for technologies for learning. It is therefore important to consider these potential differences in the generalizability of results generated in this dissertation-in- practice (DiP),

In a separate study on student preference of a customized, open-access multi- touch digital textbook, Mills (2016) reviewed graduate students' perceptions of multi-touch book interactivity, engagement, and the value of customized course eTexts. Mills' (2016) work pointed to gaps in the quantity and quality of studies around multi-media texts in education. Specifically, Mills (2016) suggested that there are inconsistencies in the findings of researchers due to rapidly evolving capabilities through recent advances in tablet computing. Mills (2016) is an important study to highlight in relation to the proposed study because it is the most closely related study available in recent literature.

Mills (2016) also described the gap in empirical studies for specific populations. In particular, the use of multi-touch books requires access to tablet technology for e-text functionality and some populations do not have access to a tablet or similar technology. These groups may, therefore, be underrepresented in the available literature and must be considered in future studies. In the Mills' (2016) study of eText use among graduate students, participants in the quasi-experimental study rated the level of interactivity, engagement, and value of three

eText formats: page fidelity (Adobe PDF), reflowable text (Kindle ePub), and multi-touch (Apple iBooks). The results of the study were that users of the multi-touch eText reported a significantly more interactive and engaging experience with their text than the other eText users (Mills, 2016). The findings of the Mills (2016) also revealed that students overwhelmingly prefer a free, customized open- access text for use in their course, no matter what eText format was used.

The Mills (2016) study is significant because it examined multi-touch books, student learning, and the relationship between the use of this technology in higher education institutions to prepare students with the skills needed in the modern workforce (Mills, 2016). By integrating current, interactive tools into teaching materials, faculty can meet their students' learning needs, thereby improving competencies and ability to track their assessment and engagement throughout a program. Mills (2016) therefore provided significant evidence in favor of the use of multi-touch books in higher education. Specifically, multi-touch books have higher interactivity, are more engagement, and are preferred by students in higher education (Mills, 2016).

Student engagement related to the use of multi-touch books/eBooks in primary and secondary education (K-12). Related to the theme of student engagement, Chen and Chiu (2016) conducted a study of 58 elementary school students over a period of nine weeks to determine the effectiveness of an intergroup competition mechanism on improving students' engagement, learning achievement, and creativity. The mechanism was integrated into a multi-touch design-based learning platform (Chen & Chiu, 2016). The researchers found that the computerized mechanism in the multi-touch system was effective in improving student engagement, learning achievement, and creativity (Chen & Chiu, 2016). The mechanism also enhanced cognitive processes through multi-touch design-based learning (Chen & Chiu, 2016).

The Chen and Chiu (2016) study is significant because it demonstrates that multi-touch designs are beneficial in improving both student engagement and learning achievement, in addition to cognitive processes and creativity. However, the Chen and Chiu (2016) study were conducted among elementary school students. Therefore, the limitations of the generalizability of Chen and Chiu (2016) to the present study must be considered.

It is important to note that in particular instances, students prefer using print materials rather than eBooks (Baron, Calixte, & Havenwala, 2017; Casselden & Pears, 2019; Mills, 2016; Pierard et al., 2016; Walsh, 2016). For example, students prefer to use print when reading complex texts, despite their general enthusiasm for using electronic text (Pierard et al., 2016; Walsh, 2016). Significant evidence suggests that the use of multi-touch books may increase engagement among students, and that some may prefer their use to traditional textbooks. As a result, the following sections will describe the available evidence on the use of multi-touch/eBooks and knowledge acquisition among students as a key component of learning in higher education.

Multi-touch books/eBooks and knowledge acquisition. Another important component of student learning, as described in the theoretical framework, is the students' acquisition of knowledge through their learning experience (Da Luz Dias, & Sales, 2017; Hwang, Tu, & Wang, 2018; Pierard et al., 2019; Sánchez-Azqueta, Gimeno, Celma, & Aldea, 2016). Researchers have suggested that media enhances student learning, particularly when the messages presented in the media was consistent with the way the human mind operated (Rupley, Paige, Rasinski, & Slough, 2015). For this reason, even printed textbooks have been designed to look more like the internet, popular software, and/or applications for smartphones (Rupley et al., 2015). Sánchez-Azqueta et al. (2016) explained that technologies have been created to stimulate adapted and

interactive student learning. Materials have also been made to be more readily accessible by making them downloadable to mobile devices such as smartphones and tablets (Sánchez-Azqueta et al., 2016).

Knowledge acquisition related to the use of multi-touch books/eBooks in primary and secondary education (K-12). In the United States, there have been recent initiatives to implement digital textbooks (multi-touch/eBooks) for use as primary or supplemental source materials for K-12 educations (Rupley et al., 2015) Similarly, Pickering and Swinnerton (2019) noted that for the education of medical students, anatomy curricula has been supplemented using technology, such as through the use of eBooks and other technologies such as anatomy drawing screencasts via YouTube. The transition of textbooks to more interactive platforms with graphic and visual elements has been found to improve communication, instruction, evaluation, diagnosis, and feedback (Rupley et al., 2015). This suggests the use of digital platforms form textbooks may improve both student engagement and the learning experiences, particularly on the K-12 academic level (Rupley et al., 2015).

In contrast with the findings of Rupley et al. (2015), the Pickering and Swinnerton (2019) study included results on how students engaged with these technology-enhanced learning resources but the researchers did not find a correlation between the levels of engagement and the use of technology-enhanced learning experiences (Pickering & Swinnerton, 2019). Furthermore, there was no relationship between levels of engagement, usage, and assessment outcomes (Pickering & Swinnerton, 2019). However, the Pickering and Swinnerton (2019) study was specific to outcomes for medical students in an anatomy course. The researchers also noted a need for additional studies on the topic in the areas of engagement and assessment outcomes (Pickering & Swinnerton, 2019).

In a study on the reading orientation of intermediate grade boys, Martinez, Woodley, Lucero, and Parra (2019) explored the impact of Kindle eReaders on reading experiences and motivation. The results of the study showed that the participants were purposeful in their selection of book titles, which allowed for self-regulated learning. It is important to note that students are often provided texts based on the course curricula in the higher education context, limiting selection and self-regulated learning opportunities (Martinez et al., 2019). Nonetheless, what is significant and applicable to Martinez et al. (2019) is that Kindle eReaders did improve reading motivation and increased reading engagement among the participants, who were reluctant readers. This finding provides support for the use of digital technologies such as eBooks and eReaders to improve student engagement and learning experiences, which are related to knowledge acquisition (Martinez et al., 2019).

In a similar study, Reid (2016) investigated the differences between eBooks and print books on literacy comprehension among six students. The purpose of the study was to determine whether eBooks were useful in improving the reading comprehension of the students when compared to the use of print books (Reid, 2016). Reading comprehension was tested by having students read aloud for both a pre-reading and post-reading assessment. Reid (2016) found that eBooks that contained engaging features helped students improve their reading comprehension. Given this finding, Reid (2016) recommended the use of eBooks in the school curriculum along with the professional development of teachers to improve literacy comprehension among students. Tas with Martinez et al. (2019), Reid (2016) focused on learning outcomes for primary school students, rather than higher education students.

As related to multi-touch technology and eBooks, Hwang et al. (2018) explained that due to the rapid progress of technology, tablet computers and eBooks have come into consideration

for use as learning tools. At the same time, school education requires not only providing students with knowledge but ensuring that they actively construct knowledge (Hwang et al., 2018). For this reason, Hwang et al. conducted a study in an elementary school natural science course to investigate the impact of integrating a guided-peer feedback strategy into the design of an eBook (Hwang et al., 2018). A quasi-experimental design method was used to conduct the study in which students were divided into two groups: the experimental group that included the peer-feedback strategy in addition to the eBook development approach and a second group in which students learned with the conventional eBook development approach (Hwang et al., 2018). The results of the study were that the experimental group with the integrated guided peer-feedback and conventional eBook development approach had significant impacts on the learning achievements of the students and on the eBook project outcomes. The experimental group also reduced cognitive load and increased innovative thinking during the eBook design process. It is important to note that the Hwang et al. (2018) study was conducted in an elementary school and that applicability may be different between the elementary school and higher education environments. However, what is important about Hwang et al. (2018) is that it demonstrated the importance of eBooks as a learning tool due to the growing influence of technology in education.

Hwang et al. (2018) is also significant to the present study because the findings suggested that developments in eBook technologies could improve student learning achievements and yield positive outcomes in the learning process, particularly when additional considerations, such as peer-feedback, are considered in the eBook design. It is important to note that, although much of the available evidence related to knowledge acquisition through the use of eBooks, some researchers have found that students are able to concentrate better using print materials and have a preference for print over the use of eBooks (Baron et al., 2017; Casselden & Pears, 2019; Mizrachi, 2016; Walsh, 2016).

Student engagement related to the use of multi-touch books/eBooks in higher education. A topic related to student engagement particularly for reading is the factor of motivation. Akpokodje and Ukwuoma (2016) conducted a study to evaluate the impact of eBooks on reading motivation among students in higher education. The study was conducted in the University of Nigeria and the University of Jos. The investigation was conducted based on the observation that the rate of reading among youth had dwindled (Akpokodje & Ukwuoma, 2016). The findings of the study were that university students were aware of familiar with eBooks and often accessed them using Google books (Akpokodje & Ukwuoma, 2016). Specifically, students often used eBooks as textbooks and reference materials for studying and conducting research (Akpokodje & Ukwuoma, 2016).

The researchers found that students were motivated to use eBooks because they were able to use them at home and they were easy to search (Akpokodje & Ukwuoma, 2016). The students also expressed that the use of eBooks improved their reading habits, increased the volume of books read, and helped them to understand the text (Akpokodje & Ukwuoma, 2016). Based on these findings, Akpokodje and Ukwuoma (2016) concluded that universities should provide improved internet access and sufficient facilities to accommodate all students in their use of eBooks. Akpokodje and Ukwuoma (2016) also noted that librarians should increase their efforts to build awareness of eBooks among university students.

In another recent study also conducted in the higher education setting, Pierard et al. (2019) investigated the specific barriers related to students' learning with eBooks in a semester-length course. In the study, librarians and a professor in the learning sciences asked graduate students to share information on the student experience with eBooks (Pierard et al., 2019). The study involved two parts: the first cohort in which students explored eBooks to discover benefits

and barriers; and a second cohort in which student comfort with PDF formats increased but comfort with eBooks decreased.

The most identified affordances, or benefits, identified by students were readability, portability, and navigation (Pierard et al., 2019). However, students in the study noted more barriers than affordances related to the use of eBooks (Pierard et al., 2019). The barriers identified were that navigation was difficult, that printing or downloading was difficult, and that the interface was challenging, in addition to other barriers revealed through regular experience using eBooks (Pierard et al., 2019). In comparison between eBooks and print, some studies have found that students are more likely to revisit and restudy materials if they are in print format (Mizrachi, 2016; Pierard et al., 2019; Singer & Alexander, 2017). However, other studies have found no differences between eBooks and print in terms of comprehension (Pierard et al., 2019; Walsh, 2016). To clarify these differences, additional research is needed on the topic of knowledge acquisition and the potential differences between multi-touch books/eBooks and print materials (Mills, 2016; Mizrachi, 2016; Pierard et al., 2019; Walsh, 2016). Additionally, barriers related to these differences must be addressed. The section to follow will explore barriers and factors related to the adoption of multi-touch/eBooks in education settings

Adoption of multi-touch/eBooks in education settings. Although multi- touch/eBooks have been found to be potentially beneficial in improving student engagement and knowledge acquisition in the academic setting, there are many barriers and factors associated with the adoption of multi-touch/eBook technologies by students, teachers, and/or institutions (Morris & Lambe, 2017; Pierard et al., 2019; Qazi, Raza, & Shah, 2018). On the higher education level, constraints to the adoption of technologies may include cultural, political, and financial resources available to the university administrative body (Tarhini, Tarhini, & Tarhini, 2019). Specifically,

Tarhini et al. (2019) found that the following factors are related to the integration of information technologies (IT) in academic institutions:

- Partial IT integration enhances organizational knowledge creation
- University culture and politics is positively related to IT integration
- Financial resources are positively related to technology integration in universities
- University structural framework is positively related to technology integration

These considerations and constraints are important to consider in this dissertation- in-practice (DiP) because they may influence the perspectives of teachers/educators as related to the use of multi-touch books/eBooks in higher education. For example, building on the findings of Tarhini et al., (2019), the conclusion of a study by Morris and Lambe (2017) on the use of eBooks in this higher education setting found that the positive feedback was received from students. The positive feedback was related to the use of multimedia interactive eBooks to support learning but that there are other factors that affect the adoption of new technologies that must be considered (Morris & Lambe, 2017). Specifically, the researchers found that factors related to a student's willingness to adopt eBooks include their judgments about the usefulness of the eBook over paper-based resources: the usability of the eBook, and the support of academic teachers (Morris & Lambe, 2017).

Prior to implementing technology, particular attention must be paid to the intended learning benefit, the pedagogic rationale, student training needs, and practical considerations (Morris & Lambe, 2017). In a separate study by Qazi et al. (2018), the researchers investigated the intention of students to adopt eBooks in higher education in Pakistan. The data for the study was collected from a five-point Likert questionnaire from 620 university students (Qazi et al., 2018). The results of the study were that compatibility, complexity, observability, trialability,

attitude, and awareness had a significant effect on the behavioral intention of students to use eBooks (Qazi et al., 2018). Relative advantage had an insignificant effect on behavioral intention (Qazi et al., 2018). Furthermore, the behavioral intention has a significant positive impact on actual usage of eBooks by students (Qazi et al., 2018). The researchers explained that these findings were beneficial in understanding the factors associated with the adoption of eBook use (Qazi et al., 2018). These factors must similarly be considered in this DiP in order to identify any potential barriers to adoption or use of multi-touch/eBooks in the study setting. In consideration of these potential barriers, the literature on the use of multi-touch/eBooks in higher education will be presented.

Use of multi-touch books/eBooks in higher education. Because the present study focuses on the impact of the use of multi-touch books/eBooks on learning outcomes, this section will include evidence related to that topic. As mentioned in Chapter I, higher education institutions have a responsibility to provide students with interventions, resources, services, and tools that facilitate student access to learning as well as their success and retention (Harkins, 2016). The integration of digital technologies such as multi-touch books/eBooks may be one way to increase the student learning experience. The use of new technologies and teaching methods coincide with current trends in higher education and changes in student behavior (Allen, Withey, & Lawton, 2016). Information technology has had a significant effect on higher education institutions (Tarhini et al., 2019). Non-traditional methods have become more common in higher education and include both classroom facilitation methods such as blended classrooms, flipped classrooms, active learning, and team-based learning, as well as the incorporation of classroom technologies in the form of interactive tutorials, eBooks, Toolwire simulations, and the use of embedded media into course content (Allen et al., 2016).

Technologies such as eBooks can be easily integrated into traditional classroom and non-traditional classroom facilitation methods to strengthen student learning, engagement and success (Allen et al., 2016). eBooks could serve as an integration platform for introducing multimedia content into higher education (Strecker et al., 2018). Researchers such as Sánchez-Azqueta et al. (2016) have explained that information and communications technologies are invaluable tools thatcan be used to facilitate and promote meaningful earning. For this reason, many higher education institutions have adopted technologies such as e-learning and the virtual learning environment in combination with traditional teaching methods as part of mixed learning (Sánchez-Azqueta et al., 2016).

Allen et al. (2016) explained that eBooks have become a large part of e-learning as well as aid for classroom technology. eBooks have become valuable because they provide students with a way to have constant access to reading materials through the use of the devices they carry around on a daily basis (e.g. iPhone, iPads, Tablets, mini-computers, etc.), rather than carrying around heavy textbooks (Allen et al., 2016). The use of multi- touch books/eBooks in higher education has been considered to be part of the process of digital convergence in higher education, which involves the integration of digital technologies in the academic setting (Makani et al., 2019). eBooks, multi-touch books, and other e-materials are therefore part of the redesigned learning environment that had emerged with the development of greater access to technology and digital materials. Media convergence, including the integration of digital technologies such as multi-touch books and eBooks, is a communications process and in education, impacts the way in which students acquire knowledge and access learning (Makani et al., 2019).

Although digital convergence brings opportunities, such as increased student learning and engagement in higher education, it also brings challenges such as easier disruption in learning (Makani et al., 2019). Specifically, task focus has been found to be negatively affected by the use multi-touch interfaces (Schimitt & Weinberger, 2018). As a new phenomenon, there is a need for additional research on the impact of digital convergence and the specific use of digital tools in higher education on student achievement and engagement (Makani et al., 2019).

One study by Alhammad and Ku (2019) explored the use of eBooks in higher education with a focus specifically on the experiences and perspectives of graduate students. The study included twenty graduate student participants from a midsized university in the United States. The researchers used a qualitative design to explore how graduate students interpreted their experiences with the use of eBooks for learning. They focused on various aspect of the students' experience, including: the reasons that influenced their preference for eBooks rather than printed books for learning, how they perceived the impact eBooks had on their learning, and how they compared their learning experiences between the use of a printed books when compared to an eBook containing similar content but that also included different multimedia options (Alhammad & Ku, 2019). Other researchers have found that students prefer eBooks as an environmentally friendly alternative to print materials, which may influence their preference for the use of eBooks (McCusker, 2018; Pierard et al., 2019).

Related to the topic of multimedia options from multi-touch/eBook content, Bruun, Ray, and Udby (2019) conducted a study on the use of problem-solving in physics through the use of online textbooks problems. The researchers used network analysis and principal component analysis to explore student interactions with an online textbook that featured physics problems (Bruun et al., 2019). In the study, Bruun et al., (2019) applied five components of behavioral

structure: complexity, linear length, navigation, mutuality, and erraticism. The results of the study implied that problem-solving sessions could be divided into three main groups that differ in their complexity and could be further divided into ten behavioral structure clusters based on linear length, navigation, mutuality, and erraticism (Bruun et al., 2019). The ten clusters identified in the study were:

1. Reading-Selective-Verification: included the time between selecting solutions for offline work with the problem
2. Reading: associated with very little activity and therefore little time for online work with the problem
3. Embedded-Reading-Verification: included time between selecting solutions for offline work with the problem but the embedding problem is devoted more time and perhaps complex behavior
4. Read-Verify-Explore: time is spent going back and forth between the problem, where hints and solutions are viewed, and students visited wiki- textbook pages with relevant information
5. Reading-Peaking: the problem was viewed for some time during which the solution or hint was shown and then quickly hidden again
6. Reading-Verification: associated with opening all hints and solutions quickly after reading the problem
7. Embedded-Selective-Verification: embedded within a more complex problem, with some time spent before showing particular solutions while other solutions are opened more quickly
8. Exploration: associated with visiting different wiki-textbook pages, which may not be related to the problem; solutions and hints are likely opened and shown quickly
9. Integrated-Interactive: associated with making use of many if not all of the features of the wiki-textbook when engaged with the problem; some time was spent before the next action after the solutions were shown
10. Erratic-Interactive: associated with erraticism and involves multiple showing and hiding of hints and solutions with short interviews between the actions (Bruun et al., 2019)

Based on the findings of the study, the researchers recommended further research with the use of other methodological approaches to better understand how learning strategies are used by students in settings with online features, such as the use of online textbook problems (Bruun et al., 2019). The Bruun et al. (2019) study is significant because the researchers specifically called for additional research to understand student interactions with online textbook content. This is the precise problem addressed in the present study, which followed Bruun et al.'s recommendations by analyzing student outcomes as a result of their use of iBook *Educational Leadership and Policy.* Bruun et al. (2019) is also significant because it demonstrated the complexity of student interaction with digital technologies that may impact their learning outcomes. The researchers found that graduates preferred using eBooks to printed texts (Alhammad & Ku, 2019). However, when preparing for an exam, graduate students preferred an eBook only when the eBook offered content similar to the printed text and provided additional resources. Alhammad and Ku (2019) concluded that additional research is needed on this topic. The present study was therefore supported by the need for additional research on the use of eBooks and multi-touch books as related to the perspectives, experiences, and learning outcomes of students in higher education. The Alhammad and Ku (2019) study provides evidence that multi-touch books, specifically eBooks are preferred by students in higher education.

Another key article identified from the review of the literature is a recent study conducted by Casselden and Pears (2019). The researchers explained that eBooks have been enthusiastically adopted by academic libraries and their use has resulted in efficient resource use, space-saving, and increased student satisfaction (Axelrod, 2017; Casselden & Pears, 2019; Raynard, 2017; Wood et al., 2017). To investigate this claim, Casselden and Pears (2019) conducted a small-scale online interview at Northumbria and Durham Universities to investigate students' eBook

use to examine aspects of learning eBooks support, searching strategies, devices used to access eBooks, and reading and use strategies of eBooks. Ninety-two participant responses were analyzed using a mixed- methods approach to identify advantages and frustrations associated with the use of eBooks among the higher education students (Casselden & Pears, 2019).

The researchers found that, although many advantages of eBooks were identified such as their portability, availability, functionality, and ability to use searching functions, the student sentiment related to eBooks was not generally positive (Casselden & Pears, 2019; Yuan, Van Ballegooie, & Robertson, 2018). These results were specific to student concern related to the availability of eBooks as approximately half of the respondents were concerned about the physical lack of eBooks in certain subject areas or expressed misunderstanding regarding how to access eBooks (Casselden & Pears, 2019). Another challenge was the compatibility of the eBooks with the students' personal eBook readers, which severed as frustration for students wishing to access eBooks (Casselden & Pears, 2019). Students also expressed a ‘soft spot” for and emotional attachment to hard copy formats for an enjoyable reading experience (Casselden & Pears, 2019; Myrberg, 2017; Wilders, 2017). This “soft spot” may be due to familiarity with print materials (Casselden & Pears; Hobbs & Klare, 2016).

Similarly, the preference for print materials may also be linked to the fact that few students use the advanced features available from the use of eBooks (Casselden & Pears; Hobbs & Klare, 2016). On the other hand, highlighting and note-making by hand in a print text has also been identified as a potential reason their preferences. Such activities enhance engagement and absorption of text (Casselden & Pears; Hobbs & Klare, 2016; Wilders, 2017). An additional frustration associated with the use of eBooks includes eyestrain from reading from a screen (Casselden & Pears, 2019; Hobbs & Klare, 2016). Based on these findings, Casselden and Pears

(2019) urged the importance of ensuring that library collections provide materials that facilitate the complexity of learning styles and that provide opportunities for students to better digest content (Raynard, 2017). Cleary and Lenahan (2018) similarly expressed the need for libraries to respond to changes in acquiring eBooks, noting the use of Demand Driven Acquisition (DDA) and Evidence-Based Acquisition (EBA) for the purchasing trends of eBooks. It is important to consider the purchasing trends of eBooks in libraries as potentially impacting the ability of students to readily access these materials, with access being an issue identified by Casselden and Pears (2019).

The Demand Driven Acquisition model has been used to build and maintain affordable access to a collection of multiuse eBooks (Buck & Hills, 2017; Cleary & Lenahan, 2018). The use of this model for libraries allows for the acquisition of eBooks from a wide range of academic publishers (Buck & Hills, 2017; Cleary & Lenahan, 2018). However, researchers have noted the difficulties of the affordability of eBooks using the Demand Driven Acquisition model, particularly for small, liberal arts university libraries (Buck & Hills, 2017; Cleary & Lenahan, 2018). The most important measurements of success for Demand Driven Acquisition models relates to the input and satisfaction of students and faculty, in addition to costs (Cleary & Lenahan, 2018). The measurements determined to be the most important measurements of success for these models are quality and appropriateness of purchased titles, cost per use, post-purchase usage, the effect of new workflows on staff time, feedback from faculty/students, and cost reductions (Cleary & Lenahan, 2018). Understanding access to eBooks is relevant to the proposed study because access could act as a potential barrier to the adoption of the use of eBooks by students in higher education (Casselden & Pears, 2019).

It is important to note that demand for particular eBooks may differ based on content and subject (Cleary & Lenahan, 2018; Costello, 2017a; Costello, 2017b). One example of the role of libraries as related to the use of eBooks by students is the ability to increase the visibility of eBooks in a library, develop collections with user-friendly interfaces, and ensure more open digital rights to enhance the user experience with eBooks (Axelrod, 2017; Casselden & Pears, 2019; Hobbs & Klare, 2016; Raynard, 2017; Wood et al., 2017). The Casselden and Pears study (2019) is relevant to this DiP because the researchers demonstrated the importance of considering factors, such as accessibility and ease of use of multi-touch/eBooks, as key to student satisfaction with the use of eBooks.

Watson (2016) similarly described some of the frustrations expressed by students in Casselden and Pears (2016) related to eBook accessibility and features. Watson (2016) explained that unfortunately, there are no guarantees that eBook platforms will deliver a consistent standard of accessibility, and some features that would improve accessibility are not always well promoted. Researchers such as Watson (2016) and Axelrod (2017) have also explained that the reliability and accessibility of eBook materials in higher education is particularly important for students with disabilities as accessibility features are important for their reader experience. In particular, eBooks help to alleviate some problems related to accessibility for students with disabilities in higher education (Axelrod, 2017; Wood et al., 2017). In the present study, given the information presented by Watson (2016) and Casselden and Pears (2019), difficulties related to the accessibility, reliability, and usability of multi-touch/eBooks must be considered.

In a separate study conducted in the higher education system in the United Kingdom, Morris and Lambe (2017) investigated the use of eBooks in a specific laboratory bioscience course. The study was conducted because bioscience students in the higher education system in

the United Kingdom are making increasing use of technology (Morris & Lambe, 2017). Technologies are used by students to support learning both in class and during private study (Morris & Lambe, 2017). Given the increased use of technology among bioscience students, Morris and Lambe (2017) investigated the role of multimedia interactive eBooks in bioscience laboratory classes that were delivered using a blended learning approach. Thirty-nine undergraduate students participated in the study and were assigned to alternating trail and control groups (Morris & Lambe, 2017). The researchers collected data using quantitative and qualitative responses, in addition to the analysis of summative assessment marks (Morris & Lambe, 2017).

Through the analysis of the data, Morris and Lambe (2017) found that students made extensive use of eBooks in their practical class and over 70% of the participants agreed that eBooks were beneficial for learning. However, the use of the eBooks did not have a statistically significant effect on the assessment marks of students (Morris & Lambe, 2017). Similarly, less than 40% of the students expressed a preference for eBooks over traditional paper protocols and materials for the practical-based classes. Now that the use of multi-touch books/eBooks has been established in this presentation of relevant Literature, the following section will provide a summary of key findings.

Summary

The identified literature described in this review was presented in the following categories to gradually provide a more specific framing to the proposed study: a) multi- touch books and eBooks; b) teacher/educator perspectives of multi-touch books/eBooks; c) multi-touch books/eBooks and student engagement; d) multi-touch books/eBooks and knowledge acquisition; e) adoption of multi-touch/eBooks in education settings; and f) use of multi-touch books/eBooks in higher education. Subthemes were also presented under each of these sections

to better frame the presentation of existing evidence. As demonstrated in this literature review, there is a substantial amount of recent evidence that highlights the increased importance and focus on integrating digital technologies into education (Buchanan, Pressick-Kilborn, & Maher, 2019; Chen & Chiu, 2016; Hwang et al., 2018; Martinez et al., 2019; Pedro, 2017; Reid, 2016; Rupley et al., 2015; Schmitt & Weinberger, 2018).

Due to the number of available technologies, many of the available studies focus on the application of specific technologies on student outcomes such as engagement, motivation, and academic achievement (Akpokodje & Ukwuoma, 2016; Makani et al., 2019). There has also been a significant amount of work on the use of digital technologies to important literacy and reading outcomes as much of the available recent literature has been conducted in the primary and secondary education settings (Buchanan et al., 2019; Chen & Chiu, 2016; Hwang et al., 2018; Martinez et al., 2019; Reid, 2016; Rupley et al., 2015; Schmitt & Weinberger, 2018).

In the review of recent literature, the researcher found that many articles pertaining to digital technologies in higher education focused on the use of digital learning platforms such as blended learning, rather than on the specific use of multi-touch books/eBooks (Buchanan et al., 2019; Chen & Chiu, 2016; Hwang et al., 2018; Martinez et al., 2019; Pedro, 2017; Reid, 2016; Rupley et al., 2015; Schmitt & Weinberger, 2018). However, of the recent literature identified as related to the use of multi-touch/eBooks, many researchers identified the benefits of utilizing multi-touch books/eBooks and a student preference for using these technologies in the higher education setting (Akpokodje & Ukwuoma, 2016; Alhammed & Ku, 2019; Mills, 2016). On the other hand, other researchers have found that students prefer print materials to multi-touch/eBooks, noting a number of frustrations including ease of use and access to multi-touch/eBooks in addition to a general preference for multi-touch/eBooks (Baron et al., 2017;

Casselden & Pears, 2019). In the context of preferences for print materials versus multi-touch/eBooks, it is important to consider factors related to student interaction and experiences with each format (Bruun et al., 2019).

Researchers have described the importance of university libraries to address this challenge by increasing access to and awareness of multi-touch/eBooks among university students to encourage their use (Akpokodje & Ukwuoma, 2016; Casselden & Pears, 2019; Watson, 2016). In order to increase the likelihood that students will have a positive experience with multi-touch/eBooks, barriers to adoption of multi-touch/eBooks, such as access, awareness, and usability, must be overcome (Axelrod, 2017; Casselden & Pears, 2019; Hobbs & Klare, 2016; Raynard, 2017; Wood et al., 2017). It is important to note that there is substantial evidence that student preference for print text over multi-touch/eBooks remains strong in the university setting, especially for use in complex topics (Carroll Corlett-Rivera, & Hackman, 2016; Casselden & Pears, 2019; Pierard et al., 2019; Singer & Alexander, 2017). What is evidence from the existing literature is that libraries, faculty members, and students each play an important role in the adoption of multi-touch/eBooks in higher education.

Researchers have suggested that divergent findings related to the use of multi-touch/eBooks over print among students may be related to the way in which students interact with multi-touch/eBooks, including the type of multi-touch/eBook used for learning (Pierard et al., 2019; Van Horne, Russell, & Schuh, 2016). The inconsistency in the research related to the overall student preference for using multi-touch/eBooks in higher education and the implications for this inconsistency will be further discussed in the conclusion section. the conclusion to follow, gaps identified in the literature will be described to conclude Chapter II.

Conclusion

Based upon the exploration of the literature presented in this review, multi-touch books/eBooks have emerged in the higher education setting and have been found by researchers to be a potentially viable medium for use in higher education to improve student outcomes (Akpokodje & Ukwuoma, 2016; Alhammed & Ku, 2019; Allen et al., 2016; Axelrod, 2017; Dabbagh et al., 2019; Elkhateeb et al., 2019; Makani et al., 2019; Mills, 2016; Morris & Lambe, 2017; Strecker et al., 2018; Wood et al., 2017). Specifically, researchers have found that multi-touch books/eBooks allow for increased student engagement and collaborative learning (Akpokodje & Ukwuoma, 2016; Makani et al., 2019; Schmitt & Weinberger, 2018). Furthermore, multi-touch/eBooks can be easily integrated with traditional learning strategies as well as in blended and online learning models (Allen et al., 2016). As such, a higher education iBook, as a multi-touch book/eBook may be critical for students to gain a deeper understanding of subject-matter through this medium as a new educational tool (Hwang et al., 2018; Schmitt & Weinberger, 2018). The use of the iBook *Educational Leadership and Policy* within a higher education institution will, therefore, be investigated in the present study in consideration of the evidence thus far presented by researchers.

As related to the use of multi-touch/eBooks in higher education, some researchers have also revealed that there is a preference for the use of multi-touch books/eBooks in higher education due to factors such as portability, accessibility, on the other factors (Akpokodje & Ukwuoma, 2016; Alhammed & Ku, 2019; Mills, 2016). However, other researchers have found that students have a ‘soft-spot’ for print materials over multi- touch/eBooks (Baron et al., 2017; Casselden & Pears, 2019; Riha & LeMay, 2016; Ward & Colbron, 2017). Researchers have also found that students may prefer multi- touch/eBooks due to challenges and frustrations related to

usability, access, and familiarity with multi-touch/eBook content (Baron et al., 2017; Casselden & Pears, 2019; Riha & LeMay, 2016; Ward & Colbron, 2017). These factors would therefore likely negatively impact the likelihood adoption and use of multi-touch/eBook technology in higher education and are therefore essential factors relevant to the present study.

As mentioned previously, these identified differences in the literature are important to consider as they provide competing evidence in support of and contrary to the use of multi-touch/eBooks in higher education. Importantly, of the researchers that have identified a preference in favor of print materials over multi-touch/eBooks. Specific reasons have been suggested to explain this preference (Baron et al., 2017; Casselden & Pears, 2019; Riha & LeMay, 2016; Ward & Colbron, 2017). Similarly, barriers and challenges to the use and adoption of multi-touch/eBooks have been presented by researchers (Baron et al., 2017; Casselden & Pears, 2019; Riha & LeMay, 2016; Ward & Colbron, 2017).

Ultimately, as demonstrated based on the differences between these findings, there is an inconsistency in the available literature that must, therefore, be addressed through additional research (Mills, 2016; Porion, Aparicio, Megalaki, Robert, and Baccino, 2016). Although there have been several recommendations and suggestions made by researchers in an attempt to explain these inconsistencies, future research is needed to understand the complex factors of student preference and satisfaction related to the use of tactile books, challenges and frustrations related to the use of multi-touch/eBooks, and impacts of multi-touch/eBook use on student engagement and outcomes (Baron et al., 2017; Casselden & Pears, 2019). This study may, therefore, contribute to existing literature and could potentially alleviate some of the inconsistency in the research by presenting conclusive findings on the use of multi-touch/eBooks in the specific context related to the population and topic of interest.

Although several studies have been identified in this review of the literature, researchers have explained that there are still gaps in existing evidence that need to be filled related to the student use of multi-touch/eBooks, particularly in higher education (Mills, 2016; Pierard et al., 2019). There is a lack of understanding as to why and when students choose to transition from paper formats and adopt electronic formats and a similar lack of evidence related to how students perceive and use multi-touch/eBooks (Pierard et al., 2019; Walsh, 2016). The present study will provide evidence to contribute to the filling of this gap by investigating the adoption of the iBook *Educational Leadership and Policy* within the higher education setting, with consideration for student and faculty perceptions in the adoption of this iBook.

The literature also reveals that limited research of multi-touch books might benefit from studies on the relationship between student outcomes and iBooks across different domains as with the specific use of the iBook *Educational Leadership and Policy* (Makani et al., 2019). Although there is some literature available, many of the existing studies on the use of multi-touch technologies in education alsohave been primarily conducted in the K-12 setting, rather than in higher education, as identified in this review of relevant literature (Buchanan et al., 2019; Chen & Chiu, 2016; Hwang et al., 2018; Martinez et al., 2019; Reid, 2016; Rupley et al., 2015; Schmitt & Weinberger, 2018). Of the available evidence in the K-12 setting, the majority of the findings presented by researchers has been in favor of the use of eBooks to improve student outcomes (Buchanan et al., 2019; Chen & Chiu, 2016; Hwang et al., 2018; Martinez et al., 2019; Reid, 2016; Rupley et al., 2015; Schmitt & Weinberger, 2018). These studies differ from the studies conducted in the higher education context as researchers in the higher education setting have differed in their findings on the benefits of multi-touch/eBooks when compared to print texts (Casselden & Pears, 2019; Mills, 2016; Pierard et al., 2019 Singer &

Alexander, 2017). The limitations of the generalizability of studies conducted in the K-12 setting has been previously described. As described in this review, researchers have provided various explanations to describe the challenges, barriers, and preferences related to the adoption of multi- touch/eBooks in higher education among students and teachers (Casselden & Pears, 2019; Greene, 2018; Mills, 2016; Pierard et al., 2019; Sanches, 2016; Singer & Alexander, 2017). Each of these challenges must be considered in the present study to understand and analyze the potential barriers to the adoption and use of the iBook *Educational Leadership and Policy.* The present study will, therefore, address the gaps in existing evidence due to inconsistencies and will contribute to the existing literature related specifically to higher education.

By applying a theoretical framework based on the three theories of Connectivism (e.g. Siemens), Systems Theory (e.g. Bateson, Khan, Mantura), and Postmodernism in the Information Age (e.g. Senge, 2006b) described previously, the present qualitative research study may also provide a more complex and thorough understanding of the factors related to the adoption of the iBook *Educational Leadership and Policy* through an analysis based on these theories. The application of these specific theories will also allow the researcher to made recommendations for future studies and potential theories that could be applied as related to this topic.

Although the findings of the present study will be specific to a specific iBook content within an identified university, the findings yielded may still be useful for better understanding the use of iBook content in higher education in general. Given that new technologies within higher education are relatively recent, this study will nonetheless add to the evidence available on this emerging topic. The study may also help to inform the adoption and implementation of

multi-touch/eBook technologies in higher education, particularly for institutions interested in introducing the use of iBooks and/or the specific iBook *Educational Leadership and Policy*. As noted previously, to date no other study has investigated the implementation and adoption of the iBook *Educational Leadership and Policy* within a higher education institution.

The research explored in this review consisted of an exploration of the topic solely from an academic standpoint as opposed to consumer or entertainment purposes. As described in the introduction, all literature was identified and reviewed from database searches, peer-reviewed articles, and graduate dissertations. Chapter III will include a description of the methodology to be used in this study, including the study design, instrumentation, participant selection, and ethical considerations. This concludes chapter II.

CHAPTER III

Methodology

Introduction

This chapter will examine and explain the study, the type of research, research questions, participants, data collection, and analysis methods to be utilized. This dissertation-in-practices employed a qualitative case study research as defined by Creswell and Creswell (2018) as "a qualitative design in which the researcher explores in depth a program, event, activity, process, or one or more individuals. The cases are bounded by time and activity, where researchers collect detailed information using a variety of data collection procedures over a sustained period of time.".

The purpose of this dissertation was to appraise the instructional effectiveness of multi-touch textbooks in schools of educations. "Multi-touch books" rely upon digital coding embedded in mobile computing devices to access interactive content whereby readers have an interactional experience with the subject. Multi-touch books expose readers to selected areas of knowledge, concepts, facts, and analytic techniques that might otherwise be difficult to capture in conventional textbooks (Mills, 2016). The qualitative research sought to appraise the effectiveness of multi-touch books as an effective tool in education that facilitates reader understanding of, and interest in, a particular subject. This appraisal relied principally on semi-structured audio-recorded interviews of multi-touch textbook users, both students, and their instructors. The interviews utilized a particular response seeking feedback of potential students and faculty in schools of education. The respondent sample of necessity was small. Nevertheless, the results of the study may shape subsequent and larger studies of multi-touch books in Higher Education.

Research Questions

1. How useful does the multi-touch book, *Educational Leadership and Policy,* serve as an instructional resource for faculty at Colleges of Education?

2. In what ways do students share views of the efficacy of the multi-touch book, *Educational Leadership and Policy?*

Description of Population

The population for which the research will focus includes graduate-level faculty and students at a College of education who voluntarily agreed to participate in a qualitative review of multi-touch books. Sampling was conducted using *purposive sampling* for graduate-level faculty and students who are convenient to the researcherand readily collected from a College of education in the South-eastern United States. “Purposive sampling is based on the assumption that the researcher wants to select participants or sources of data based on their anticipated richness and relevance to the study’s research questions, including sources whose data are presumed to challenge and not just support a researcher’s thinking” (Yin, 2016). No biases are known, and care will be taken if results are found outside of the sampled school, department, andparticipants.

The data was gathered through the use of audio-taped interviews (Appendices B and C). This form of interviewing is ‘one where the researcher’s goal is to reveal the participant’s point of view, and the interview assumes a conversational mode rather than a tightly scripted format (Yin, 2016). The graduate-level faculty was interviewed individually (Appendix B) from and the student sample who were interviewed in one

or more focus groups. (Appendix C). "Focus groups are a form of data collection whereby the researcher convenes a small group of people having similar attributes, experiences, or “focus” and leads the group in a nondirective manner. The objective is to surface the perspective of the participants in the group with as minimal influence by the researcher as possible” (Yin, 2016).

Instrumentation

The researcher posed semi-structured questions to participants (Appendices B and C). Primary open-ended questions were chosen as a way to elicit ample feedback with a richer understanding of the participants experience and combined narrative. The investigator employed two audio-recording devices, as well as capture digital notes with an Apple Pencil and iPad while using a digital note-taking application, ‘Notability.’ Duplicity of recording devices, as well as hand-written notes, will ensure access and accuracy of participant narratives.

Data Collection

A case study design with audio-recorded interviews will be used to collect Faculty and student narratives (Appendices B and C). Before the researcher began the study to collect data, approval was requested from the university’s Institutional Review Board (IRB). Following approval from the IRB, the researcher proceeded with acquiring qualitative data through audio-recorded interviews. From here, the recordings were transcribed by the researcher, verified by the dissertation committee for accuracy, and then codified for themes. Analyses will be formulated from the documented research themes and interviews so as to develop constructs and corresponding narratives for the study of multi-touch books in Colleges of Education. In sum, the body of knowledge

garnered through case study analysis will be ‘bound by time and activity, where detailed information is collected using a variety of data collection procedures over a sustained period of time’ (Creswell & Creswell, 2018). All collected data will be either stored in a locked cabinet or on a password-protected computer to which only the researcher has access.

Data Analysis

The method of data analysis involves broad data categorization, interpretation and identification of patterns based on common or different themes, and evaluating the current practices used at the institution being studied. “The coding of qualitative data analysis is the assignment of simple words or short phrases to capture the meaning of a larger portion of the original text” (Yin, 2016). Upon completion of transcribing participant narratives, the researcher will share the anonymized transcriptions with the dissertation committee to ensure accuracy of the data and its collection. Once affirmed as qualifiable by the committee, the researcher will group the data into thematic clusters.

The researcher will conduct qualitative content analysis of individual themes as the unit for analysis where themes may be expressed in single words, phrases, sentences, or paragraphs of the transcribed. As such, the researcher will explore themes embedded as coding units, which may reveal expressions of an idea (Minichiello, Aroni, Timewell, and Alexander, 1990).

From these thematic clusters, a combined narrative emerges which will be used to create a multi-media presentation. All collected data and its findings will be either stored in a locked cabinet or on a password-protected computer to which only the researcher has access.

Sample

Students and faculty in an institution of Higher Education will be recruited for this qualitative study. The participants will be Faculty teaching at the graduate level of a College of education, as well as their students who are currently enrolled in a College of education graduate program. The sample size is anticipated to be 5 – 25.

Procedures

Gateway to Study Participants (Appendix A). Upon IRB approval, the researcher will work with the Dean of the College of education to secure volunteers for the study with an email request to faculty in the College of education (Appendix A). Interested faculty will then reach out to the researcher to arrange times for a possible interview and/or opportunity to interview a focus group of their graduate-level students.

Faculty Interviews

Background and Informed Consent (Appendix B). The researcher will schedule and meet with the faculty member on campus and outside of class time. The faculty will receive background of the study, a review of the Informed Consent, and if agreeable, a request to sign the document before proceeding. The faculty will be made aware that the Informed Consent and any other documentation relating to the study will be securely stored in a locked cabinet for two years for which only the researcher has access.

The researcher will explain that the purpose of the study to review the efficacy of multi-touch books through case-study analysis of audio-recorded interviews. The researcher will then review the process following the interview, including researcher availability, transcription of interviews, capturing of narratives, and anonymous review of narratives by the dissertation committee for data accuracy. Introductory statements to the interview will detail:

- The confidential and anonymous nature of the audio-recorded interview

- The duration of the study will be 15 - 20 minutes
- Terms to be defined by the researcher include multi-touch books: iBooks, Apple Book, ePub
- Primary question will be open-ended to understand a participant's experience
- Upon Faculty agreement of the background and signed Informed Consent, the researcher will pose two delimiting questions to ensure the scope of the study. The following third will be presented as the primary question of inquiry of the study.

Faculty Questions (Appendix B). The demographic questions will be used to delimit the scope of the study.

1. Are you a Faculty at an institution of higher education? <<Yes or No>>

2. Do you teach, taught or will teach in a School of education? <<Yes or No>>

The researcher will then pose the primary, open-ended question for Faculty.

3. Tell me about your experience using an iBook or other multi-touch book?

Possible follow-up questions to Question 3 may include:

a) Give me a sense of your experiences using iBooks in class.

b) (If no experience) Why might you not have experience with iBooks

Faculty Interview Close

Following the audio-recorded interviews, the researcher will announce the close of the study, thank the volunteers for their time and feedback, and remind the participants of how they may contact the researcher.

Student Interviews

Background and informed consent (Appendix C). The researcher will meet with a student focus group outside of class time. The student focus group will receive background of the study, a review of the Informed Consent, and if agreeable, a request to sign the document before proceeding. The students will be made aware that the Informed Consent and any other documentation will be securely stored in a locked cabinet for two years for which only the researcher has access. The researcher will explain that the purpose of the study is to review the efficacy of multi-touch books through case-study analysis of audio-recorded interviews. The researcher will then review the process following the interview, including availability, transcription of interviews, capturing of narratives, and anonymous review of narratives by the dissertation committee for data accuracy. Introductory statements to the interview will detail:

- The confidential and anonymous nature of the audio-recorded interview
- The duration of the study will be 15 - 20 minutes
- Terms to be defined by the researcher include multi-touch books, iBooks, ePub
- Primary question will be open-ended to understand a participant's experience Upon student agreement of the process, background and signed Informed Consent,

the researcher will pose four open-ended questions of inquiry.

1. Tell me about your experience using the multi-touch book 'Educational Leadership and Policy'.

2. In what ways has this iBook influenced your engagement in class?

3. How has this iBook influenced your grade?

4. Is there anything else you would like to share?

Focus Group Interview Close

Following the audio-recorded interviews, the researcher will announce the close of the study, thank the volunteers for their time and feedback, and remind the participants of how they may contact the researcher.

Ethical Considerations

The participants will be informed, and consent will be obtained prior to participating in the study. The participant's identities will be protected by not using names or the names of their educational role instead they will be identified by numbers. The participants will be instructed that they may terminate the survey at any time they wish if they feel they are under duress. There will be not monetary incentive for participating in the study. The results of the data will be transcribed from the instrument and will be kept on a password protected computer that only the researcher has access to. Records of the study will be destroyed two years after dissertation defense.

Design

This research study employs a qualitative method to investigate the why and how of the decision process in regard to an individual's experience using multi-touch books in a College of education. This dissertation-in-practice contains both a product of the practice, an iBook, *Educational Leadership and Policy*, as well as a qualitative case study. Merriam (1998) defines a qualitative case study as "an intensive, holistic description and analysis of a bounded phenomenon." While Yin (2003, 2016) extends this definition further as an *empirical inquiry* that,

1. Investigates a contemporary phenomenon within its real-life context, particularly when the boundaries between phenomenon and context are not clearly evident.

2. Allows for technically distinctive situations in which there are more variables of interest than known data points.

3. One result may rely on multiple sources of evidence, with data needingto converge in a triangulated fashion, while another result may benefit from prior developments of theoretical propositions that guide data collection and its analyses (Yin, 2003, 2016).

Furthermore, case study research is known to be a flexible method to evolving phenomena where findings are derived from written narratives as a way for researcher and reader alike to garner greater insights and understanding of the case or situation. “Qualitative research tries to establish an empathetic understanding for the reader, through description, sometimes ‘thick description,’ conveying to the reader what the experience itself would convey” (Stake, 1995).

Lastly, by conducting a case study analysis in conjunction with a product in practice, an iBook, *Educational Leadership and Policy*, the study may yield a richer narrative with greater findings beyond the research questions in this study of multi-touch books in colleges of education.

Case Study Analysis

The analysis will be formulated from recorded audio interviews, drawing on document research themes to develop constructs and corresponding items for the assessment of multi-touch books in colleges of education. Case study analysis will be utilized, and transcriptions will be typed and uploaded, as well as coded and examined for themes. A committee member will review the transcriptions, and the codes and themes will verify that researcher is accurately making meaning and sense of the data.

The interaction between researcher and participant through the interview process will allow for an "establishment of human-to-human relation with the respondent and the desire to *understand* rather than to *explain*" (Fontana & Frey, 1994). Interviews with the participants will be semi-structured and the researcher will pose open-ended questions. This will allow for consistent investigation of particular topics with the participant and open-ended questions, flexible enough to engage new, evolving topics by way of natural conversation. Similarly, case study interviews may 'reveal morally sound and reliable findings as it treats the participants as peers, allowing for the expression of personal feelings, and presenting a more realistic picture than can be uncovered using traditional interview methods' (Fontana & Frey, 1994).

Evaluation of Research Methods

Threats to the validity of the research may occur if the researcher receives little interest or a significantly small number of respondent interest from the 25 potential participants. A lack of response will be proactively addressed by monitoring the Faculty response to the Dean's request for volunteers. If the responses are low, the researcher will ask the Dean to follow-up with another email request one week later.

Equally, when participants express interest, the researcher may respond with a placeholder calendar invite (from iCal) to hold a designated and time for the qualitative interviews (see member check form in Appendix D).

Summary

This chapter outlined the proposed use of qualitative interviews and case studies for thematic, narrative perspectives as applied to the research questions contained in this work. Data will be collected from faculty and students at a school of education. The researcher will audio-record interviews of 5-25 participants. The questions will be qualitative due to their open-ended

design to elicit a substantive narrative of the study. The chosen methodology may be sufficient to gather data that contribute to the body of knowledge regarding multi-touch books in colleges of education and ability to identify significant relationships in nonordinal data. The case analysis will proceed by studying and analyzing data from the transcribed interviews. The researcher selected this mindful inquiry for its ethical consideration, flexible and effective research design, and contribution to the body of knowledge on the topic. Responses from the qualitative interviews, thematic findings, and results from the combined narratives are described in Chapter IV.

CHAPTER IV

Results

Introduction

The primary purpose of this study is to appraise the instructional effectiveness of multi-touch textbooks in Schools of education. As part of the DiP, a product was developed alongside the study, a multi-touch iBook, *Educational Leadership and Policy*. Multi-touch books rely upon digital coding embedded in mobile computing devices to access interactive content whereby readers have an interactive experience with the book content. The purpose of multi-touch books with interactive content is to expose readers to selected areas of knowledge, concepts, facts, and analytic techniques that might otherwise be difficult to capture in a conventional textbook (Mills, 2016). This study applies the dissertation-in-practice iBook product, *Educational Leadership and Policy*, as an effort to appraise a modality that has moved from teacher-centered methodologies of the industrial age (Coates, 2007) to a contemporary student-focused methodology that incorporates technology in instruction (Adrian-Hollier, 2015).

This chapter describes the audio-recorded interview data that were collected and analyzed in order to investigate the research questions as situated in the literature and presented in the findings from case study analysis. The qualitative semi-structured questions are restated, followed by case study analysis of codes and themes derived from responses from two homogenous focus groups. The qualitative research appraises the effectiveness of multi-touch books, relative to conventional textbooks, in facilitating reader understanding of and interest in a subject. This appraisal relies principally upon semi-structured audio-recorded interviews of multi-touch textbook users, both students, and their instructors in a School of education. From

this, deeper data analyses are compiled to understand common themes among the two focus groups codes and themes as related to the research questions in Chapter I.

Summary of Analysis

Analysis of Population. The population in the research included graduate-level faculty and students at a college of education who voluntarily agreed to participate in a qualitative review of multi-touch books. Purposive sampling was conducted to secure participants from two homogenous populations: one comprising graduate-level faculty, and the other of students of the same faculty, at a college of education in the south-eastern United States convenient to the researcher. Purposive sampling enabled access to "participants and sources of data based on the anticipated richness and relevance to the study's research questions, including sources whose data were presumed to challenge and not just support the researcher's thinking" (Yin, 2016). The research study commenced in February 2020 with an email from a Dean of a College of education that served as a gateway to participants (Appendix A).

Once contact was made with potential study candidates, the researcher shared an opportunity to participate in audio-recorded focus groups to explore multi-touch books in higher education. Members who agreed to participate were presented with convenient schedule options. The researcher followed up with an email confirming the focus group logistics, including a calendar invite, as well as a digital version of the Informed Consent (Appendices A and B). Care was taken to ensure that focus group participants belonged to one of two homogenous groups in a sampled college of education in an institution of higher education. The resulting focus group participants were comprised of seven faculty and eighteen students from a college of education. All twenty-five participants were assigned pseudonyms for confidentiality while ensuring proper coding and categorizing of unique participant data. The researcher

randomly assigned letter and number combinations most relevant to the demographics of the study. Student were assigned with an initial letter 'S' and a random number (e.g. S1, S2, S3, etc.); similarly, faculty were assigned with an initial letter of 'F' and a random number (e.g. F1, F2, F3, etc.).

Audio-recorded focus groups were conducted over secure video conferencing with two homogenous samples of graduate-level students and faculty at a college of education. The audio-recorded focus groups lasted approximately 20 minutes. Two digital recorders were employed with embedded transcription service to ensure data integrity and prevent data loss from device malfunction.

Research questions. The qualitative research study was designed to appraise the effectiveness of multi-touch textbooks in Colleges of Education. The appraisal relied principally on thematic narratives derived from audio-recorded interviews of faculty and students, as well as the body of knowledge found in the literature. The audio-recorded interviews utilized particular response-seeking feedback of faculty and students to understand the primary research questions:

1. How useful does the multi-touch book, *Educational Leadership and Policy* , serve as an instructional resource for faculty at Schools of education?

2. In what ways do students share views of the efficacy of the multi-touch book, *Educational Leadership and Policy* ?

Additional considerations for the study included understanding assumptions that a multi-touch book, *Educational Leadership and Policy*, was an effective tool for schools of education and student success. It was also assumed that Schools of education Faculty and their students appraise multi-touch books differently where:

a. Faculty value multi-touch books as an opportunity to promote student achievement but find them restrained due to resources, competencies, and burdensome to classroom efficiency

b. Students of the faculty find multi-touch books, such as *Educational Leadership and Policy*, to be engaging and relevant tools in their learning and workforce-readiness

c. Both sampled student and instructor groups share a desire to improve student engagement and success

Data analysis. This next section describes the experience of carrying out the audio-recorded interviews as framed by the research questions for the two homogeneous focus groups. This method of data analysis involves broad data categorization, interpretation, and identification of patterns based on common or different themes where "the coding of qualitative data analysis assigns simple words or short phrases to capture the meaning of a larger portion of the original text" (Yin, 2016). The semi-structured questions posed in the research study are discussed, along with delimiting questions as posed to ensure reliability and validity of the sampled population. The section will then examine details of the data collected and will conclude with a summary analysis.

Qualitative semi-structured interview questions. The researcher created two separate lists of semi-structured questions for the faculty and student groups. The faculty audio-recorded interviews began with two delimiting questions to qualify the sample. The demographic questions used to delimit the scope of the study were:

1. Are you a Faculty at an institution of higher education?

2. Do you teach, taught or will teach in a school of education?

The remaining faculty questions were structured in such a way to elicit as much feedback as possible on the use of multi-touch books (Table 1). The semi-structured student questions were structured to elicit feedback on the multi-touch book, *Educational Leadership and Policy*, as recently used in graduate-level coursework (Table 1). The questions were also structured to understand how the use of the multi-touch book might influence student engagement and success. Table 1 displays the semi-structured questions asked for both focus groups.

Table 1.

Semi-Structured Questions	
Faculty	. Tell me about your experience using iBooks or other multi-touch books. . Give me a sense of using iBooks in class. . (If no experience) *Why might you not have experience with iBooks?* . Is there anything else you would like to share?
Students	. Tell me about your experience using the multi-touch book, or iBook, *Educational Leadership and Policy.* . In what ways might this iBook have influenced your engagement in class? . How has this iBook influenced your grade? . Is there anything else you would like to share?

Student focus group. The researcher opened the student focus group on a secure video conference with a personal introduction and statement of appreciation for member participation. The fifteen student participants were doctoral students in a college of education who had recently used the multi-touch book *Educational Leadership and Policy* in a class relating to the subject matter. The researcher affirmed receipt of the member's signed informed consent

(Appendix C), and verbally reviewed the elements of the document, including an overview of the study, details of procedures, study risks, benefits, participant confidentiality, institutional contact information, as well as the opportunity to exit the study at any time. The researcher explained that semi-structured questions would be asked to understand the group's collective feedback. The researcher noted the importance of allowing fellow participants to finish their statements and responses prior to responding so that all member voices could be adequately captured for the research study. The members concurred, and none withdrew once the digital recording commenced.

The researcher advised members that the focus group study would last for 15-20 minutes and would be audio-recorded for later transcription for case study analysis in order to compile a substantive narrative to evaluate codes and themes where thematic findings may add to the body of knowledge on multi-touch books in higher education. The researcher then initiated the recording devices with embedded transcription, along with personal notetaking, to ensure a complete and accurate capture of focus group feedback. It should be noted that pseudonyms for student participants were used to confidentially map participants with randomized letter and number combinations (e.g. S1, S2, S3, etc.).

Following the audio-recorded focus group, the researcher performed 'member check' to ensure that the qualitative research data acquired were accurate and trustworthy (Appendix D). The member check process included an email from the researcher to the participant expressing appreciation for participating, and a request to review the transcription for data collection integrity with any updates or changes. Members were given seven days to respond and advised that no responses to the member check email request affirmed accuracy of the transcribed data.

Faculty focus group. The researcher opened the individualized Faculty focus groups on a secure video conference with a personal introduction and statement of appreciation for member participation. The seven faculty participants were educators in a college of education in the Southeastern United States. The researcher affirmed receipt of each faculty member's signed informed consent (Appendix B), and verbally reviewed the elements of the document, including the overview of the study, details of procedures, study risks, benefits, participant confidentiality, institutional contact information, as well as the opportunity to exit the study at any time. The researcher explained that semi-structured questions would be posed to gather a collective faculty narrative appraising multi-touch books in higher education. The researcher advised the faculty focus group members that the audio-recorded interviews would last 15-20 minutes for later transcription in order to apply case study analysis on the faculty narrative to evaluate codes for thematic findings. The faculty members concurred, and none withdrew during the digital recording process.

The researcher initiated the recording devices with embedded transcription, as well as personal notetaking, to ensure complete and accurate capture of the audio-recorded interviews. It should be noted that pseudonyms for faculty participants were used to confidentially map randomized participants with a letter and number (e.g. F1, F2, F3, etc.)

Following the audio-recorded focus group, the researcher performed 'member check' to ensure that the qualitative research data acquired were accurate and trustworthy (Appendix D). The member check process included an email from the researcher to the participant expressing appreciation for participation, a request to review the transcription for data collection integrity and return the document with any updates or changes. Members were given seven days to

respond and advised that no responses to the member check email would affirm accuracy of the transcribed data.

Summary of Responses from Focus Groups

Student Focus Group Question 1: Tell me about your experience using the multi-touch book, or iBook, *Educational Leadership and Policy*.

Question 1 was posed following a review of the informed consent. At this point, the students appeared eager to hear and respond to the questions in the survey. The researcher field notes indicated, "attentive, smiling." The researcher also noted keywords, phrases, and interest-level. Table 2 illustrates the word frequency found in student question 1.

Most of the students shared favorable comments about the iBook and highlighted its differences from traditional textbooks. S1 contrasted the digital text against traditional text stating, "The material was a lot easier for me to read from my iPad. It's just easier to use and I can get through it a lot easier than other formats." S4 drew on comparative differences adding, "And it was a lot easier to access the information digitally versus going through an actual book." S2 provided another example, "In a traditional book, if you're looking for one little thing, it can take forever; however, with the iBook, you can look for something and find that part right away." S12 commented that, "I actually like to have the option which you clearly don't have with just paper text." S10 punctuated general difference between iBook text and traditional by applying it to practice and education, "I think universities have already made the transition to digital texts for undergraduate and master's programs and I can see how important it is for us in our doctoral program."

Along those lines, students also noted a lack of prior experience with iBooks and reported that they were "traditionalists." S4 launched this concept by adding, "I am sort of old

school." S7 agreed, and elaborated, "When I learned that the book was being sent through the iPad, I was a little skeptical at first as I am a traditional HP girl." S11 went on to clarify, "You can hear that this is part of our age group where we didn't grow up with this type of technology, but we may need to work with it in our jobs."

The focus group participants used various terms to express a lack of experience with multi-touch books and/or modern computing. The following terms and comments were captured as examples: "old school" (S4); "skeptical, traditionalist" (S7); "we didn't grow up with this" (S11); "more of an old school," "I like to old school highlight" (S17); "that was the only experience I've had" (S16); and "I'm on the old school side" (S18). And lastly, the term "experience or experienced" was used 21 times throughout the student response to question 1.

The students also expressed positive perceptions of the differences in the iBook's digital or technical utility, such as printing pages, search and find, digital highlighting, annotating, bookmarking, and screenshot. S9 noted, "I love it so much more and I have an ability to just grab my pen and iPad to make changes or take notes rather than in multiple places." S8 responded, "I came to learn how to add notes and stickies and bookmarks in the book." S17 added, "I find it positive to be able to screenshot the eBook and then I add it to a notepad or draft document. It's easy to find content and information later."

Several students juxtaposed the iBook's utility to a need for understanding the iBook format whether with training or tutorials. As shared earlier, some students shared a lack of experience using such technologies and elaborated that they had to 'figure them out'. Others, such as participants S8 and S9, more expressly conveyed a need for introductory materials that explain the features and functionality of multi-touch books. S8 initiated this conversation, noting, "if there were some sort of tutorial in advance of how to work with the electronic

material, I would have really appreciated that in advance of the class." S9 added that, "maybe if there was a tutorial video, whether at the start of the class or the program of how to use electronic books, that might help." Nodding, S12 commented,

They really should have put an introduction to this type of learning and access in the initial 501 class. It's viable, and its current, and it would've been helpful at the start of the program. After all, most of us are already teaching younger people who have these skills. For me and my students or anyone else teaching, we need to be current, engaging, and teach with visual tools, and so knowing how to do this now is great.

Student Focus Group Question 2: In what ways has this iBook influenced your engagement in class?

The student responses to question 2 were markedly different from those in question 1, where the conversation had centered on one's preference and the differences between traditional text and the iBook in terms of technical utility and functionality. Conversely, researcher field notes captured participant sentiment in question 2 where students "respond by comparing and contrasting learning with multitouch books; they contextualize interactive media and case studies in ways that improve learning with improved focus, retention, and deeper engagement in the material." Table 2 illustrates the word frequency found in question 2. Themes of 'difference' continued in question 2, however, the conversation moved away from technical utility to pedagogical benefits derived in teaching and learning. The researcher noted more of an individual and group willingness to respond to question 2. Three students began by speaking simultaneously, at which point, S1 encouraged S3 to lead off. S3 began the dialogue noting:

> The inclusion of multimedia does enhance the learning experience versus just a book and reading words on the paper or just looking at a simple illustration of being able

> to include an audio file or a video file that adds to the learning. The interactive media adds to your depth of learning.

S4 concurred by stating, "I agree, the video part made it really personal for me."

S1 responded in a way that included her personal engagement as well as of her students in practice:

> I do enjoy reading but the more I read for school, I begin to feel like my students, where I'm forced to do something, and I don't necessarily want to do it. But with the 703 iBook, there are so many more interesting pieces in the videos and audio, and it brought me back to focus so I can retain it better. I know we all work with different types of learners, so this brought it all together for me with enjoyable features compared to just reading an actual book. I can really take my work to the next level which is also enjoyable.

Most students contributed by responding with specific examples and benefits drawn from the use of embedded multimedia. S2 noted,

> I especially struggle with academic writing and can't remember what I read two paragraphs back. It can escape me. I found the audio and video elements to be powerful tools for me to focus and retain the material." S5 agreed, adding, "Yes, the audio and visual are very helpful, and I, in the same way, literally get through a sentence and I have to go back and reread it a few times. Like everyone else, the format was very beneficial for me.

S16 summarized the general sentiments shared across the group.

> Interactive, yes, it was the interactivity of the iBook. I think that was what I liked. And more, I like how it shared personal experiences, as well. There was also the

> engagement of the personal experience. Not only was I just reading someone's personal experience, but I was learning through their personal experiences, like their own emotions, their connections, and their enthusiasm. And I think those interactions was the piece that was important and helpful for me. It was like you were with them in the room.

S11 specified how embedded case studies and assessments contributed to her engagement.

> We were all assigned case studies. In class we talked about several leaders who we could access more deeply later in the iBook. The Professor gave us scenarios, and then the digital case studies in the iBook, which helped me to think about them contextually and how that could apply to me now or in the future. I found the contextual aspect of the leaders and case studies to be very helpful in modern days.

S12 added how this was his preferred mode of learning. He stated

> Yes, it's a modern view of the Socratic method of teaching and learning. The dialogue and content are richer. It's a combination of learning from one another, and then learning even more from those who we are studying with by using modern technology. I find it very valuable as it combines the old with the new.

Student Focus Group Question 3: How has this iBook, *Educational Leadership and Policy,* influenced your grade?

The researcher field notes captured a reluctance among the students to respond to this question about relationships to their grade. The investigator noted a "hesitancy to respond" and "heads down," as well as an entry noting, "less participation." The researcher captured this essence of group sentiment with retracted body language and eye avoidance once the question was posed. The field notes did, however, cite how responses correlated general performance,

rather than a class grade, to the role the iBook played in teaching and learning. Table 2 illustrates the word frequency found in question 3.

S6 injected humor to the quiet conversation, noting the lack of participant response. As the group laughed, S6 responded. “I feel good about it. Being able to quickly access a topic was great. You can scroll and easily find info quickly.” S16 continued,

> I agree, and I’d like to explore other iBooks and their functionality further, like notetaking. This was my first.” S1 added, “The iBook has a great feature where you can take notes while you're reading. I played around with features which was nice. Highlighting for me is the best thing ever. It is right there. And for me, when you’re talking about an actual physical book, if you don't have the little tabbies, it's very hard to go back and find something versus this digital book where I can highlight and add my notes with keywords. And with the digital keywords, I can look those up later or for specific parts of the content. So, when I look up that word, it pulls all the different things associated with my keyword or highlights, which is great for me and it takes all that extra time out. Because when I get a book, I’ll read it, and all my tabbies sit there, like I did when I was in undergrad, and never look at again. But with the iBook keywords and highlights, I’ll actually use them and the book again and again.

S17 shared,

> For me, if I have my laptop and having the iBook in class, it's easier for me to open up another tab, and do something that was a one off. Regardless if I have to go back later, I take notes and I’m efficient, but not sure about the influence on my grade.

S1 reengaged in the dialogue:

> An electronic version of the material is for lack of better words, a blessing for me. Most people won't admit this, but when I go to find a book and I can't, or I get to class and didn't read a section, I can pull it up on my iPad. It allows immediate access and for me once I have immediate access it eliminates something in me where I come up with an excuse of why I can't or won't do something. It's also cheaper even if you're renting it or buying an iBook than getting the actual book so I feel like it makes it easier for the working person or the person with a busy life, whatever the case may be, to just get a hold of the material and then to start which eliminates barriers instantly which I do appreciate.

Nodding while S1 was speaking, S16 added:

> Well, a lot of times I read the parts of the text that I was required to read. I might not read the text in its entirety. And this type of book encouraged me to continue reading because it's engaging. And because it is more innovative and more involved, and it had different aspects of a textbook, it encouraged me to continue reading sections of the text that I'm not have been required to read, which could encourage me to gain more knowledge which would increase my grade.

Student Focus Group Question 4: Is there anything else you would like to share about your experience working with the multi-touch book, Educational Leadership and Policy?

The researcher field notes included the group's general appeal to answer the question. As with Question 2, Question 4 responses began with multiple students speaking at the same time. The investigator noted two student participant hands being raised in order to respond. Other comments captured in field notes included, "other feature benefits: dictation, mobile, accessible, mentoring, a guide, career progression, create iBook." The group took this

question as an opportunity to share feedback beyond what had already been mentioned, as well as opportunity to speak more to the relevance the iBook had in personal and professional development. Table XX illustrates the word frequency found in Question 4.

S6 began the conversation by exploring other relevant benefits derived from the use of the iBook. “I really like having the dictation option so that I can listen to the book on my way to work. It makes it that much more accessible. I get a lot more done.” S8 and S9 continued to speak to relevance of the modality with S8 commenting, “There was another really unique part of the book in the case studies, I liked highlighting and copying and pasting. And when I copied and pasted into my notes or a Word document, it footnoted where it came from automatically. All of the sourcing and research capabilities were pretty great.” Nodding, S9 added, “I also liked the option to create study cards.”

The dialogue shifted to other areas of iBook relevance, including student learning, mentoring, and professional development. S4 stated,

> I think that the book can be used amongst peers, and when you are mentoring people. And it could be used as a guide, like a how-to guide, and it gives great insights where you can use it over and over again. It could be used later as a tool for mentoring.” S3 elaborated on these comments. “I was going to say the same thing, when we are all in certain levels of leadership or admin, as leaders or mentors, or with our responsibilities on our campus, you have to explain why things can't be done or could be done in a certain way. ‘Educational Leadership and Policy’ gives us easy access to current factual data that people need in order to see or help get others on board. I don’t want to use the word ‘comply’, but it might help others understand why or how things were or are done. In other words, having this iBook with digital access gives us easier

> access for immediate reference or coaching. So, instead of running to find my traditional book that I have at home and will have to bring back to campus for a talk the next day, the iBook gives you that instant and immediate access to relevant content in educational leadership.

S1, S2, and S16 continued this theme of relevance as it related to practice and professional development. S1 commented,

> For me, it made me realize that if I wanted to teach to a larger audience, especially with so many different types of learners and trying to maintain people's interest that, similar to the book, it would be beneficial to give the information using a variety of methods all in in one presentation. So, not just talking not just getting them a piece of paper but trying to tie everything together. Sharing a little audio clip or little video clip during professional development, like throughout the book, showed me a way to be more impactful than just saying, 'here is a document, let's review.' It has deeper connections between the message and its audience, and I realize I can also connect in different more meaningful ways. It's become professional development for me by looking for deeper ways to get my message across that deeply impact diverse audiences while keeping in mind the diversity of my audience at the same time.

S2 responded, noting "I agree with what she said and basically summarizing it accommodates all the different kinds of learners that you would have in Professional Development." S16 provided additional clarity by sharing new opportunities for iBooks in practice:

> Well as an educator, I do a large nonfiction unit with my third graders, and we use a Google-based program, and a lot of Google Slides, and the kids are developing

their own nonfiction books, integrating videos and pictures from web-based programs. But I think this would be a really neat way for the kids to create their own books. And they're very capable of doing it because they do it on their own from Google Slides and so I think they enjoy making their own informational texts, and I think this would be a great way for them to share information, and they would take more ownership of it. And so, I like the idea of integrating this in an age appropriate way for elementary students.

S3 and S5 transitioned the theme of relevance to a combine practice with educating educator role. S3 stated,

> We want to use these different modalities to reach not only our students but also our staff. Not everyone is in a doctoral or master's program and by using these digital tools or platforms in settings whether K-8, middle school or colleges, we become aware of their path, learning, and modalities in teaching and learning that might better meet their needs." S5 responded, "At the same time, we're currently experiencing challenges to be present with one another, and it is making it even more relevant in learning. And so, having that accessibility and opportunity to provide that development with our colleagues and especially in this new remote capacity that we are expected to teach in is really important and supports our knowledge and use of current platforms and modalities to support remote learning.

S4 concluded the student feedback for question 4, stating:

> I think that the iBook and its content are multifaceted and layered in ways to support a variety of perspectives, whether in a school, in a research setting, or even a corporate environment. This iBook can be used across functional areas. For me, 'Educational Leadership and Policy, made our learning the material easier. The authors

> did a remarkable job and I think it's a resource that is going to be paramount to learning experiences for individuals in our doctoral program, amongst other programs at the university.

The researcher thanked the students for participating in the focus group, reiterated elements in the informed consent, and offered an opportunity to review the transcripts that would be emailed as a 'member check.' The audio recording devices were disabled, and the study concluded.

Faculty Focus Group Question 1: Tell me about your experience using an iBook or other multi-touch book.

F1 noted familiarity with multi-touch books as used in the classroom. The researcher captured a sense of hesitancy as F1 began to respond that she didn't feel multi-touch books were fully accessible to students, noting that "digital books are limited by device-type and contingent on the publisher. When made available by the publisher, I use them. This poses problems, though, when students don't have the same kind of device to access the digital content." Still, F1 found multi-touch books to be valuable learning tools in the classroom and beyond, stating,

> I appreciate their functionality, especially the interactive qualities. The books become more than that, they become tools, and I love to see how students light up with the material, such as with videos or performing group work. Also, students learn differently. Multi-touch books are a powerful way to get information across to all learners. I particularly like the flexibility of a tool with accessible content, malleable to the learner style, and facilitates the learning. An iBook, for instance, helps them learn and apply the material, and will continue to have access to material in the future which

> helps embed learnings in their memory. I think these are great tools for our toolkit as educators.

Conversely, F2 conveyed gaps in using multi-touch books where there is a lack of training. F2 expanded on F1's benefits by expressing training needs and support of the modality in changing environments, stating,

> It's expanding. I'm coming to see the utility of it in several ways. One is expanding the range of the information available to the reader, more than you can capture in the written word alone. Additionally, I'm seeing the benefits of multi-touch formats for its currency of the document and keeping the content up to date. And three, it enables expanding the boundaries of the topic with which you are dealing. I realize that its more than capturing reading and writing alone. The topic within multi-touch books have the ability to remain current.

F4 also shared having some experience with and a desire 'to do more.' Whereas, F3 had no experience using iBooks. As with F1, F2, and F4, F3 expressed an interest in training on how to use this modality, as well as understand the benefits of its use.

F3 took the notion of iBook professional development further by expressing interest in authoring multi-touch books for use in the classroom, saying, "I keep thinking that I'm going to learn more about iBooks and possibly how to write one for class. I can list all of the requirements for writing a book, and then I wonder how I go about incorporating those into an iBook."

F5 responded to question 1 noting a preference to teach with digital and multi-touch media as they offered greater accessibility with interactive engagement:

> I often use iBooks, mostly because they are accessible. You can pull it up on your laptop, move around in a remote work situation, and you've got the ability to pull it up on your device, your phone device, or iPad. You can carry it in your purse or your pocket; or it can be on your person and be accessed in between meetings or while waiting for something. That's the efficiency part. It's a combination of access and efficiency where you can just pull it up anytime you've got a few minutes.

F5 transitioned to concepts of updating and distribute content, noting,

> It's easier to share information or an entire document. And when I say document, that could be little manuals, booklets, or handbooks, or even an entire notebook. And with the iBook, it becomes a resource you share with students or colleagues collaboratively and quickly. As opposed to the olden days, which I'm a product of, where I would have to find the book, relevant pieces, or sections, and then copy it and later distribute. It's so much easier to share information. And for my class, it's all accessible online. I don't recall anyone in my classes, except for me personally, bringing hard copies of a book into class. I also know that students are reading it, or they've reviewed a section before or in class. I don't see anyone marching around with hard copies under their arms anymore.

F6 self-identified as very proficient and well-versed in the use of multi-touch books across the educational landscape. F6 shared how she employs the modality in K12 and higher education settings as both a consumer and creator of iBooks. F6 provided a robust narrative that focused primarily on the relevance of the multi-touch modality in terms of student benefits derived from interactivity. F6 provided an in-depth narrative of her journey from working with legacy text, to digital text, then to multi-touch books as both consumer and present-day author:

I have many years of experience. I've been a curriculum specialist, primary teacher educator, and elementary educator. And when I stopped and looked at the textbooks, I realized that real-world examples were not included in them. I thought that it was kind of old school, and it didn't really relate to the issues that we're facing. I get compliments about my stories in class, and those made sense to the students. The first iBook I wrote was simply because the textbook was 12 years old and there was nothing else on the market for classroom management, it was management in the classroom that was more than discipline. Most people think it's just discipline in it. Now, it's so much more than that it's scheduling its child study teams and school-based teams its professional learning meetings, it's so much more than the one I wrote the textbook, this my students. Each chapter is introduced by a teacher, His name is [Omitted], and there's little scenario that introduces every single chapter to get them engaged and get them thinking about, oh gosh what does that look like sound like feel like for me. It made a tremendous difference. I'm a true advocate of multi-touch textbook; and for the paper textbooks that we use in our classrooms, they really are not a great benefit for our students. I think that when we use technology for them, it's how they learn. It's where they learn best; and they'd rather just click on something to get instant access than just flip to the back of the book to see the glossary, or flip to the front of the book for the table of contents. No, with the iBooks, they just click on something and bam, it opens right up for them. I think we need to be more cognizant of the needs of our students that are in our classrooms, nowadays, and the old-fashioned textbooks.

The first iBook I wrote made a world of difference. In the past I would use eTexts that had a little blurb with a link to click on. Click here and it linked to a video clip of a

> teacher doing XYZ, or the student doing ABC, that kind of thing. And they were effective but not as effective as the multi-touch textbooks. When we did the multi-touch textbook, I could easily say to them, 'Okay, we're talking about Florida code of ethics, for example, and click on that inside of a particular chapter in the iBook', and bam up came the code of ethics. There was no searching for a book, an article, or a device. I really am an advocate now. I'm actually writing more iBooks for my other courses that I teach, because there's so much of a difference in today's world.

The researcher asked F6 to elaborate on the specific student example provided. F6 responded,

> With each chapter there were student learning objectives that were associated to the course itself. So, when I asked them to look at FEAP, which is the Florida Educator Accomplished Practices, they clicked on FEAP, the appropriate topic, in a particular chapter, and asked them to explain it to me. It made sense to them and what we would be studying. FEAP, in that example, became the learning environment. They had freedom and ease of access, to keep the students more engaged. When they can click on something in an iBook, and it goes to it instantly, its more relevant and has more meaning to them, and I don't lose their attention. We have to keep their attention, and they'd rather be texting on their phone. Now, if I say, click on the bolded words within this paragraph, and ask them 'what do you get,' right away someone is able to tell me, 'oh that is blah, blah, blah,' because the definition pops right up.

F7 was the only faculty who had no experience or immediate interest in deploying multi-touch books in her course. F7 responded to question 1 stating,

That's kind of like a loaded question. I would say that I'm not like an expert on eBooks by any means. I'm familiar with them. But I wouldn't say I'm an expert. This comes from or relates to the particular class that I teach [omitted], where I like to use a lot of articles. That is really the main thing, where keeping up with the different articles from Leadership magazines, education, newspapers, any kind of peer-reviewed journal, is costly. I can hand those out for discussion. Some of these require subscriptions but could be done digitally. As with your degree, it's costly. I don't want to have people have this or that subscription 'also.' And my hope would be, of course, is that somebody who said they really like a periodical, or reference material, or other peer-reviewed journal, they can then purchase it or buy their own subscription later on.

Faculty Focus Group Question 2: Is there anything else you would like to share?

F3 shared that she 'gets somewhat stuck,' and "I wouldn't want to do it wrong, per se. I'm not technical and wouldn't know where to start. I'm curious what all it entails. Don't get me wrong, I'm interested but I don't know where to start." F4 added to her earlier account,

I find them to be sorely lacking in instruction. The iBooks I've used have more capabilities than just a regular PDF. You can't do much with a PDF other than what's written on the document or paper. Regular texts, textbooks and PDFs are not interactive, and they lack capabilities I could use with my students in the classroom. My students already use devices and interactive media before they come into my class. What I like most about multitouch iBooks is their interactive functionality and ability to do more with the content, that's engaging, and gives more students more access with richer material. I'm not sure why we don't use them more.

F5 extended earlier commentary to include details of relevance to practice, noting,

> I have long history of practice. I've been in practice for 40 years as an [omitted]. I went to [omitted] school, a long time ago, and it was all books, books, hardcopy books, which were heavy and expensive. I really think there is an incredible opportunity to have multi-touch books available for the points I identified, accessibility and portability, being able to share the information. And it has been a transition because those of us that worked with traditional books really got attached, sort of sentimentally, and it was really a challenge to convert functionally and emotionally. But once that happened, and especially for business and educational purposes, there's absolutely no match for having these and the ability to produce them. This is a great opportunity to share the knowledge in a very easy and economical way.

F6 provided insights in the final question that opens the research up to further inquiry. F6 articulated the different types of text and digital media as well as a review of respective benefits. Of the sampled faculty, F6 presented a deep perspective of multi-touch books in higher education. Her final narrative went beyond the scope of this study to include emergent patterns for further research.

> I think multi-touch books are more relevant for our students than eBooks. I still have a couple of textbooks that are now eBooks that my students now access, and the downfall with just using an eBook is, I can't tell whether they're truly engaged with me, or if they are on the internet shopping, or talking to a friend, or something else. I see that they have an iPad open in front of them, and I'll ask, 'where's your textbook' and they'll say, 'I got it, it's online, it's the eBook.' And I'll say, 'that's great.' But with the eBook, I can't see what they are doing or where they are. Whereas if I use the multi-touch book, right away I can see whether someone's clicking on the right page, clicking on the right

word, and so on. So, I think that's important to note, too, because people are just going to eBooks. Either way, there are benefits like saving some money. They won't spend as much money for an eBook than a traditional textbook. And then what do they do with the textbook once the course is over? With that, I think it's more important for students to have a multi-touch book.

Cross Focus Group Analysis

Identification of patterns. Several different codes emerged within and across the focus group responses to the semi-structured questions. Tables 2, 3 and 4 illustrate these codes by word frequency and categorized words by question. Table 2 illustrates high frequency words uncovered found in the student responses to the focus group questions. These are derived from units of data found in the student verbatims by each question.

Table 2.

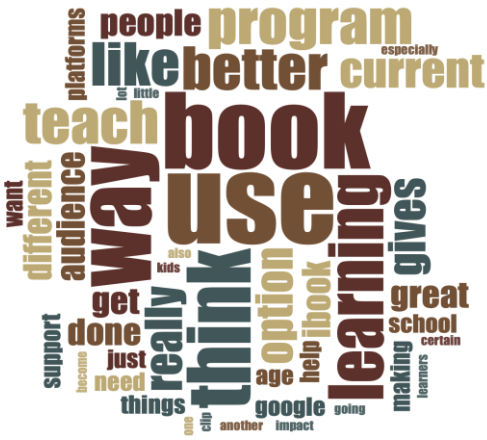
Student Focus Group Word Frequency by Question

Student Focus Group Word Frequency – Question 1

Student Focus Group Word Frequency – Question 2

Student Focus Group Word Frequency – Question 3

Student Focus Group Word Frequency – Question 4



Tables 2 below illustrates high frequency words uncovered in the student and faculty responses to all focus group questions. These are derived from units of data found in the verbatims by each question.

Table 3.

Student and Faculty Focus Group Word Frequency – All Questions

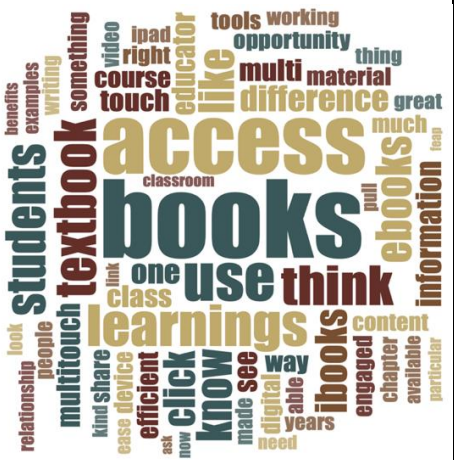
Student Focus Group Word Frequency – All Questions	*Faculty Focus Group Word Frequency – All Questions*
	

Table 4 illustrates how the codes are categorized into patterns by focus group and question.

Table 4.

Cross Focus Group Analysis

Focus Group Questions	Faculty Focus Group	Student Focus Group
Tell me about your experience using multi-touch books.	Access, books, ability, opportunity, learnings, difference, students, textbooks, educator, efficient, engaged, benefits, relationships, digital,	Like, using, difference, technical utility, learning, digital, access, tutorial, training, experience, traditionalist, interactive, experienced, highlight, note-

	functionality, tech, interactive, content	taking, visual, functionality, technical, books, multimedia
In what ways might multi-touch books influence student engagement?	Not Applicable	Engagement, learning, digital, access, difference, interactive, enhance, engagement, functionality, multimedia, videos, learning, personal, modalities, case studies
How might multi-touch books influence your grade?	Not Applicable	Encouraged, learning, parts, interactive, Socratic, teaching and learning, engagement, functionality, technical, embedded, multimedia, videos, personal, modalities
Is there anything else you would like to share?	Access, books, ability, interactive, engaged, difference, eTexts, technical, challenge, opportunity, students, starting, update, ease-of-use, eBooks, educator, inexpensive,	Relevant, learning, teach, practice, use interactive, teaching and learning, practice, education, engagement, functionality, technical, multimedia, videos, personal, modalities

	engaged, benefits, relationships, digital, functionality, tech, interactive	

Themes

During the thematic analysis of the summary of responses from the semi-structured questions, the researcher explored coding units for analysis where themes emerged from single words, phrases, or sentences of the transcribed. From this, the researcher developed common or differing themes as revealed in expressions of ideas (Minichiello et al, 1990). Thematic clusters were identified and noted in Table 5.

Five major themes were identified from the Student Focus Group while four were identified from the Faculty Focus Group. Major themes emerged from the analysis of focus groups conducted where both teachers and graduate students supported the effectiveness and value of multi-touch textbooks in higher education. The key themes were *differences from traditional text, ease-of-use, need for tutorial, multimedia engagement,* and *relevance* for students and, for instructors, *technical challenges, difficulty starting*, *ease-of-updating,* and *interactive engagement.*

Table 5.

Major Themes and Sub-Themes Identified

Major Themes and Sub-Themes of Multi-touch Books by Focus Group	
Students Findings	1. Differences from traditional text a. Highlighting b. Note-taking 2. Ease-of-use 3. Need for training / tutorial 4. Multimedia Engagement 5. Relevance
Faculty Findings	6. Technical Challenges 7. Difficulty Starting 8. User Engagement a. Ease-of-use, update b. Interactive Engagement

Major Student Theme 1: Differences from Traditional Text

Differences from traditional text. One of the key ideas highlighted by the students was that the iBooks significantly differed from traditional texts. Most students did not have prior experience utilizing iBooks and reported that they had tended to be traditionalists. However, these students expressed positive perceptions of the iBook once they realized that, if desired, they could still utilize it like a traditional text, such as printing pages for manual highlighting. On the other hand, at least one student directly expressed that the format's difference from traditional text made it easier for them to engage with.

Major Theme 2: Ease-of-Use

Ease-of-use. The theme of ease-of-use emerged in several students' responses. One student noted the utility of its portability, which made it easier to access the text when and where desired. Other participants expressed that the iBook format made it easier to access certain parts of the content, such as searching for specific topics or following up on concepts that were addressed at greater length in a later section.

Major Theme 3: Need for Tutorial

Need for tutorial. In contrast to the ease-of-use advantages, participants also expressed a lack of a strong introduction to the iBook format. Several students noted that they had not previously used such technologies and essentially had to 'figure them out'. Although they found the iBook easy to use once they understood it, multiple participants expressed that they wished they had been specifically provided with more introductory material to explain the features and usage if the iBook.

Major Theme 4: Multimedia Engagement

Multimedia engagement. Several students highlighted the value added by the audio and video components of the iBook. This included non-specific praise of these features as well as more targeted appreciation, such as the ability to more deeply engage with the leaders being studied in leadership studies. These were noted by some students to generally boost engagement as well, such as by decreasing the monotony of reading the assigned text. Multimedia content was also noted as helping to cater to different learning styles, a key part of modern education.

Major Theme 5: Relevance

Relevance for Students. The final student theme was relevance. Students felt that learning from an iBook helped them engage with relevant changes in educational technology.

One participant noted that learning to use an iBook helped to address frustrations in terms of sometimes being less technologically adept than their own students. The participants felt that the iBook was a relevant educational modality, noting that many undergraduate courses had already shifted over to its utilization.

Major Theme 6: Technical Challenges

Technical challenges. The theme of technical challenges emerged in the faculty focus group. Different teachers highlighted different technical challenges in using iBooks. One noted that not all students use the same type of devices, and that this could create technical hurdles to using multi-touch books. Another highlighted that the technical knowledge for writing an iBook is different than that for writing a textbook, creating difficulty producing new materials.

Major Theme 7: Difficulty Starting

Difficulty starting. As with students, instructors highlighted challenges with first starting to use multi-touch books. One instructor specifically noted a lack of any experience with or knowledge of multi-touch books as a barrier to their use. Another echoed student concerns in feeling that the utilization of multi-touch books as an educational tool requires a greater degree of introduction than is currently present in their school.

Major Theme 8: Engagement

Subtheme: Ease-of-use. Several instructor responses mentioned that the ease of updating multi-touch books is an advantage. Whereas physical texts often go out-of-date and require new versions, updating multi-touch books is a significantly simpler process, as opposed to updating the version of a physical text, for both instructors and students. One instructor also noted that the context on key topics can be expanded in real time, keeping the material current and relevant to fast-changing social circumstances.

Subtheme: Interactive engagement. The final instructor theme was interactive engagement. The instructors, like the students, noted that the multi-touch books offer a different and more expansive experience of educational engagement, including the inclusion of multimedia content. Such interactivity allows multi-touch books to better serve students with a wider array of learning styles and content delivery preferences.

Summary

The results of the analysis are summarized as follows. The purpose of the qualitative case study was to appraise the instructional effectiveness of multi-touch textbooks in schools of education. Broadly speaking, the themes that emerged from the analysis of focus groups conducted with both teachers and graduate students supported the effectiveness and value of the multi-touch textbook that was investigated. The key themes were *differences from traditional text, ease-of-use, need for tutorial, video and audio engagement,* and *relevance* for students and, for instructors, *technical challenges, difficulty starting*, *ease-of-updating*, and *interactive engagement.* Student themes skewed more positive than did instructor themes. Students and faculty were united in their desire for better introductory and tutorial content for the utilization of multi-touch books. The analysis found that the sampled students and faculty groups lacked prior knowledge of multi-touch technology and digital skills experience. Both groups expressed benefits of multi-touch books in education as the inclusion of multimedia content allowed for easier engagement with the subject matter. Further, there were specific aspects of multi-touch book deployment where faculty and student focus groups expressed needs for improvement, including introductory trainings and tutorial. Apart from these needs, both student and faculty focus groups conveyed an interest in innovative forms of textbooks which broadly seemed to

provide advantages and capabilities that even appealed to students who preferred traditional texts. Further exploration of the findings with recommendations are presented in Chapter V.

CHAPTER V

Discussions, Conclusions, and Recommendations

Introduction

To recall, the problem that the present study was intended to address is that of a disconnect between the technological inclination of college students and the extent to which instructors integrate digital media into their teaching at the college level. Therefore, the purpose of this qualitative case study was to appraise the instructional effectiveness of multi-touch textbooks in schools of educations. “Multi-touch books” rely upon digital coding embedded in mobile computing devices to access interactive content whereby readers have an interactive experience with the book content. The present study addressed two key qualitative research questions, namely: (a) How useful does the multi-touch book, *Educational Leadership and Policy* , serve as an instructional resource for faculty at Schools of education and (b) In what ways do students share views of the efficacy of the multi-touch book *Educational Leadership and Policy* ?

The study was conducted at a single study site, with a population which comprised graduate-level faculty and students at a College of education. The name of the specific institution of higher education under study is omitted for the purposes of protecting the participants. Data for the study were collected through audio-recorded interviews of focus groups that included students and faculty. These two key participant groups comprised two separate focus group sessions. The first focus group consisted of students and involved 18 graduate-level student participants. The second focus group consisted of faculty and included seven graduate-level faculty members. The focus groups with participants were recorded, transcribed, and analyzed

using a qualitative thematic analysis process. The results of the analysis are summarized as follows.

Summary of Results

Key results of the study are divided between student findings and faculty findings. These are further divided into the following themes: *differences from traditional text, ease-of-use, need for tutorial*, *multimedia engagement*, and *relevance* for students and, for instructors, *technical challenges*, *difficulty starting*, and *engagement.*

Differences from traditional text. One of the key ideas highlighted by the students was that the iBooks significantly differed from traditional texts. Most students did not have prior experience utilizing iBooks and reported that they had tended to be traditionalists. However, these students expressed positive perceptions of the iBook once they realized that, if desired, they could still utilize it like a traditional text, such as printing pages for manual highlighting. On the other hand, at least one student directly expressed that the format's difference from traditional text made it easier for them to engage with.

Ease-of-use. The theme of ease-of-use emerged in several students' responses. One student noted the utility of its portability, which made it easier to access the text when and where desired. Other participants expressed that the iBook format made it easier to access certain parts of the content, such as searching for specific topics or following up on concepts that were addressed at greater length in a later section.

Need for tutorial. In contrast to the ease-of-use advantages, participants also expressed a lack of strong introduction to the iBook format. Several students noted that they had not previously used such technologies and essentially had to figure them out. Although they found the iBook ease to use once they understood it, multiple participants expressed that they wished

they had been specifically provided with more introductory material to explain the features and usage if the iBook.

Multimedia engagement. Several students highlighted the value added by the audio and video components of the iBook. This included non-specific praise of these features as well as more targeted appreciation, such as being able to engage with the leaders being studied in leadership studies more deeply. These were noted by some students to generally boost engagement as well, such as by decreasing the monotony of reading the assigned text. Multimedia content was also noted as helping to cater to different learning styles, a key part of modern education.

Relevance. The final student theme was relevance. Students felt that learning from an iBook helped them engage with relevant changes in educational technology. One participant noted that learning to use an iBook helped to address frustrations in terms of sometimes being less technologically adept than their own students. The participants felt that the iBook was a relevant educational modality, noting that many undergraduate courses had already shifted over to its utilization.

Technical challenges. The theme of technical challenges emerged in the faculty focus group. Different teachers highlighted different technical challenges in using iBooks. One noted that not all students use the same type of devices and that this could create technical hurdles to using multi-touch books. Another highlighted that the technical knowledge for writing an iBook is different than that for writing a textbook, creating difficulty producing new materials.

Difficulty starting. As with students, instructors highlighted challenges with learning to use multi-touch books. One instructor specifically noted a lack of any experience with or knowledge of multi-touch books as a barrier to their use. Another echoed student concerns in

feeling that the utilization of multi-touch books as an educational tool requires a greater degree of introduction than is currently present in their school.

User Engagement: Ease-of-use. Several instructor responses mentioned that the ease of updating multi-touch books is an advantage. Whereas physical texts often go out-of-date and require new versions, updating multi-touch books is a significantly simpler process as opposed to updating the version of a physical text, for both instructors and students. One instructor also noted that the context on key topics can be expanded in real-time, keeping the material current and relevant to fast-changing social circumstances.

User Engagement: interactive. The final instructor theme was interactive engagement. The instructors, like the students, noted that the multi-touch books offer a different and more expansive experience of educational engagement, including the inclusion of multimedia content. Such interactivity allows multi-touch books to better serve students with a wider array of learning styles and content delivery preferences.

Discussion of Results

Each of the themes in the analysis was arrived at in the attempt to answer two key research questions, namely:

(a) How useful does the multi-touch book, *Educational Leadership and Policy* , serve as an instructional resource for faculty at Schools of education?

(b) In what ways do students share views of the efficacy of the multi-touch book *Educational Leadership and Policy*?

In addressing these research questions, the population under study ultimately expanded to include instructors as well as students. The nine themes that emerged in addressing these research questions must be understood within the context of the literature. Hence, in this section, each

theme is related back to the key ideas in the literature review and the study's theoretical underpinnings of the learning theories of Connectivism (e.g. Siemens, 2004) and the Connectivist Learning Model (see Figures 1 & 2), Systems Theory (e.g. Bateson, 1972; Khan et al., 2018; Manturana, 1991), and Postmodernism in the Information Age (e.g. Senge, 2006).

Connectivism and the Connectivist Learning Model. According to primary Connectivist theorist, Stephen Downes (2008), knowledge is distributed across 'connections' and is created when information is sent from one connection, or 'entity', to another. Learning, therefore, becomes the capacity to construct these connections and/or the capacity to traverse them (Downes, 2008). Similarly, knowledge is not acquired nor is it a specific 'thing'; rather, it is the growth and/or development of connections that elicit a change within the entity or entities (Downes, 2008). For Connectivists, anything that has the ability to connect can be thought of as a learning 'thing' or a 'node' (Downes, 2008; Perrin, 2005; Siemens, 2004; Siemens & Downs, 2009). For example, a person's mind would be considered a *learning node*, as might a computer or society (Downes, 2008; Perrin, 2005; Siemens, 2004). Connectivists find evidence of this in a society's, individual's, and computer's ability to 'learn'. As demonstrated in the table below connectivism is a key theory associated with learning domains (Siemens, 2005; Wilson, 1997).

As such, connectivism frames the present study to understand the specific learning domains of acquisition and accretion through the use of multi-touch books in higher education institutions. Better said, connectivism supports the use of multi-touch books as a modern and effective way to contribute to student learning domains of acquisition and accretion, which account for 20% and 70%, respectively, of learning over a lifetime (Siemens, 2005; Wilson, 1997).

George Siemens (2004, 2009) asserts that modern technologies have been change agents for the ‘democratization of knowledge’ (Siemens & Downes, 2009). Therefore, multi-touch textbooks, as a modern technology, are included within the scope of the ‘democratization of knowledge’ described by Siemens (2009). It is important to note that Connectivists do not limit learning to formal settings, rather they subscribe to the idea of lifelong, informal learning. People learn "through communities of practice, personal networks, and through completion of work-related tasks" in an environment in which "know-how and know-what is being supplemented with know-where – or the understanding of where to find knowledge needed" (Downes, 2008; Perrin, 2005; Siemens, 2004). Thus, Connectivists view making connections, not content, as the beginning point for the learning process itself (Downes, 2008; Perrin, 2005; Siemens, 2004). Based on this understanding of connectivism, in this dissertation-in-practice (DiP), learning through the use of multi-touch books must be understood in the consideration of how they facilitate the learning process by allowing the student to make connections.

Multi-touch books and iBooks. Just as connectivism in the post-modern information age correlates human learning to technological development, so too, human development correlates student expectations of modern learning tools in education. The literature confirms that increasingly more integrated learning technologies are in the modern classroom (Greene, 2018; Sanches, 2016). Sun & Wu further correlated how different teaching methods impact learning achievement (2016). For this reason, new technologies affect learning achievement. As related to this study, educational leaders are interested in the impact of multi-touch books on learning achievement and outcomes. Multi-touch interfaces have been found to be beneficial because they allow for direct and simultaneous input by learners and allow for hands-on learning experiences (Schmitt & Weinberger, 2018). Multi-touch technologies, such as Apple Books, are found to be

both enjoyable by the learner and effective collaborative learning tools (Schmitt & Weinberger, 2018). Convenience has also been identified as a key benefit of eBooks (Casselden & Pears, 2019; Enis, 2018). Users of the multi-touch platform reported significantly more interactive and engaging experiences with their content than the other eText users. Other studies have that students overwhelmingly prefer a free, customized open-access text for use in their course, no matter what eText format is used (Grush, 2019).

Differences from traditional text. With respect to the differences between multi-touch books and traditional text, most of the findings of this study mesh with the advantages of multi-touch books discussed in the literature. One point that the findings did not address was Schmitt and Weinberger's (2018) assertion that multi-touch books foster increased levels of cooperation and collaboration between students. Another theme that appeared in the literature was that different teaching strategies impact the effective use of multi-touch books (Sun & Wu, 2016). Since the present study did not draw students from the context of many different classrooms, the extent to which the students may or may not have substantiated this theme is unclear. One key idea that appeared in this study but was not present in the present study was that the students appreciated the fact that the multi-touch book format ultimately allowed them to treat it as a technological resource or, by contrast, the possibility of printing the text and hand highlighting for those given to more traditional approaches to reading and studying. Not initially being aware of this ability represented a barrier to engagement with the text at first for those who preferred traditional text.

Ease-of-use. The central ideas in the ease-of-use theme align with the literature. In particular, prior researchers have highlighted that students appreciate and value how multi-touch books allow them to scroll and search the text (Akpokodje & Ukwuoma, 2016). These ideas were

central to the ease-of-use theme in this study. Furthermore, in this study, students reported liking the portability and accessibility of multi-touch books. This aligns with results in the literature, wherein scholars (e.g., Pierard et al., 2019) identified the affordance of portability and accessibility as key to students' use of multi-touch books. Conversely, Pierard et al. (2019) found that many students took issue with the navigation of multi-touch books and that printing content was difficult. By contrast, in this study, students did not indicate any meaningful frustrations with the interface or navigation of the iBook. Moreover, although students did indicate they did not initially realize they could print, they reported the ability to print the text as an ease-of-use advantage. Some studies have indicated that students may be more likely to revisit content in print text (Mizrachi, 2016), but this study did not find such a result. Instead, students reported being more likely to look back or ahead at other content relevant to the content under study because of the ease of navigation. Further, at least one student reported the ease of searching as making it easier to return to specific pieces of content as needed.

Need for tutorial. The need for tutorial theme in this study was somewhat distinct from the literature. In terms of the factors influencing the adoption of multi-touch books, researchers such as Tarhini et al., (2019) highlighted factors such as (a) Partial IT integration enhances organizational knowledge creation, (b) University culture and politics is positively related to IT integration, and (c) integration of information technologies (IT) in academic institutions as being the keys to adoption. Scholars such as Allen et al. (2016) have called the integration of technology, such as multi-touch books, into the classroom "easy." When challenges were identified in the literature, it tended to be with respect to issues such as task focus (Schimitt & Weinberger, 2018). The results of this study, by contrast, suggest that one of the key issues with implementation and adoption may be simply providing proper introduction and tutorial. This is

especially true for graduate students and non-traditional students, as there is a common assumption in the literature that students will be more technologically adept than their teachers. Especially for older students, such as the graduate students in this study, that assumption is not necessarily well-founded and should be reevaluated.

Video and audio engagement. One of the key themes in this study was the value of the multimedia aspect of multi-touch books. This theme broadly aligns with the literature regarding the effects of multi-touch books on education and learning. For example, Makani et al. (2019) argued that the adoption and use of multi-touch books affects the modalities in which students learn. Researchers such as Allen et al. (2016) have also emphasized how non-traditional content within multi-touch books helps engage students who are not drawn to or influenced by the types of media included in traditional learning. Some researchers (e.g. Morris & Lambe, 2017) have addressed the idea that the utility of these multimedia aspects of multi-touch books may require particular academic support and depend on the technological adeptness of the school. By contrast, the findings of this study did not support the idea that students who were not familiar with multi-touch books required any special assistance or support using the multimedia aspects of the book. Instead, other aspects of the multi-touch books seemed to require better support, as per the prior theme. Furthermore, in this study, the students identified the utility of multimedia for not only meeting their own different learning-style related needs but providing a valuable example of how they could provide content that meets the learning style needs of their own students.

Relevance. The theme of relevance in this study was both related to the literature and somewhat unique with respect to it. While the idea of using technology being relevant and important in education today is somewhat ubiquitous within the literature reviewed (e.g. Greene,

2018; Makani et al., 2019; Raynard, 2017; Sanches, 2016), the perspective on relevance in the literature was usually from an institutional or instructor point-of-view. However, as it emerged in this study, the theme of relevance instead related to students' perspectives. The students not only felt that learning through a multi-touch book was a modern and relevant strategy, some also expressed that it helped them understand the relevance of such educational methods. Furthermore, some students reported that the interactivity and engagement of the multi-touch book helped them to better understand the relevance of educational content. They stated that it provided a more immersive grasp of educational leadership or helping them understand the importance of catering to their own students' preferred learning styles.

Technical challenges. Moving from student themes to student themes, the theme of technical challenges represents some degree of unique insight. For example, while Tarhini et al., (2019 spoke to the importance of IT issues, there was little discussion of the technological complications, such as different students having different or incompatible devices. Such specifics aside, the broad theme of technical challenges did align with the literature in that the technical capability and knowhow of teachers had not kept pace with that of technological innovation (Morris & Lambe, 2017; Pierard et al., 2019; Qazi et al., 2018). In this sense, although the students found more student-side technical barriers than expected, the teacher-side barriers were expected and aligned with the literature.

Difficulty starting. A specific issue related to but distinct from the prior theme was the specific challenges that teachers faced at the beginning. This represents a barrier to implementation, and the consensus in the literature does suggest that barriers to implementation hinder the utilization of technology in college classrooms (Morris & Lambe, 2017; Pierard et al., 2019; Qazi et al., 2018). However, the specific barrier of simply having no familiarity with the

technology, specifically multi-touch books, was shared between faculty and students. This ran contrary to the assumptions of the original problem statement, which presumed that faculty would have poor grounding in technology while students would have a strong understanding.

User Engagement

Subtheme: Ease-of-use. The ease-of-updating theme that arose from the faculty focus groups was a major theme that arose in this study, but which had no strong parallels within the existing literature. None of the prior studies referenced this specific utility of multi-touch books vis-à-vis traditional textbooks. It does, however, align with one of the key principles of connectivism as postulated by Siemens (2004). In particular, the fifth principle of connectivism is that accurate, up-to-date knowledge is the intent of all learning activities. To say that the potential of keeping more easily up-to-date for multi-touch books is an overlooked benefit might be premature—for example, it may be too inherent in the form for scholars to note it. Nonetheless, the theme is worthy of attention because it is arguably not obvious and represents a material advantage of multi-touch books when the many iterations of physical text are cumbersome. Moreover, given fast-moving real-world events like the currently ongoing epidemic of CoVID-19, there are times when educational policy and practice may need updates in the moment, as opposed to waiting months or—more likely—years for a new edition to include these key ideas.

Subtheme: interactive. The instructor theme of interactive engagement pertains to and is grounded in many of the same results in the literature as was the student theme of engagement. One of the key reasons identified for interactive engagement was multimedia content. This idea is hardly new; Elkhateeb et al. (2019), for example, spoke to the utility of multimedia content in improving students' interaction and engagement with course content. The alignment between the

student and teacher perceptions of this theme, however, strengthens it, supporting the issue from both sides. This consensus is important because scholars such as Mills (2016) have highlighted inconsistencies in terms of the potential benefits of utilizing multi-touch texts. The results of this study, at the very least, firmly support the utility and value of the multimedia content and interactivity entailed by multi-touch books.

Limitations of the Study

Despite the value added by this study, which is addressed through the interpretation of the findings above, there were also some notable limitations. These limitations must be addressed prior to deriving any key recommendations or implications from the study's findings. The first limitation is that the present study addressed only graduate students and instructors at a single university. Accordingly, the results cannot be generalized to a wider context. In particular, the use of a graduate student sample resulted in unique results, such as a stronger need for introduction and tutorial, that may or may or apply more widely. This sample, however, also has the advantages of evaluating a less studied subset of students. Another limitation of the study is that the results were primarily based on the students' experiences with a single iBook, *Educational Leadership and Policy.* Since several students explicitly addressed the particular iBook as being their first experience with a multi-touch book, it is not certain to what extent their perspectives on multi-touch books may have differed if their responses had been based on experiences with a wider array of multi-touch books. On the other hand, this circumstance also afforded the opportunity to examine the ways in which students' first encounter with a multi-touch book took shape.

Another limitation for the present study lies in the focus group format. Focus groups are a strong choice for data collection that seeks to detail communal sentiment, but they are less fully

appropriate for collecting data on individual sentiment. The results of the focus group may not fully reflect what a person would say individually. In more than one case, participants played off one another's responses, meaning they may well have been influenced by the sentiments expressed by others. This may be one reason why there was a surprising degree of consensus amongst the student focus group responses on each issue. The faculty focus group was significantly smaller and did not see the same similarity between different participants' responses. However, the communal perspectives of students are still relevant.

A final limitation of this study is that the data were gathered amongst only the students and faculty of a college of education. This helps to hone the specific implications of these results within the field of education. At the same time, some of the unique themes that emerged, such as the theme of relevance, may be reflective of the specific context of students at a college of education rather than being reflective of more widely held sentiments amongst all graduate students or faculty.

Significance of the Study

The significance of this Dissertation-in-practice extends beyond its appraisal of an interactive multi-touch book, *Educational Leadership and Policy*, as an effective delivery tool for faculty members in schools of education to improve student engagement and success. The study correlates the adoption of new learning technologies, such as multi-touch modality, as a way to improve student engagement and student success. The research builds on the current literature, which points towards adopting new learning technologies because of a digital tool's efficacy and unique capabilities rather than the role they play in effective teaching and learning (Grush, 2019). The data acquired from this sampled population in higher education sheds further light on the relevancy of multi-touch book capabilities, as well as the perceived impact the

modality has on effective teaching and learning. More precisely, the data added to the body of knowledge about the ways that multi-touch adoption in higher education does or does not meet student learning expectations and needs, thereby improving competencies with an ability to track engagement throughout a program.

Implications for Practice

Moving beyond the recommendations for further research, the present study has several key implications for practice. The first of these pertains to introductory materials. In this study, both students and teachers emphasized the need for better introductory or tutorial materials through which they could understand the features and limitations of multi-touch books. The participants of this study were graduate students who were possibly less technologically savvy than younger students. Nonetheless, the same students who reported initially struggling to understand multi-touch books also ultimately came to say highly complementary things about the medium. This suggests that there is a strong case to be made that schools and classes utilizing multi-touch books should not assume that all their students are technologically savvy. Instead, by creating introductory and tutorial materials that demonstrate the usage and features of multi-touch books, they can help inform both students and teachers who are unfamiliar with the medium.

Given that these introductory materials can likely be reused with modifications for future years, there is little argument to be made for *not* providing such instructional content if it could meaningfully improve the educational experience for even one student. The results of this study provide relatively strong support for the idea that it could do so. Furthermore, the illustration of such issues would not only help meet a need identified in this study, but it would also help students with aspects of multi-touch books that other studies have suggested may be problematic,

such as interface or navigation (Pierard et al., 2019). Furthermore, illustrating that multi-touch books can be functionally used in many of the same ways as traditional books while bringing unique advantages such as portability, easy searching, and multimedia content may help to convince students who are skeptical of multi-touch books that they, in effect, have nothing to lose through using one.

This implication extends further to teachers. The literature emphasizes how barriers to implementation may decrease teachers' effective use of technology in the classroom (Morris & Lambe, 2017; Pierard et al., 2019; Qazi et al., 2018). The strongest barrier identified in this study was a lack of familiarity with the form. Hence, the same instructional efforts that might help students understand what they get out of a multi-touch book could also help instructors understand those advantages and better position themselves to utilize them.

Another key implication of the study lies in the alignment of teacher and student perspectives on the role of multimedia in multi-touch books. Both students and teachers perceived that multi-touch books' inclusion of audio and video content could improve students' interest in and engagement with the content. One student noted that the multimedia aspects helped alleviate the feeling of the book's content being onerous schoolwork or an obligation. Although the results of this study are delimited to graduate education students and teachers, their comments offer strong support for the option and utilization of multi-touch textbooks as a valuable resource for improving students' interest in and engagement with course content.

Given the specificity of the present study, there are few broader theoretical implications to be drawn. The experiences and perceptions of the participants offer mostly practical insights into the utilization of multi-touch books as an effective approach for teaching graduate students in education. Still, the present study does affirm the theory of connectivity in particular, wherein

one of the theory's key principles is closely tied to the idea that multi-touch books are perceived as being up-to-date. Furthermore, advancing any of the lines of research indicated in the recommendations section above should help to develop and extent the key theoretical underpinnings of this study.

Recommendations for Future Research

Based on the results of the present study, several key recommendations for further research can be made. The first and strongest recommendation for further research is that future researchers should follow up on the theme of need for tutorial. This theme, which reflected a strong desire amongst students for more introductory material that explained the uses and functionality of the multi-touch book, had the least precedent in the literature. Further exploring this theme could take several forms. One approach would be to examine the extent to which undergraduate students, graduate students, and non-traditional students express this sentiment to understand whether better guidance for fully utilizing the features of a multi-touch book is a need specific to older students or a broader need. Another approach to this theme would be to further study the kind of introductory and tutorial content that students find most useful in learning to utilize multi-touch books.

Another avenue for further research might be to explore the theme of ease-of-use. In this study, students reported, after they had learned to use the multi-touch book, that they found several aspects of its use easy. This included aspects that other researchers have found students had difficulties with, such as interface and navigation. A fruitful direction to take this line of inquiry might be an attempt to better understand how and why students find a multi-touch book easy to use. Better understanding the design choices that influence these perspectives could allow the authors and designers of future multi-touch books to better suit students' needs. This line of

research would also help to fill an unmet need noted by one of the instructors in that the instructor felt there was no clear guidance on how to make a multi-touch book, what it should contain, etc. Research into these questions has a clear practical value for both students and teachers.

Another key direction for further inquiry may be to follow the ideas found in the relevance and up-to-date themes. The issues of relevance perceived by the students in this study could potentially be a function unique to utilizing multi-touch books within the discipline of education. However, at least one participant addressed the ability of multi-touch books to emphasize the relevance of content, not just learning styles. Hence, it would be interesting to know if students in other disciplines also view multi-touch books as increasing the perceived relevance of their course materials. Related to this is that teachers perceived multi-touch books could be more easily kept up-to-date, a sentiment echoed by at least one student. A study of multi-touch textbooks that examined whether or they are kept more up-to-date than physical textbooks through reviewing the frequency and nature of updates and other textual changes would be valuable. If this is true, then it represents a potentially key benefit of multi-touch textbooks that has not been strongly presented in the literature which could easily be overlooked.

A final recommendation for future study is to construct an experimental design. In this scenario, a more rigorous experiment would rely on random assignment of groups as a basis for obtaining two groups that are similar (Trochim, 2020). Of these, one group is assigned as the treatment, while the other is not, and the outcomes of both are observed. An experimental design would provide strong internal validity at assessing causal relationships with the use of multi-touch books in practice.

Summary

In conclusion, the purpose of the qualitative case study was to appraise the instructional effectiveness of multi-touch textbooks in schools of educations. Broadly speaking, the themes that emerged from the analysis of focus groups conducted with teachers and graduate students supported the effectiveness and value of the multi-touch textbook that was investigated. The key themes were *differences from traditional text, ease-of-use, need for tutorial, multimedia engagement,* and *relevance* for students and, for instructors, *technical challenges, difficulty starting*, *ease-of-updating*, and *interactive engagement.* Student themes skewed more positive than did instructor themes, in alignment with the expectations established in the literature. More unexpectedly, students and teachers were united in their desire for better introductory and tutorial content for the utilization of multi-touch books. This may be because the sample contained graduate students who were broadly older and less technologically inclined. Nonetheless, the importance of not assuming that students already know how to use technology effectively is a key takeaway, in addition to the need to better educate instructors.

Overall, both students and faculty agreed that a key advantage of multi-touch books was that their inclusion of multimedia content allowed for easier engagement with the subject matter. Although there are specific aspects of multi-touch book usage that need improvement, such as introduction and tutorial, this innovative form of textbook broadly seems to have many advantages that even appeal to students who prefer traditional texts.

Executive Summary

Multi-touch Books in Higher Education: *Educational Leadership and Policy*

Summary of Problem in Practice

A goal of higher education is to prepare students with future-ready skills needed in the modern workforce (Da Luz Dias, & Sales, 2017). College students have grown up in an increasingly digital world where post-modern learning is supported by independent activities and self-learning environments, with experimental learning opportunities and practical training (Greene, 2018; Makani et al., 2019; Raynard, 2017; Sanches, 2016). Today's learners rely on relevant pedagogy as they continue to post-secondary institutions where faculty play an increasingly important role in facilitating student cognitive skills related to the content (Da Luz Dias & Sales, 2017). Students enter college with expectations of learning that include the use of modern technologies and techniques, yet, he literature show that university faculty are less likely to integrate digital tools and media in the classroom due to perceived barriers to implementation (Morris & Lambe, 2017; Pierard et al., 2019; Qazi et al., 2018).

Institutions of higher education can address gaps in student expectations and faculty implementation through interventions, resources, services, and tools for students' access to learning, success, and retention (Harkins, 2016). As such, the researcher of this Dissertation-in-practice co-authored a multi-touch textbook, *Educational Leadership and Policy,* as a relevant tool for educators in schools of education. The researcher has also appraised the adoption of this modality as a way to provide key insights into its use instruction. The result of this has yielded

both a useable multi-touch book for colleges of education, as well as strategies for training, support, and ways to promote student engagement and their success in practice.

Although multi-touch textbooks exist across the educational landscape, there are gaps in knowledge about higher education adoption, implementation, and capabilities for faculty and students alike. As a result, this study created and appraised a multi-touch book to be used as a formation tool for educators, along with guiding data to effectively deploy this and other multi-touch books across the educational domain. *Educational Leadership and Policy* includes interactive media, contextual case studies, and assessments that are relevant to modern learning styles. Equally, the qualitative research study provides detailed findings confirming the problem in practices, as well as an effective instructional tool for Schools of education.

Summary of Major Research Findings in the Literature

In appraising multi-touch books in higher education, there were several themes that stood out as relevant to the study of the modality in education. The underpinnings of the study that formed the theoretical framework were contextualized as post-modern. Through this post-modern lens, interactive multi-touch books in education presume learning theories of Connectivism (e.g. Siemens, 2004) and the Connectivist Learning Model (Figures 1 & 2), Systems Theory (e.g. Bateson, 1972; Khan, 2018; Manturana, 1991), and postmodernism in the Information Age (e.g. Senge, 2006). The theories substantiate the need for contemporary modalities in education.

Connectivism and the Connectivist learning model. According to primary Connectivist theorist, Stephen Downes (2008), knowledge is distributed across *connections* and is created when information is sent from one connection, or "entity," to another. Learning, therefore, becomes the capacity to construct these connections and/or the capacity to traverse them (Downes, 2008). Similarly, knowledge is not acquired, nor is it a specific 'thing'; instead, it

is the growth and/or development of connections that elicit a change within the entity or entities (Downes, 2008). For Connectivists, anything that has the ability to connect can be thought of as a learning *thing* or a *node* (Downes, 2008; Perrin, 2005; Siemens, 2004; Siemens & Downs, 2009). For example, a person's mind would be considered a *learning node*, as a computer or society might (Downes, 2008; Perrin, 2005; Siemens, 2004). Connectivists find evidence of this in a society's, individual's, and computer's ability "to learn". As demonstrated in the table below connectivism is a key theory associated with learning domains (Siemens, 2005; Wilson, 1997).

Figure 2.

Learning Domain	Associated Theories	Traits	Percent of learning over a lifetime contributed by the domain
Transmission: Learning as instructor led courses, lectures, demonstrations	Behaviorism & Cognitivism	High organizational control over content and structure; Learning is mastering pre-determined objectives; developmental and formative learning occurs; formal learning	about 10%
Emergence: Learning as reflection and cognition	Cognitivism & Constructivism	High personal control over content and structure; Learning is learner constructed; personal learning and innovation occur; informal learning	about 1-2%
Acquisition: Learning as self-selected (e.g., exploring, experimenting, self-instruction, inquiry, satisfying a curiosity)	Constructivism & Connectivism	High personal control over content with some personal control over structure. Learning is learner motivated, collaborative; involves a variety of sources; group and needs-based learning occurs; informal learning	about 20%
Accretion: Learning as continual/embedded process; often subliminal or unconscious (e.g., accounting for learning of language, culture, habits, prejudices, social rules, behaviors)	Connectivism	High personal control over content with high organizational control over structure; Learning in a network; knowing-where to find information is valued; connection-making; informal learning	about 70%
Sources for content and percentages adapted from: Siemens, G. (2005). *Learning development model: Bridging learning design and modern knowledge needs*. Elearnspace. Retrieved July 24, 2007 from http://www.elearnspace.org/Articles/ldc.htm Wilson, L. O., (1997). *Types of learning*. Retrieved July 24, 2007 from http://www.uwsp.edu/education/lwilson/learning/typesofl.htm			

As such, connectivism frames the present study to understand the specific learning domains of acquisition and accretion using multi-touch books in higher education institutions. Better said, connectivism supports the use of multi-touch books as a modern and effective way to contribute to student learning domains of acquisition and accretion, which account for 20% and 70%, respectively, of learning over a lifetime (Siemens, 2005; Wilson, 1997). George Siemens (2004, 2009) asserts that modern technologies have been change agents for the 'democratization of knowledge' (Siemens & Downes, 2009). Therefore, multi-touch textbooks, as modern

technology, are included within the scope of the ‘democratization of knowledge’ described by Siemens (2009). It is important to note that Connectivists do not limit learning to formal settings; rather they subscribe to the idea of lifelong, informal learning. People learn "through communities of practice, personal networks, and the completion of work-related tasks" in an environment in which "know-how and know-what is being supplemented with know-where – or the understanding of where to find knowledge needed" (Downes, 2008; Perrin, 2005; Siemens, 2004). Thus, Connectivists view making connections, not content, as the beginning point for the learning process itself (Downes, 2008; Perrin, 2005; Siemens, 2004). Based on this understanding of connectivism, in this dissertation-in-practice (DiP), learning through the use of multi-touch books must be understood in consideration of how they facilitate the learning process by allowing the student to make connections.

Multi-touch books and iBooks. As stated earlier, developments in technology have led to digital expectations in education, which are found in the continued integration of new learning technologies in the classroom (Greene, 2018; Sanches, 2016). Similarly, Sun and Wu (2016) found that different teaching methods impact learning achievement. For this reason, new technologies similarly affect learning achievement. As related to this study, educational leaders are interested in the impact of multi-touch books on learning achievement and outcomes. Multi-touch interfaces have been found to be beneficial because they allow for direct and simultaneous input by learners and allow for hands-on learning experiences (Schmitt & Weinberger, 2018). Multi-touch technologies, such as Apple Books, are found to be both enjoyable by the learner and effective collaborative learning tools (Schmitt & Weinberger, 2018). Convenience has also been identified as a key benefit of eBooks (Casselden & Pears, 2019; Enis, 2018). Users of the multi-touch platform reported significantly more interactive and engaging experiences with their

content than the other eText users. Other studies have found that students overwhelmingly prefer a free, customized open-access text for use in their course, no matter what eText format is used (Grush, 2019).

iBooks. In this study, the researcher investigated the use and adoption of the Apple Books or an iBook, *Educational Leadership and Policy,* in higher education. In order to create a multi-touch iBook, the researcher defined, designed, and deployed techniques that embedded interactive content in the digital text format. The researcher examined the structure of multi-touch books with instructional guides on how to write and publish digital content using Apple's Books platform (Apple, 2019). It is important to highlight that Apple Books/iBooks are a specific product of Apple, Inc., which produces books as interactive media. The specificity of this product over other available multi-touch/eBook platforms may, therefore, be important to consider in this study.

Figure 4 below is an example of interactive content created for the Apple Book, *Educational Leadership and Policy*. NB Right-click the embedded media and select 'Play.'

Figure 4.

Example of media clip in 'Educational Leadership and Policy'

In this video narrative, the researcher interviewed James Guthrie, Ph.D., in San Francisco, California on various topics impacting educational leadership and policy (2019). The video series was produced, edited, and published by Frankie Mendez, Ed.D., for online educational purposes, including incorporation of the multi-touch book, '*Educational Leadership and Policy*.'

I. Context and Methodology of the Study

The research questions that inspired this study were:

1. How useful does the multi-touch book, *Educational Leadership and Policy* , serve as an instructional resource for faculty at Schools of education?

2. In what ways do students share views of the efficacy of the multi-touch book, *Educational Leadership and Policy?*

As previously noted, the basis for creating the iBook, *Educational Leadership and Policy*, was to provide a relevant learning tool that met student expectations and contributed to relevant student success. The goal of creating the iBook was to construct a usable multi-touch product for students that could be appraised as an effective tool for colleges of education. Further, the decision to create the Apple Book was inspired by the speed, efficiency, and access such a tool offers thanks to modern computing with vast access to immeasurably more interactive content. *Educational Leadership and Policy* is also a powerful tool for curating content in one modality as a resource for educators and students alike.

From an appraisal perspective, the researcher employed a qualitative method of audio-recording focus groups to investigate the why and how of the decision process in regard to an individual's experience using a multi-touch book, such as *Educational Leadership and Policy,* in a college of education.

Participants

The research participants included faculty and students at a college of education. Purposive sampling was conducted to secure participants from two homogenous populations: one comprising graduate-level faculty, and the other of students of the same faculty and convenient to the researcher. Participation in the study was voluntary. Care was taken to ensure that the focus group participants belonged to one of the two homogenous groups. The resulting focus group participants were comprised of seven faculty and eighteen doctoral students in a College of education.

Methodology

Audio-recorded interviews were conducted with focus groups over secure video conferencing with two homogenous samples of graduate-level students and faculty at a college of

education. The audio-recorded data were collected and analyzed in order to investigate the research questions as situated in the literature and presented in the findings from case study analysis. During the audio-recorded interviews, semi-structured questions were asked of the two groups, followed by case study data analysis of codes and themes as derived from their responses. The qualitative research appraised the effectiveness of multi-touch books in this unique setting.

The researcher created two separate lists of semi-structured questions for the faculty and student groups. The faculty audio-recorded interviews began with two delimiting questions to qualify the sample.

1. *Are you a Faculty at an institution of higher education?*
2. *Do you teach, taught or will teach in a School of education?*

The remaining faculty questions were structured to elicit as much feedback as possible on the use of multi-touch books. The semi-structured student questions were structured to elicit feedback on the multi-touch book, *Educational Leadership and Policy*, as it was recently used in graduate-level coursework. The questions were also structured to understand how the use of the multi-touch book might influence student engagement and success. Table 1 displays the semi-structured questions asked for both focus groups.

Table 1.

Semi-Structured Questions	
Faculty	1. Tell me about your experience using iBooks or other multi-touch books. a. Give me a sense of using iBooks in class. b. (If no experience) *Why might you not have experience with iBooks?* 2. Is there anything else you would like to share?
Students	1. Tell me about your experience using the multi-touch book, or iBook, *Educational Leadership and Policy.* 2. In what ways might this iBook have influenced your engagement in class? 3. How has this iBook influenced your grade? 4. Is there anything else you would like to share?

Summary of Results

The themes that emerged from the analysis of the focus groups conducted with both teachers and graduate students supported the effectiveness and value of multi-touch books in higher education, as used by students with *Educational Leadership and Policy*. Key themes were: *differences from traditional text, ease-of-use, need for tutorial, video and audio engagement,* and *relevance* for students and, for instructors, *technical challenges, difficulty starting*, *ease-of-updating*, and *interactive engagement.* Student themes skewed more positive than did instructor themes. Students and faculty were united in their desire for better introductory and tutorial content for the utilization of multi-touch books. The analysis found that the sampled students and faculty groups lacked prior knowledge of multi-touch technology and digital skills experience. Both groups expressed benefits of multi-touch books in education as the inclusion of multimedia content allowed for easier engagement with the subject matter. Further, there were specific aspects of multi-touch book deployment where faculty and student focus groups

expressed needs for improvement, including introductory trainings and tutorial. Apart from these needs, both student and faculty focus groups conveyed an interest in innovative forms of textbooks which broadly seemed to provide advantages and capabilities that appealed to even students preferring traditional texts.

Limitations and Recommendations

Despite the value added by this study, which is addressed through the interpretation of the findings above, there were notable limitations. These limitations must be addressed prior to deriving any key recommendations or implications from the study's findings. The first limitation was that the present study addressed only graduate students and instructors at a single university. Accordingly, the results cannot be generalized to a wider context. In particular, the use of a graduate student sample created unique results, including a stronger need for introduction and tutorial that may or may or apply more widely. This sample, however, also has the advantages of evaluating a less studied subset of students. Another limitation of the study was that the results were primarily based on the students' experiences with a single iBook, *Educational Leadership and Policy.* Since several students explicitly addressed the particular iBook as being their first experience with a multi-touch book, it is not certain to what extent their perspectives on multi-touch books may have differed if their responses had been based on experiences with a wider array of multi-touch books. On the other hand, this circumstance also afforded the opportunity to examine the ways in which students' first encounter with a multi-touch book took shape.

Recommendations for Future Research

Based on the actionable feedback of student respondents regarding the dissertation-in-practice product, *Educational Leadership and Policy*, minor changes were made to the iBook. These included adding author biographies and correcting minor spelling errors. Regarding the

study of multi-touch books as effective instructional tools in higher education, the study uncovered a need for assistance in practice with further research around the role of multi-touch trainings and/or tutorials. This theme was reflected as a strong desire amongst students for more introductory materials that explained its uses and functionality, particularly among older students. Faculty also expressed a need for trainings but extended this consideration to include trainings for the production of iBooks. One of the instructors felt there was no clear guidance on how to make a multi-touch book, what it should contain, etc. Research into these questions has a clear practical value for both students and teachers.

After having learned how to use the iBook, students found *Educational Leadership and Policy* "easy to use" with useful interfaces and navigation functionality. The literature, however, provided conflicting data. A fruitful direction may be to evaluate the how, why, and where students find a multi-touch book easy to use. Understanding multi-touch design choices appear to influence these perspectives and could allow authors and designers of future multi-touch books to best meet their students' needs.

A final key direction for further research and development in practice may be to follow the themes of *relevance* and *up-to-date*. The positive findings of relevance could be a function unique to utilizing multi-touch books within the discipline of education. However, at least one participant addressed the ability of multi-touch books to emphasize the relevance of content, not just learning styles. It would be interesting to know whether students in other disciplines experience multi-touch books as increasing the perceived relevance of their course materials. Related to this, teachers and students perceived multi-touch books to be more current and up-to-date than traditional text. The literature is lacking in this area, suggesting further evaluation of

the frequency and nature of iBook updates might yield further insights into the effectiveness of multi-touch books in higher education.

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APPENDIX A

Gateway to Study Participants

From: Dean Weigel

Subject: Research Study Opportunity: Interviews

Message: Dear College of education Faculty,

An Ed.D. Candidate is conducting a case-analysis study of iBooks/Multi-touch books in Higher Education. The researcher is looking for current faculty and student volunteers to gather data pertaining to iBooks/Multi-touch books in Colleges of Education. The researcher has allocated 15-minutes for anonymous audio-record interviews, which will then be transcribed for later review with his committee members. The interview is strictly voluntary and will remain confidential. If you are interested, please reach out to Jason Cascio, jcascio@email.mail.edu, or by phone at [redacted]. Below are additional about the study.

Thanks, Dean Weigel

Title: Research Study**:** Multi-touch books in Higher Education

Who: Graduate-level Faculty and Students in Schools of education who voluntarily opt-in to the study as informed participants.

What: Participating in 15-minute audio-recorded interview regarding the appraisal of multi-touch books in higher education.

Benefits and Risks: THIS INTERVIEW IS STRICTLY VOLUNTARY. This interview is completely anonymous. There are minimal risks, such as possible stress from answering questions regarding school issues. At any time, a participant can exit the interview and choose not to participate. Choosing not to participate will not affect

your role. There are no benefits. By participating in the study, you will be benefiting research in understanding interactive resources, like multi-touch books, in educational settings.

How to volunteer for the study:

Contact the researcher, Jason Cascio, by phone [redacted] or email jcascio@email.lynn.edu

APPENDIX B

Interview Procedure: Faculty Participants

Question 1 (a) Background and Informed Consent

The researcher will provide faculty with background of the study and an Informed Consent document for review and initial. The verbiage will include:

The purpose of the study is designed to review the efficacy of multi-touch books using case-study analysis with audio-recorded interviews. The audio-recorded interviews will be transcribed by the researcher and anonymously shared with the dissertation committee. This qualitative method was selected as a convenient way to gather sufficient data over a period of time to codify themes in the research process. The qualitative analysis will follow this interview of 1-2 semi-structured questions.

Specific Procedures

Your participation in this study will assist in learning more about the efficacy of interactive, multi-touch books in Higher Education institutions. You will be asked to answer questions about your opinions on your personal experience with the subject. **Duration of Participation and Compensation**

The total duration of your participation should be no longer than 15 - 20 minutes. There will be no compensation for participation.

Risks

This interview is strictly voluntary, and no penalty will be imposed for non-participation. There are minimal risks in participating in the interview. However, if you feel

uncomfortable or anxious at any time, you may press the "X" button in the upper right-hand corner of the interview and exit out of the interview.

Benefits

There are no benefits for answering the interview questions, however, you will be contributing to knowledge on the subject of multi-touch books as tools for higher education institutions.

Confidentiality

This interview is strictly anonymous and no identifying information about your role will be kept or available in the research. Your answers to questions will be stored for two years on a password protected computer and after that time will be deleted. This project's research records may be reviewed by departments at Lynn University responsible for regulatory and research oversight.

Contact Information

If you have any additional questions about the research project you may contact Jason Cascio by phone at [redacted] or email at jcascio@email.lynn.edu.

For any questions regarding your rights as a research participant, you may call Dr. Patrick Cooper, Chair of the Lynn University Institutional Review Board for Protection of Human Subjects, at (561) 237-7104 or pcooper@lynn.edu

Documentation of Informed Consent

A physical informed consent with the above verbiage and below consent is presented to the participant, including:

I have had an opportunity to ask questions about the research project and my questions have been answered. I am prepared to participate in the research study described above.

By checking "Agree" and signing, I am consenting to participate in this voluntary study.

<<Agree Signature_____>>

Study Delimitations Question 1(b)

I have a few demographic questions to help delimit the scope of the research.,

a.) Are you a Faculty at an institution of higher education? <<Yes or No>>

b.) Do you teach, taught or will teach in a School of education? <<Yes or No>>

Question 2.

Semi-structured question:

Tell me about your experience using an iBook or other multi-touch book?

Possible follow-up questions to understand the response to Question 2:

a) Give me a sense of your experiences using iBooks.

b) (If no experience) Why might you not have co iBooks

APPENDIX C

Interview Procedure: Students

Question 1 Background and Informed Consent

The researcher will provide students with background of the study and an Informed Consent document for review and initial. The verbiage will include:

The purpose of the study is designed to review the efficacy of a multi-touch books using case-study analysis with audio-recorded interviews. The audio-recorded interviews will be transcribed by the researcher and anonymously shared with the dissertation committee. This qualitative method was selected as a convenient way to gather sufficient data over a period of time to codify themes in the research process. The qualitative analysis will follow this interview of 1-2 semi-structured questions.

Specific Procedures

Your participation in this study will assist in learning more about the efficacy of interactive, multi-touch books in Higher Education institutions, and the appraisal of the iBook, Educational Leadership and Policy. You will be asked to answer questions about your opinions on your personal experience with the subject and use of the iBook.

Duration of Participation and Compensation

The total duration of your participation should be no longer than 15 - 20 minutes. There will be no compensation for participation.

Risks

This interview is strictly voluntary, and no penalty will be imposed for non-participation. There are minimal risks in participating in the interview. However, if you feel uncomfortable or

anxious at any time, you may press the "X" button in the upper right- hand corner of the interview and exit out of the interview.

Benefits

There are no benefits for answering the interview questions, however, you will be contributing to knowledge on the subject of multi-touch books as tools for higher education institutions.

Confidentiality

This interview is strictly anonymous and no identifying information about your role will be kept or available in the research. Your answers to questions will be stored for two years on a password protected computer and after that time will be deleted. This project's research records may be reviewed by departments at Lynn University responsible for regulatory and research oversight.

Contact Information

If you have any additional questions about the research project you may contact Jason Cascio by phone at [redacted] or email at jcascio@email.lynn.edu.

For any questions regarding your rights as a research participant, you may call Dr. Patrick Cooper, Chair of the Lynn University Institutional Review Board for Protection of Human Subjects, at (561) 237-7104 or pcooper@lynn.edu

Documentation of Informed Consent

A physical informed consent with the above verbiage and below consent is presented to the participant, including:

I have had an opportunity to ask questions about the research project and my questions have been answered. I am prepared to participate in the research study described above. By checking "Agree" and signing, I am consenting to participate in this voluntary study.

<<Agree Signature_____>>

Question 2.

Semi-structured question:

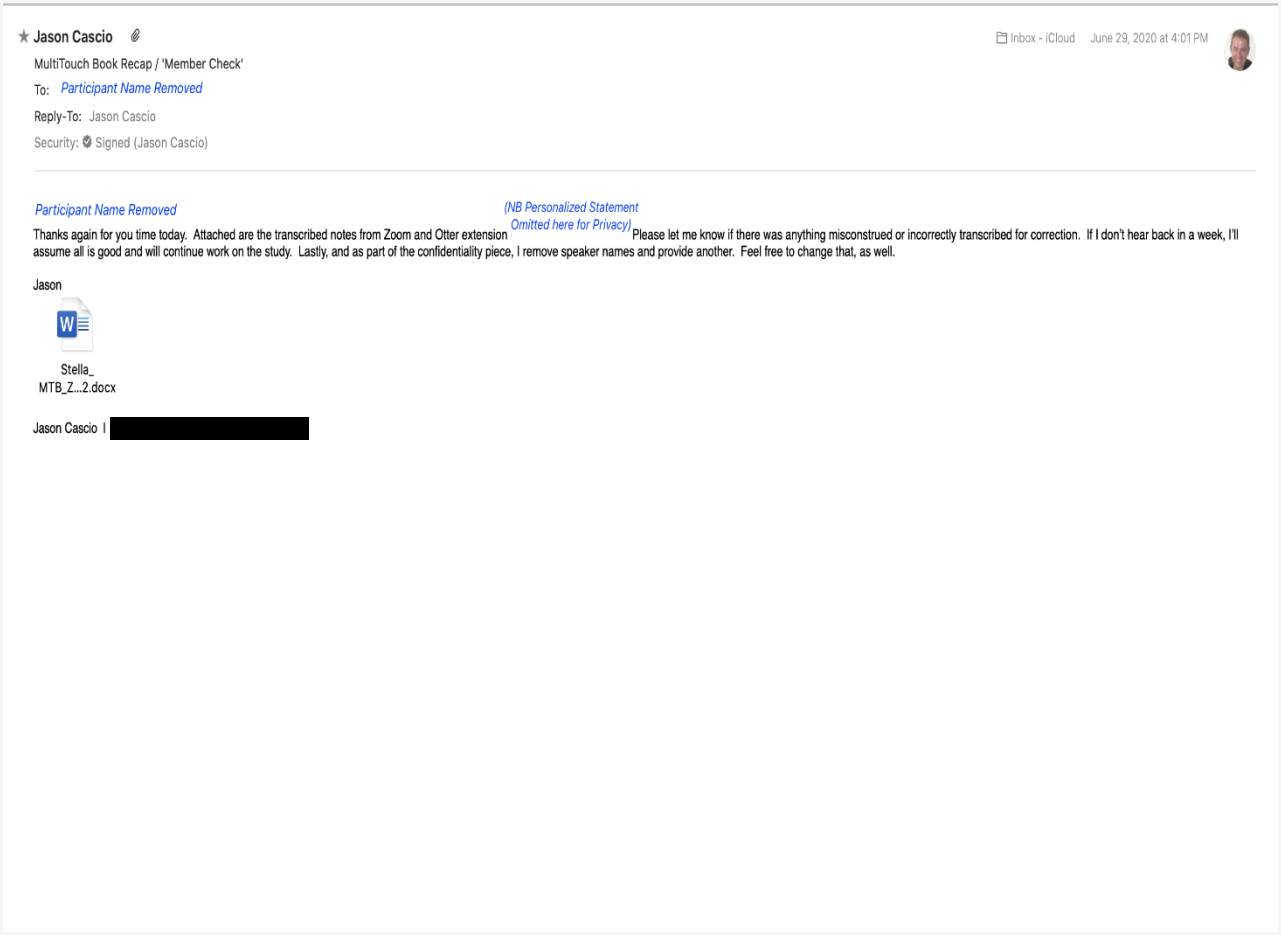
1. *Tell me about your experience using the multi-touch book 'Educational Leadership and Policy'.*
2. *In what ways has this iBook influenced your engagement in class?*
3. *How has this iBook influenced your grade?*
4. *Is there anything else you would like to share?*

APPENDIX D

Focus Group Member Check

- Sample email sent to members with note of appreciation and request to validate accuracy of transcribed audio-recorded interview

- Sample email includes an attachment with anonymized member name to ensure confidentiality



★ Jason Cascio

Inbox - iCloud June 29, 2020 at 4:01 PM

MultiTouch Book Recap / 'Member Check'

To: *Participant Name Removed*

Reply-To: Jason Cascio

Security: Signed (Jason Cascio)

Participant Name Removed

Thanks again for you time today. Attached are the transcribed notes from Zoom and Otter extension *(NB Personalized Statement Omitted here for Privacy)* Please let me know if there was anything misconstrued or incorrectly transcribed for correction. If I don't hear back in a week, I'll assume all is good and will continue work on the study. Lastly, and as part of the confidentiality piece, I remove speaker names and provide another. Feel free to change that, as well.

Jason

Stella_ MTB_Z...2.docx

Jason Cascio | [redacted]

Figure 1

Figure 1.

Engaging Students with Technology

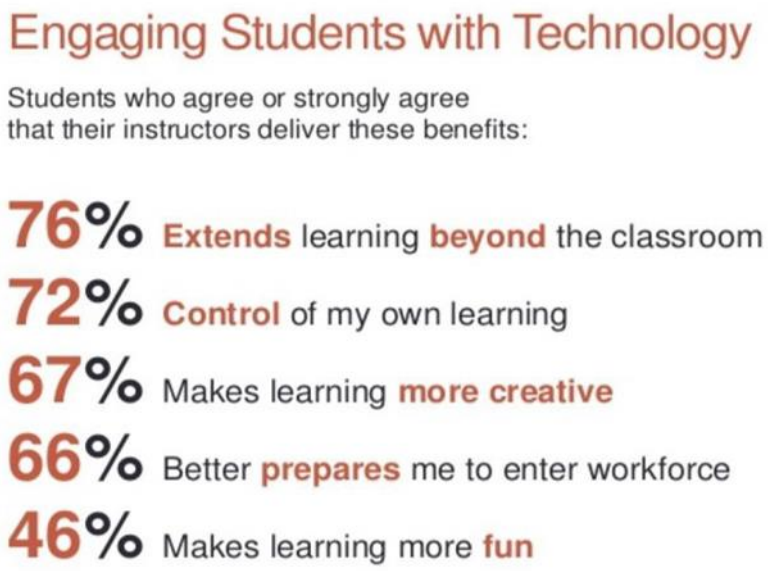
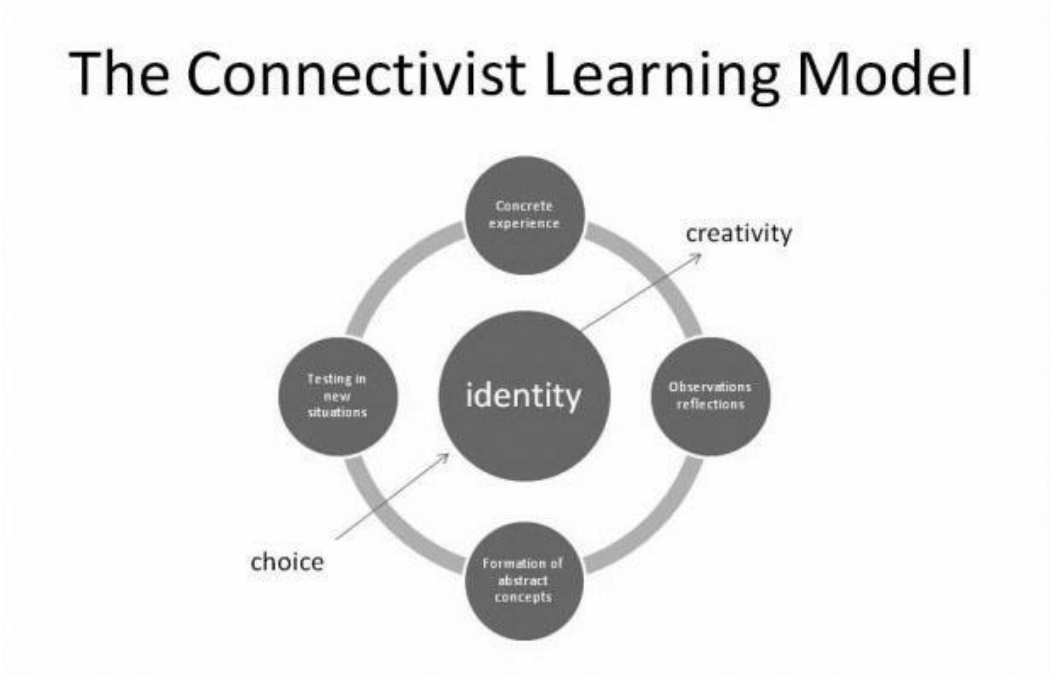


Figure 2

Theoretical Framework: Connectivist Learning Model

Figure 2.
[1] *Connectivist Learning Model*



[1] Figure 2 adapted from Steven Downes' video lecture to Kuopio, November 22, 2007

Figure 3

Learning Domains and Associated Theories

Figure 3.

Learning Domains and Associated Theories.

Learning Domain	Associated Theories	Traits	Percent of learning over a lifetime contributed by the domain
Transmission: Learning as instructor led courses, lectures, demonstrations	Behaviorism & Cognitivism	High organizational control over content and structure; Learning is mastering pre-determined objectives; developmental and formative learning occurs; formal learning	about 10%
Emergence: Learning as reflection and cognition	Cognitivism & Constructivism	High personal control over content and structure; Learning is learner constructed; personal learning and innovation occur; informal learning	about 1-2%
Acquisition: Learning as self-selected (e.g., exploring, experimenting, self-instruction, inquiry, satisfying a curiosity)	Constructivism & Connectivism	High personal control over content with some personal control over structure. Learning is learner motivated, collaborative; involves a variety of sources; group and needs-based learning occurs; informal learning	about 20%
Accretion: Learning as continual/embedded process; often subliminal or unconscious (e.g., accounting for learning of language, culture, habits, prejudices, social rules, behaviors)	Connectivism	High personal control over content with high organizational control over structure; Learning in a network; knowing-where to find information is valued; connection-making; informal learning	about 70%
Sources for content and percentages adapted from: Siemens, G. (2005). *Learning development model: Bridging learning design and modem knowledge needs*. Elearnspace. Retrieved July 24, 2007 from http://www.elearnspace.org/Articles/ldc.htm Wilson, L. O., (1997). *Types of learning*. Retrieved July 24, 2007 from http://www.uwsp.edu/education/lwilson/learning/typesofl.htm			

Figure 4

Interactive Content Sample from the Apple Book, *Educational Leadership and Policy*.

Figure 3.

Interactive Content Sample from the Apple Book, Educational Leadership and Policy.

NB Right click on the figure box and select ‘play’

Tables Findings (illustrated)

Table 1: Semi-structured questions asked for both student and faculty focus groups

Table 2: Student Focus Group Word Frequency by Question

Table 3: Semi-Structured Questions Posed to Focus Group Participants

Table 4: Cross Focus Group Analysis Codes by Question

Table 5: Major Themes and Sub-Themes of Multi-touch Books by Focus Group

Table 1

Semi-Structured Questions Posed to Focus Group Participants

Table 1.

Semi-Structured Questions		
Faculty	1.	Tell me about your experience using iBooks or other multi-touch books.
	a.	Give me a sense of using iBooks in class.
	b.	(If no experience) *Why might you not have experience with iBooks?*
	2.	Is there anything else you would like to share?
Students	1.	Tell me about your experience using the multi-touch book, or iBook, *Educational Leadership and Policy.*
	2.	In what ways might this iBook have influenced your engagement in class?
	3.	How has this iBook influenced your grade?
	4.	Is there anything else you would like to share?

Table 2

Student Focus Group Word Frequency by Question

Table 2.

Student Focus Group Word Frequency by Question

Student Focus Group Word Frequency – Question 1	*Student Focus Group Word Frequency – Question 2*
Student Focus Group Word Frequency – Question 3	*Student Focus Group Word Frequency – Question 4*

Table 3

Semi-Structured Questions Posed to Focus Group Participants

Table 3.

Student and Faculty Focus Group Word Frequency – All Questions

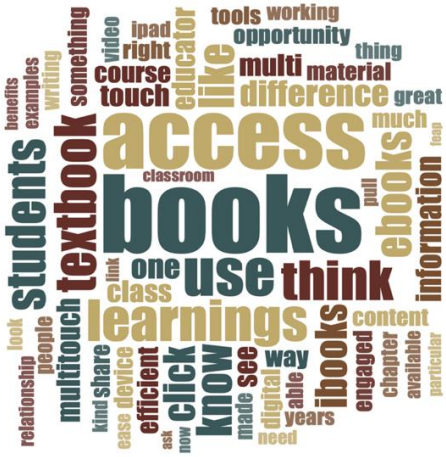
Student Focus Group Word Frequency – All Questions	*Faculty Focus Group Word Frequency – All Questions*
	

Table 4

Cross Focus Group Analysis Codes by Question

Table 4.

Cross Focus Group Analysis

Focus Group Questions	Faculty Focus Group	Student Focus Group
Tell me about your experience using multi-touch books.	Access, books, ability, opportunity, learnings, difference, students, textbooks, educator, efficient, engaged, benefits, relationships, digital, functionality, tech, interactive, content	Like, using, difference, technical utility, learning, digital, access, tutorial, training, experience, traditionalist, interactive, experienced, highlight, note-taking, visual, functionality, technical, books, multimedia
In what ways might multi-touch books influence student engagement?	Not Applicable	Engagement, learning, digital, access, difference, interactive, enhance, engagement, functionality, multimedia, videos, learning, personal, modalities, case studies
How might multi-touch books influence your grade?	Not Applicable	Encouraged, learning, parts, interactive, Socratic,

		teaching and learning, engagement, functionality, technical, embedded, multimedia, videos, personal, modalities
Is there anything else you would like to share?	Access, books, ability, interactive, engaged, difference, eTexts, technical, challenge, opportunity, students, starting, update, ease-of-use, eBooks, educator, inexpensive, engaged, benefits, relationships, digital, functionality, tech, interactive	Relevant, learning, teach, practice, use interactive, teaching and learning, practice, education, engagement, functionality, technical, multimedia, videos, personal, modalities

Table 5

Major Themes and Sub-Themes of Multi-touch Books by Focus Group

Table 5.
Major Themes

Major Themes and Sub-Themes of Multi-touch Books by Focus Group	
Students Findings	1. Differences from traditional text a. Highlighting b. Note-taking 2. Ease-of-use 3. Need for training / tutorial 4. Multimedia Engagement 5. Relevance
Faculty Findings	6. Technical Challenges 7. Difficulty Starting 8. User Engagement a. Ease-of-use, update b. Interactive Engagement

APPENDIX E

Focus Group Word Frequency

Table 2.1

Student Question Word Frequency

Word	Length	Count	Weighted Percentage	Similar Words
learning	8	27	4.82%	learn, learned, learning, learnings (also pedagogy)
engagement	17	30	3.86%	engaged, engagement
interactive	11	13	2.32%	interactions, interactive
personal	8	10	1.79%	personal, personalized
media	5	10	1.79%	media (also multimedia)
audio	5	9	1.61%	audio (also multimedia)
experiences	11	9	1.61%	experience, experiences
books	5	9	1.61%	book, books
video	5	8	1.43%	video, videos (also multimedia)
differences	11	8	1.43%	difference, differences, different
modern	6	7	1.25%	modern
content	7	7	1.25%	content
helpful	7	7	1.25%	helped, helpful, helping (or liked, benefited)
studies	7	6	1.07%	studies, studying
like	4	6	1.07%	like, liked (or benefited, helped)

iBook	5	6	1.07%	iBook (also stated as eBook)
focus	5	6	1.07%	focus
reading	7	6	1.07%	read, reading
contextual	10	6	1.07%	contextual, contextualize, contextualized, contextually
class	5	5	0.89%	class
case studies	4	5	0.89%	case studies
digital	7	5	0.89%	digital, digitally
provides	8	4	0.71%	provide, provided, provides
material	8	4	0.71%	material
found	5	4	0.71%	found
access	6	4	0.71%	access
work	4	3	0.54%	work
visual	6	3	0.54%	visual
think	5	3	0.54%	think
retention	9	3	0.54%	retention
retain	6	3	0.54%	retain
resourceful	11	3	0.54%	resourceful (in terms of technical utility)
really	6	3	0.54%	really
future	6	3	0.54%	future
enthusiasm	10	3	0.54%	enthusiasm
emotions	8	3	0.54%	emotions
dialogue	8	3	0.54%	dialogue
context	7	3	0.54%	context
connections	11	3	0.54%	connections
texts	5	3	0.54%	text, texts
technical	9	3	0.54%	technical, technically
shared	6	3	0.54%	shared, shares

finds	5	3	0.54%	find, finds
enjoyable	9	3	0.54%	enjoy, enjoyable (also liked, benefited)
enhanced	8	3	0.54%	enhance, enhanced
concurs	7	3	0.54%	concurred, concurs
combines	8	3	0.54%	combination, combines
technologies	12	2	0.36%	technologies, technology
teaching	8	2	0.36%	teaching
style	5	2	0.36%	style, styles
socratic	8	2	0.36%	socratic (in terms of learning style, pedagogy)
richer	6	2	0.36%	richer (in terms of multimedia)
reference	9	2	0.36%	reference
piece	5	2	0.36%	piece, pieces
philosophy	10	2	0.36%	philosophy
overcome	8	2	0.36%	overcome
old	3	2	0.36%	old
now	3	2	0.36%	now
narratives	10	2	0.36%	narratives
method	6	2	0.36%	method
literacy	8	2	0.36%	literacy
level	5	2	0.36%	level (as used in context of advancement)
learners	8	2	0.36%	learners
leaders	7	2	0.36%	leaders (as used in context of case studies)
know	4	2	0.36%	know (also learning, pedagogy)
influence	9	2	0.36%	influence, influenced
include	7	2	0.36%	include

impact	6	2	0.36%	impact, impacted (also helped, benefited)
features	8	2	0.36%	features
elements	8	2	0.36%	elements (also technical utility)
electronic	10	2	0.36%	electronic, electronics
earlier	7	2	0.36%	earlier
distracted	10	2	0.36%	distracted, distraction
depth	5	2	0.36%	depth
deeply	12	4	0.36%	deeply, deeper (or more profound in terms of learning)
compared	8	2	0.36%	compared, compares
brought	7	2	0.36%	brought
beneficial	10	2	0.36%	beneficial (also helpful)
assigned	8	2	0.36%	assigned, assignment
apply	5	2	0.36%	apply
agree	5	2	0.36%	agree
adds	4	2	0.36%	adds
yields	6	1	0.18%	yields
writing	7	1	0.18%	writing
view	4	1	0.18%	view
versus	6	1	0.18%	versus
valuable	8	1	0.18%	valuable (also beneficial, helpful in terms of multimedia)
types	5	1	0.18%	types
traditional	11	1	0.18%	traditional
touch	5	1	0.18%	touch
tools	5	1	0.18%	tools (also multimedia)
together	8	1	0.18%	together

times	5	1	0.18%	times
things	6	1	0.18%	things
techniques	10	1	0.18%	techniques
taught	6	1	0.18%	taught (also pedagogy)
talked	6	1	0.18%	talked
support	7	1	0.18%	support
struggle	8	1	0.18%	struggle
states	6	1	0.18%	states
starting	8	1	0.18%	starting
someone	7	1	0.18%	someone
simple	6	1	0.18%	simple
sentence	8	1	0.18%	sentence
scenarios	9	1	0.18%	scenarios (also multimedia)
right	5	1	0.18%	right
responses	9	1	0.18%	responses
researcher	10	1	0.18%	researcher
reread	6	1	0.18%	reread
represents	10	1	0.18%	represents
remember	8	1	0.18%	remember
professor	9	1	0.18%	professor
prior	5	1	0.18%	prior
present	7	1	0.18%	present
powerful	8	1	0.18%	powerful
positively	10	1	0.18%	positively
pedagogy	8	1	0.18%	pedagogy
paragraphs	10	1	0.18%	paragraphs
paper	5	1	0.18%	paper
outcomes	8	1	0.18%	outcomes
online	6	1	0.18%	online
obstacles	9	1	0.18%	obstacles

objectives	10	1	0.18%	objectives (also expectations)
notes	5	1	0.18%	notes (also multimedia)
multimedia	10	1	0.18%	multimedia (also, audio, video, links, scenarios)
looking	7	1	0.18%	looking
literally	9	1	0.18%	literally
later	5	1	0.18%	later
interpersonal	13	1	0.18%	interpersonal
interesting	11	1	0.18%	interesting
instructor	10	1	0.18%	instructor
increased	9	1	0.18%	increased
inclusion	9	1	0.18%	inclusion
improved	8	1	0.18%	improved
important	9	1	0.18%	important
illustration	12	1	0.18%	illustration (also multimedia)
greater	7	1	0.18%	greater
good	4	1	0.18%	good
format	6	1	0.18%	format
felt	4	1	0.18%	felt
feel	4	1	0.18%	feel
everyone	8	1	0.18%	everyone
especially	10	1	0.18%	especially
escape	6	1	0.18%	escape
equates	7	1	0.18%	equates
embedded	8	1	0.18%	embedded (also interactive and multimedia)
either	6	1	0.18%	either
educational	11	1	0.18%	educational (also pedagogy, relevant)
eBook	5	1	0.18%	eBook
easily	6	1	0.18%	easily

difficulty	10	1	0.18%	difficulty
dealing	7	1	0.18%	dealing
cool	4	1	0.18%	cool (also technical utility, multimedia)
contrasts	9	1	0.18%	contrasts
consumed	8	1	0.18%	consumed
challenges	10	1	0.18%	challenges
better	6	1	0.18%	better
aspect	6	1	0.18%	aspect
approach	8	1	0.18%	approach
analysis	8	1	0.18%	analysis
analogy	7	1	0.18%	analogy (also multimedia as referred to embedded cases)
actual	6	1	0.18%	actual
academic	8	1	0.18%	academic
ability	11	2	0.18%	ability, able (also capacity, capable)
Count	1212	439	36.22%	Most used words in student question 2

APPENDIX F

Focus Group Thematic Clustering

Table 5

Faculty Focus Group Coding

Source	Category	Category Title	Marked Text
Faculty Verbatim Narratives	RQ1-1	Utility	appreciate its functionality
	RQ1-1	Utility	interactive qualities
	RQ1-1	Utility	tools
	RQ1-2	Instructional Relevance	see how the students light up with the material
	RQ1-2	Instructional Relevance	students learn
	RQ1-3	Instructional Scope	students learn differently
	RQ1-2	Instructional Relevance	powerful way to get information across
	RQ1-3	Instructional Scope	powerful way to get information across
	RQ1-1	Utility	powerful way to get information across
	RQ1-2	Instructional Relevance	powerful way to get information across
	RQ1-1	Utility	flexibility
	RQ1-3	Instructional Scope	accessible to them, their style
	RQ1-1	Utility	assimilate the learning
	RQ1-1	Utility	learn and apply
	RQ1-3	Instructional Scope	access to material in the future
	RQ1-2	Instructional Relevance	embed learnings
	RQ1-1	Utility	great tools
	RQ1-1	Utility	benefits of multi-touch formats
	RQ1-3	Instructional Scope	content is up-to-date
	RQ1-3	Instructional Scope	expanding the boundaries

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